

Chapter 5

The Categories of Understanding**§ 1. Transcendental Logic**

Concepts are rules for the reproduction of intuitions in sensibility. Without the contribution of concepts going into their makeup, intuitions are mere representations of an undetermined object and no understanding attends their representation in sensibility. Nor is such an undetermined object real. This is because of the Critical definition of what it means for something "to be real." No object is real (to the Organized Being) unless that object has been re-presented in a concept and that concept has been combined (by the process of determining judgment) with other concepts that provide it with a *context*. Furthermore, somewhere in this **manifold of concepts** there must be some concept that contains information pertaining to *sensation* and allowing for its *sensuous* reproduction via the synthesis of imagination. Sensation is the effect in sensibility corresponding to the matter of a transcendental object that is held-to-be the cause of this effect. For this reason, Kant often referred to this matter as **the real in sensation**.

The functions of combination in determinant judgments are called **the categories of understanding**. The categories are pure primitive notions, i.e., pure knowledge *a priori* (know-how) for *the construction of concepts*, and they themselves cannot be represented *as themselves* in any sensuous intuition. Because they are the fundamental primitives of the theoretical Standpoint, they cannot be deduced from any more-fundamental notions, require a **practical Realdefinition**, and can never be explained by an ontological *Realerklärung*. Indeed, *they define ontology*.

We must also clearly understand what is meant by the phrase "construction of concepts" in the context of the process of determining judgment. We will soon see that a concept is a more complex structure than its practical explanation as "a rule for the reproduction of intuition" might initially seem to imply.

The doctrine that contains the theory of concepts is called **transcendental Logic**. Transcendental Logic is not, as some scholars think, a special application of the general formal logic of Kant's day (neither the Port Royal logic nor the logic of the Scholastics). Nor did Kant deduce his transcendental Logic from general logic, although he did use formal logic to provide the "clue" to discovering it [KANT1: B91-94]. Transcendental Logic is not "the rules for how we ought to think"; it is the Logic of how we, as Organized Beings, *do* think. The elements in it are, one and all, strictly those sanctioned by Critical epistemology as *necessary for the possibility of experience* as human beings know experience. Kant explained the need and role of transcendental Logic in the following way:

General logic abstracts . . . from all contents of cognition, i.e. from any reference to the Object, and considers only the logical form in the relationships of cognitions to one another, i.e., the form of thinking in general. But now since there are pure as well as empirical intuitions (as the transcendental aesthetic has set forth), a distinction between pure and empirical thinking of objects could also well be found. In this case there would be a logic given in which one did not abstract from all contents of cognition: for that one, which contained merely the rules of the pure thinking of an object, would exclude all those cognitions that were merely of empirical content. It would concern the source of all our cognitions of objects so far as that cannot be ascribed to the objects; while general logic, on the contrary, has nothing to do with this source of cognition, but rather considers representations, whether they are originally given *a priori* in themselves or only empirically, merely in regard to the laws according to which understanding brings them into relationship to one another when it thinks, and therefore it deals only with the form of understanding, which can be provided to the representations wherever they may have originated.

And here I make a remark, the influence of which extends to all of the following considerations and that one must keep well in view, namely: that not all knowledge *a priori* must be called transcendental, but only that by means of which we know that and how certain representations (intuitions or concepts) are applied entirely *a priori* or are possible (i.e., the possibility of cognition or its use *a priori*) . . .

Accordingly, in the expectation that perhaps it can give notions that might refer *a priori* to objects - not as pure or sensible intuitions but rather merely as acts of pure thinking, that are therefore notions but of neither empirical nor aesthetic origins - we then make to ourselves beforehand the Idea of a science of pure understanding and ideas of reason, by which we think objects fully *a priori*. Such a science, which determines the origin, scope, and objective validity of such knowledge, would have to be called *transcendental Logic* because it merely has to do with the laws of understanding and reason, but exclusively so far as it is relative to objects *a priori* and not, like general logic, to the empirical as well as pure ideas of reason without distinction. [KANT1: B79-82]

The categories are one piece – and a bedrock, primitive piece – of Kant's transcendental Logic but, as we are about to see, they are not the only piece of it. Mark well Kant's words that here we are dealing with *the laws of understanding and thinking*. Human beings do not need to be taught how to think (although we benefit from being taught how to think with precision and rigor, and this is what the teaching of formal, mathematical logic aims to achieve). The phenomenon of thinking is another of those base characteristics of human experience, and transcendental Logic deals with how thinking works and what mechanisms of thinking are required for thinking itself to be possible for us in the first place. As we are about to see, this transcendental Logic also takes in account the **power of imagination** as well as the synthesis of apprehension.

The discussions that follow are made from the theoretical Standpoint of Critical metaphysics. This is the Standpoint that deals with the power of understanding as the *organized* faculty of objective empirical knowledge. These discussions will also move across four different reflective perspectives (all from the theoretical Standpoint). A reflective perspective is a perspective from which philosophical ideas are evaluated in regard to Critical metaphysics proper. Each perspective takes up its viewpoint according to one of the four titles of metaphysics proper: (1)

the logical perspective for Rational Physics; (2) the transcendental perspective for Rational Psychology; (3) the hypothetical perspective for Rational Cosmology; and (4) the empirical perspective for Rational Theology. We will find that the *Realdefinition* of the categories calls upon *the practical interpretation of their functions* as these functions must be *viewed* from Rational Physics (for the understanding of objects of outer sense), Rational Psychology (for the understanding of objects of inner sense), Rational Cosmology (for the understanding of Nature), and Rational Theology (for the understanding of Reality).

§ 2. The Synthesis of the Manifold of Concepts

We will begin by means of an example, Figure 5.2.1, that serves to illustrate the nature of the processes of thinking and making determinant judgments. It also illustrates the noetic factors that are involved in this process of synthesis. In Figure 5.2.1(A) an intuition has been marked (by the process of reflective judgment) in sensibility *and* this same reflective judgment has stimulated the placement of a new concept in the manifold of concepts by means of the synthesis of re-cognition through the power of imagination. It must here be emphasized that it is the *intuition* that is the conscious representation. The *concept* is merely a rule for reproducing this intuition in sensibility.

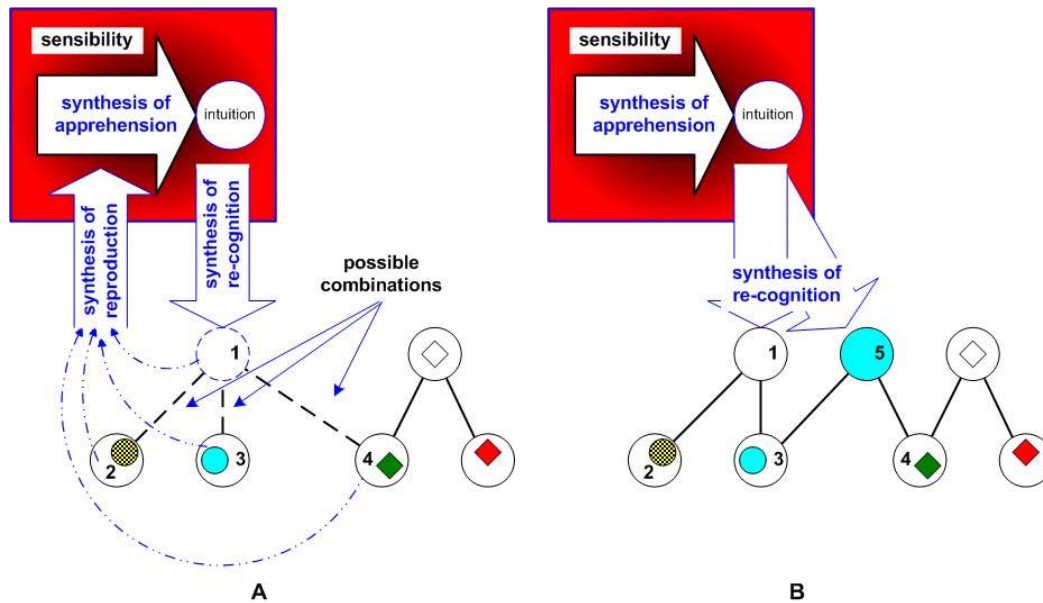


Figure 5.2.1: The making of determinant judgments. (A): An intuition is transformed into concept (1) by the synthesis of re-cognition in imagination. This concept is initially undetermined. The transformation by imagination also associates other concepts already placed in the manifold of concepts (2, 3, and 4) with the new concept. These concepts, as well as the new concept, are summoned back into the synthesis of apprehension in sensibility by the synthesis of reproduction in imagination. New intuitions are marked from the synthesis of apprehension. (B): The cycle continues until combinations for concept (1) have been determined. During the process other new concepts (5) can also be produced and combined. These combinations are signified by the solid lines, which represent determinant judgments represented by the categories of understanding. *Any set of concepts connected via the categories is also a concept.*

This new concept (1) is not yet determined. In the terminology of transcendental Logic, this concept is the product of an **inference of judgment** (specifically, reflective judgment). It contains the information needed for it to be capable of reproducing the intuition through the synthesis of reproduction by the power of imagination (and note that 'containing the information' is not the same thing as 'being a copy of the intuition'; the latter would be a form of the refuted copy-of-reality hypothesis). But concept (1) at this stage of the synthesis has no **context**. It is linked to sensibility solely through the rules of transformation in imagination, and these rules are called the **transcendental schemata**. Put another way, the process of imagination *schematizes* an intuition to produce (re-cognize) the representation of the rule of reproduction (the concept). The concept represents the intuition but, being without context, has no *real object* for its representation.

However, if there are other concepts (2, 3, and 4) already in the manifold of concepts that share *the same link to sensibility* (the same transcendental schematization) as concept (1), the same act of reproductive imagination in summoning concept (1) back into the synthesis of apprehension is likewise a summoning of these other concepts. *Concepts in the manifold of concepts linked to sensibility by the same transcendental schemata constitute an aggregation of possible materia for apprehension*. This is the first law and condition for the synthesis of determinant judgments. It is this aggregate as a whole that is swept up into the synthesis of reproduction, and this is the source of the comparates for the synthesis of *Comparison* in the *Verstandes-Actus* of the synthesis of apprehension. This is denoted by the dashed blue lines shown in the figure. These are the concepts constituting the *possible context* for concept (1) in the manifold of concepts.¹

The next round in the synthesis of apprehension and reflective judgment produces a new intuition in which some part of the aggregate of comparates, including contributions from concept (1), survive to become the *materia in qua* of the next intuition. This intuition, undergoing another synthesis of re-cognition (which does not necessarily produce the same transcendental schematization as before) now establishes (through the transcendental schemata) which concepts in the manifold "go into" the context of concept (1), and these are the concepts that will be combined by the process of determining judgment in the manifold. The combination will be made according to *rules specific to the transcendental schemata* of the second re-cognition. These rules are the categories of understanding, and the determinant judgment under the rule of the categories

¹ It will sometimes be the case (and frequently the case early in life) where a concept (1) shares no common linkage via the transcendental schemata with any other concept, or that the other concepts in the aggregation cannot be combined with concept (1), i.e. do not survive the synthesis of the *Verstandes-Actus* when summoned, along with concept (1), back into the synthesis of apprehension. In this case, concept (1) remains undetermined (without context) for as long as this condition continues. However, it is still a concept (still capable of reproducing its singular intuition); we will call such a concept a **root concept**.

is depicted by the solid lines in Figure 5.2.1(B). The manifold of concepts has undergone an accommodation by which concept (1) is assimilated into the manifold.

In Figure 5.2.1(B) we suppose this final equilibrium in the cycle is achieved by combining concept (1) with concepts (2) and (3); concept (4) did not survive the synthesis of apprehension to become part of the *materia in qua* of intuition. Concept (1) is now said *to understand* concepts (2) and (3), i.e., it is now a **mark** of concepts (2) and (3) and is said to be **contained in** these lower concepts. Likewise, concepts (2) and (3) are said to *stand under* concept (1) and to be **contained under** concept (1). Furthermore, *the combination of concepts (1-2-3) is now also a concept* because this combination is itself a rule for the reproduction of an intuition. The determinate judgment that results from this cyclic process (called **the free play of imagination and understanding**) is called an **inference of reason** because the overall process is regulated by pure speculative Reason (see Figures 1.5.1 and 3.4.1 or Figure 5.3.1 below).

But this is not all. Concept (4) did not contribute to the *materia in qua* of the equilibrium intuition, but this does not mean it cannot become part of the *materia in qua* of *another* intuition. When we discussed the transcendental aesthetic of time in Chapter 3, it was noted that the pure intuition of time is a timescape in which many intuitions are presented. In this case, concept (4) is assumed (in this example) to have joined in with other comparates in producing a second intuition that is subsequently re-cognized in imagination as a new concept (5). In this case, determined combination of concepts (3) and (4) are the immediate result standing under concept (5). This case of determinant judgment is called an **inference of understanding** because the synthesis of concept (3-4-5) emerged as an unlooked-for accident in the free play of imagination and understanding in which the immediate regulation of determining judgment by speculative Reason played no part. The determinant judgment once again is synthesized under the rule of the categories, although not necessarily the same categories (rules) applied to concept (1).

We may note four titles of representative relationships from the transcendental reflective perspective established in connecting the concepts in the manifold. The overall process of the synthesis establishes: (1) association of concepts, which is an idea of Quantity; (2) compatibility between concepts combined in the process (this combination is represented by the solid connecting lines in the figure), which is an idea of Quality; (3) transcendental anticipation, which is illustrated by the manner in which concepts were summoned as comparates in the synthesis of reproduction and which is an idea of Relation; and (4) formal expedience in the connections of concepts to form the manifold, which is an idea of Modality. As we will see later, these properties are grounded in the functions of the categories when these primitive notions are understood in the context of the transcendental reflective perspective.

This example illustrated the process using only one explicit cycle of {apprehension → imaginative re-cognition → reproduction → apprehension → imaginative re-cognition} for concept (1). However, such a one-cycle synthesis is not necessarily sufficient to come to the equilibrium needed for the act of determining judgment. It is possible that many such cycles must be carried out – each producing a partial context and possibly even summoning additional concepts from the manifold into the process – before the condition of equilibrium is finally met up with. The cyclic process that is the free play of imagination and understanding can become very complicated before equilibrium is achieved *or* the cycle itself is ruptured and abandoned. It should be noted that *receptivity* is not at rest during the synthesis of apprehension and so the inclusion of additional *materia* due to receptivity in the synthesis is also possible.

There is one final note we must make before finishing with this example. It can be very tempting, in viewing Figure 5.2.1, to fall into thinking that, because the different representations in the figure illustrating the concepts, intuition, and synthetic processes are placed in different locations, the transformations illustrated therein correspond to different physical locations in the brain (i.e. that representations are *transported* from place to place during the process). This is ungrounded supposition. Transformation is not the same thing as transportation. For example, in mathematical neural network theory there are many different forms of information, including individual neural signals, synaptic efficacies, metabotropic changes in cell behaviors, and many others. Nothing in the mathematical theory of *nous* corresponds directly or immediately (at our present state of knowledge) to empirical somatic occurrences. To fall into thinking about Figure 5.2.1 in terms of "atoms" of representation being somehow *physically* transported around from place to place is to fall victim to one's lifetime habit of ontology-centered thinking, a habit all of us are prone to fall into from a lifetime of developed *habits of thinking*. Lurking inherent in this mistaken way of envisioning Figure 5.2.1 is that most stubborn of metaphysical prejudices, the copy-of-reality hypothesis. One must always be on guard against losing one's epistemology-centered focus and falling back into the habits of an habitual but failed pseudo-metaphysic.

§ 3. Imagination and the Transcendental Schemata

Kant used three technical terms in his discussions of imagination. These were *Einbildung* (imagination), *Einbildungskraft* (power of imagination), and *Imagination* (Imagination). All three terms are somewhat close in connotation to the usual first dictionary definitions of imagination: (a) the act or power of forming mental images of what is not actually present; or (b) the act or power of creating mental images of what has never actually been experienced, or creating new images or ideas by combining previous experiences; creative power. Nonetheless, we must also

take regard of the need for a certain metaphysical cautiousness in understanding the phenomenon of imagination (which is what the dictionary definitions describe). The use of such phrases as "what is not actually present" in the dictionary definition should warn us that our typical use of the word "imagination" carries in it some presuppositional ontological baggage.

The term **Imagination** means *the purposive employment of the power of (productive) imagination in reasoning and judgmentation*. The process of determining judgment is a substructure within the overall structure of *nous* and this process is tasked with finding particular concepts to subsume under general ones provided via reflective judgments. The act of subsuming is what is denoted by the solid lines joining the concept nodes in the graph of the manifold of concepts illustrated in Figure 5.2.1 above. There are a couple of fine points for us to consider when we juxtapose this functional definition of determining judgment with the process illustrated by the example in the previous section.

The first of these comes out of the phrase "finding particular concepts to subsume." In the previous example, the concepts that stood as candidates for the subsuming act were said to be summoned into the synthetic process by imagination, not by determining judgment. This would seem to be in contradiction with the role prescribed for determining judgment. However, this is easily resolved by considering the difference between a function and a mechanism. The process of imagination described earlier *makes no judgments*. The dotted line symbols in Figure 5.2.1 are labeled *possible combinations* and we note that not all of these possibilities ended up becoming actual combinations. We further note that the synthesis of apprehension also makes no judgments but, rather, merely presents a singular representation (the sensible intuition) of an appearance. The *determination* that particular concepts would be joined in judgment falls to the process of determining judgment and not to either the process of imagination or that of apprehension. The actual combining of concepts is the *function* of determining judgment and imagination is merely the *mechanism* making it possible for determining judgment to fulfill this function.

This leads us to our primary *practical* definition of **imagination**: it is *the process of coordinating the capacities for the synthesis of apprehension and the synthesis of determinant judgments*. As two logical "organs" of the anatomy of *nous*, apprehension and determining judgment are reciprocally determining, and it is to this reciprocal co-determination that the phrase "free play of imagination and understanding" refers. This practical definition also leads us directly to a practical definition for the **power of imagination**: *the power of the capacity for representation for which imagination is the process*. Thus power of imagination and imagination are the matter and form divisions (in a 1LAR) of the **capacity of imagination** (Kant's term for this would be *Einbildungsvermögen*).

This brings us to the second fine point. The previous section's example could be taken to imply that the initiation of the cycle of synthesis is triggered automatically by the mere act of recognizing the intuition in a concept. This is not the case. Determining judgment does not determine its own employment. Its jurisdiction is a narrow one. It is tasked with structuring the manifold of concepts, structuring in this case referring to combining concepts by acts of judgment according to universal laws of understanding (these laws being none other than those of the categories of understanding). Its acroamatic principle is the principle of **conformity to law**: *All objects of Nature conform necessarily to the a priori laws which are the conditions of the possibility of experience.* However and as we shall see, there is nothing contained in the notion of the categories dictating which parts of the manifold of concepts are to be selected for the judgment of appearances. Nor can either sensibility or reflective judgment be regarded as acting to "steer" such a selection. Sensibility does not judge at all and reflective judgment is not objective.

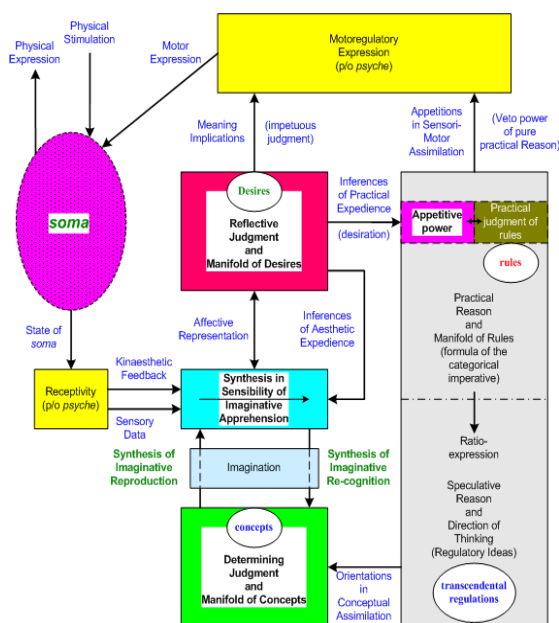


Figure 5.3.1: The logical organization of *nous*.

to pure practical Reason, the master regulator of all non-autonomic acts of the Organized Being, which regulates determining judgment through the ratio-expression of pure speculative Reason. All ratio-expression serves the purpose of pure practical Reason (conformity with the master formula called the categorical imperative of pure Reason), and thus all employment of determining judgment by Reason is said to be "purposive." Thus, Imagination is a term that denotes the effect of the active role of Reason in regulating cognition.

Like reflective judgment, the process of imagination "faces in two directions." It is in this

Put in other words, determining judgment determines local empirical laws of objective Nature but cannot be the determiner of Nature overall. The latter is a bigger job than determining judgment has the capacity to handle on its own. At this point it is useful to refer once again to Figure 1.5.1, which for convenience is reproduced here as Figure 5.3.1.

We define **attentiveness** (*attentio*) as the positive effort to become conscious of one's representations, and **attention** (*Aufmerksamkeit*) as consciousness according to choice. Determining judgment does not decide "what it will attend to" in its acts. That capacity belongs

where we find the need to make a distinction between an "image" and a "schema" of imagination.

In *Critique of Pure Reason* Kant tells us

the *image* is a product of the empirical capacity of productive imagination; the *schema* of sensible concepts . . . is a product and, as it were, a monogram of pure imagination *a priori*, through which and in accordance with which the images first become possible.
[KANT1: B181]

Image pertains to the representation in intuition, i.e. to the sensuous appearance of the object. A **transcendental schema**, on the other hand, pertains to concepts and provides the linkage required between the sensuous representations of sensibility and the formal representation of the manifold of concepts. *As* representations, an intuition and a concept are quite heterogeneous and if a determinant judgment is to have any relevance whatsoever for intuition, and thereby for cognition, then an homogenizing factor must be found and this is what a transcendental schema is (again from a thoroughly practical point of view). Kant tells us,

The schema as it is regarded in itself is always only a product of imagination; but since the synthesis of the latter has as its aim no individual intuition but rather only unity in the determination of sensibility, the schema is to be distinguished from the image. Thus, if I place five points in a row . . . this is an image of the number five. On the contrary, if I only think a number in general, whether it be five or a hundred, this thinking is more the representation in an image of a method to represent a multitude . . . in accordance with a certain concept than the image itself . . . Now this representation of a general procedure of imagination to provide a concept with its image is what I call the schema for this concept. [KANT1: B179-180]

We can see from this that we are quite right in regarding imagination as a mechanism for cognition and, therefore, for the function of determining judgment. A cognition is an objective representation for which the representation contains contributions from concepts in the intuition and we again heed the fact that the human being is not conscious of his sensible representation *as* a representation but, rather, as an appearance. From this it follows that

since all of our intuition is sensible, the power of imagination belongs to *sensibility* because of the subjective condition under which it alone can give a corresponding intuition to notions of understanding; but so far as its synthesis is still an exercise of spontaneity (which is determining and not, like sense, merely determinable and can thus determine the form of sense *a priori* in accordance with the unity of apperception), the power of imagination is to this extent a capacity to determine sensibility, and its synthesis of intuitions in accordance with the categories must be the transcendental synthesis of the *power of imagination*, which is an effect of understanding on sensibility [KANT1: B151-152].

This puts us in a position to examine the dictionary description of imagination in which the phrase "what is not actually present" is used. An intuition that contains nothing from concepts represents merely an undetermined object as a mere appearance, and this object is not even a thing (to the Organized Being) because it is not yet become *real* to the Organized Being (i.e., the

representation in intuition does not yet satisfy the condition necessary for holding-the-object-to-be-real, which always requires a determinant *judgment*). Such an intuition does contain the ground for judging the *Dasein* of a *cause* for which the representation in sensibility is held-to-be an effect, but the object *as a thing* cannot yet be called "present" in the normal ontology-centered connotation embedded in the dictionary definition quoted earlier. "To be present" requires the object to be understood *as a phenomenon*, and this requires reproductive imagination in the synthesis of the intuition. However, it is also possible for spontaneity to produce an intuition containing nothing but *materia in qua* sourced from concepts (with no actual immediate contribution from receptivity), and in this case the object of the intuition *is* understood as a phenomenon. It is only in this latter case where we can say imagination is a power to present "what is not actually present." The dictionary definition of "imagination" is a leftover we owe to the metaphysics of Aristotle (whose word for imagination was *phantasia*) and under Critical epistemology this definition must give way to the Critical one presented here.

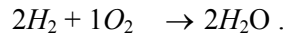
The transcendental schemata are the linkages between the condition for the possibility of sensibility (inner sense – i.e., the pure intuition of time) and the rules for the construction of concepts in determining judgment (i.e., the categories of understanding). **Schematism** is the procedure of understanding by means of these transcendental schemata. The categories are pure *a priori* notions (know-how) for constructing the manifold of concepts. As such they are the primitive functional *momenta* for the synthesis of determinant judgments, and because there are always three such *momenta* for each of the four 2LAR titles of representation, there are precisely twelve categories. Corresponding to each category is a transcendental schema of imagination, the role of which – as the "bridge" between determining judgment and inner sense – is thus seen to be nothing else than **a time-determination synthesized by the process of imagination**. Our next task is to understand what is contained under this idea of "time-determination" and this gives us our practical *Realerklärung* of the twelve transcendental schemata.

The transcendental Ideas that ground the deduction of the transcendental schemata are those of Rational Physics (Axioms of Intuition, Anticipation of Perceptions, Analogies of Experience, and the Postulates of Empirical Thinking in General). The deduction of Kant's transcendental schemata is fairly long and covered in Chapter 8 of *CPPM*. We will again limit this book to a more brief explanation and summary.

§ 3.1 The Transcendental Schemata of Quantity

All appearances are extensive magnitudes (Axioms of Intuition). The apprehension of an appearance by the synthesis of apprehension produces an intuition when this representation is

marked at a moment in time by reflective judgment. Apprehension does not cease at that moment but continues on, one intuition "growing" or "evolving" out of the previous one (its direct cover). Kant called this on-going synthesis the 'successive addition' of one representation after another. However, we should not understand this phrase to imply 'addition' in an arithmetic sense of that word. A better metaphor is 'addition' in chemistry, e.g.,



This analogy is particularly appropriate inasmuch as the chemical formula is really just a summary of what happens and hides the details of the dynamics taking place in a chemical reaction. The chemical formula says we have a particular quantity of hydrogen molecules being combined with a particular quantity of oxygen molecules to produce a particular quantity of water molecules. Note, too, that the hydrogen *molecules* and the oxygen *molecules* "disappear" during the synthesis and *water* molecules "appear" out of it.

To apply this analogy, we must ask: How does the synthesis of *time* give rise to apprehension of appearances insofar as the representation of Quantity is concerned? First we recall that time has three distinctive *modi* of apprehension: (1) persistence in time; (2) succession in time; and (3) coexistence in time. To each of these *modi* there will correspond one schemata of Quantity. Now, if in apprehension there were no representation of something persistent between successive moments in time we could have no universal and necessary ground for combining discrete intuitions of appearances into the representation of *one* phenomenal object. Yet this does happen. This is the **transcendental schema of persistence in Quantity**: [Aggregation of distinct intuitions in one object](#).

Second, successive intuitions must *differ* from one another. Were this not so, there would be no ground for marking one representation in apprehension as being distinct from the other. But *change* is not something understood by reflective judgment (which marks intuitions) and, hence, must be a pure schema of time in the form of composition in sensibility. This schema also must be a schema of pure *form* (time is the form of inner sense), and for Quantity this is represented by the extensive magnitudes of intuitions. This is the **transcendental schema of succession in Quantity**: [Change of composition in extensive magnitude](#).

Finally, we obtain the third transcendental schema of Quantity through synthesis of the first two deductions. For this we can call on the third general idea of representation in Quantity and state the **transcendental schema of coexistence** as: [Integration of extensive magnitudes in time](#).

Collectively, these three schemata define **the determination of time-series** and, likewise, that character of representation by which an intuition is understood to have an extensive magnitude.

Indeed, the form of composition of anything we call a "series" owes the original possibility of its concept to the schemata of Quantity. The series is the character of time-determination in regard to Quantity. Kant collectively referred to these schemata as "number," a word we must take in a mathematical context as denoting the counting numbers (1, 2, 3, etc.) but *not* what mathematicians call "the real numbers" (e.g., fractions, the "transcendental number" π , etc.).

§ 3.2 The Transcendental Schemata of Quality

The schemata of Quality come under the principle of Anticipations of Perception: In all appearances the sensation, and the real which corresponds to it in an object, has intensive magnitude. Now, the concept of "intensive magnitude" is one that can be, as we discussed earlier, hard to grasp initially. First, we need to notice that *qualities* in general are incomparable among themselves *as* qualities. For example, the pain of a toothache is "qualitatively different" from the feeling of nausea. Yet we also can say from experience that qualities differ "within themselves" in the sense that we usually describe in "more vs. less" terms. We speak of the vanishing of the sunlight with the coming of night in such terms ("it is dim; it is dimmer; it is dark; it is darker; it is darkest"). The concept of intensive magnitude is *essentially* the concept of being able to perceive differences in a quality and thereby compose an ordered structuring. We do often try to *quantify* differences in qualities, and thus we say the *amount* of a quality is a **degree**. But a degree is not the same thing as an intensive magnitude and is in essence nothing but a quantity used to describe an ordering of intensive magnitudes. This is, in fact, what mathematicians do with the "real numbers." The "real number" 1.2670 *means* (to a mathematician) that

$$1.2670 - \varepsilon < 1.2670 < 1.2670 + \varepsilon$$

for any amount ε that is not actually "nothing at all." Degree is a *measure* of intensive magnitude, and one which has the peculiarity that it is a measure for which there is *no smallest unit*. Indeed, this character underlies the mathematician's idea and definition of mathematical continuity.

An intensive magnitude

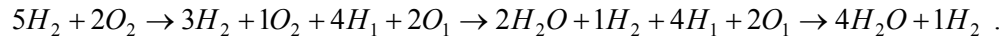
is understood as a magnitude whereby the parts are not recognized previously in order to determine the magnitude; rather it must be recognized as a unity and the parts drawn out from the unity. [KANT: 29 (999)]

Sensation is the matter of representation in intuition² and it is regarded as an effect registered in sensibility of a cause placed with the transcendental object we say is represented *by* the intuition. The phenomenal reality of an object is grounded in the consciousness of sensation. As Kant put it,

² When we are speaking of an affective perception the sensation is called a "feeling."

Reality is either phenomenon or *noumenon*. Everything that is presented positively to our senses is called phenomenal reality; and everything that is presented positively to our pure understanding is *noumenal* reality. Phenomenal reality or reality in appearance (or seeming-reality) is that which lies only in our senses. [KANT: 28 (560)]

The Quality of time-determination is the schematization for speaking to what exists in time; it contains a notion of a *Dasein* (a "there be" being presented in time). Using Kant's terminology, the synthesis of apprehension in regard to Quality is a "filling of time" with sensation. We can again use our chemistry metaphor to describe this idea. This time let us write a water formula that includes some intermediate terms, i.e.,



We will let the "atom" terms (H and O) correspond to particular "elements" of sensation. The particular sensations themselves are represented by the different terms (hydrogen molecules, unbound oxygen atoms, water molecules, etc.). From left to right in this sequence, we have a gradual reduction in "the sensation of H_2 " along with the reduction and eventual "disappearance" of "the sensation of O_2 " and the gradual "appearance" and increase of "the sensation of H_2O ." We also have the "appearance" and then "disappearance" of "the sensations of H_1 and O_1 ."

However – and this is an important point – if the specific terms at each step are regarded as *intuitions*, then the *perceptions* depicted in the metaphor are not perceptions of the individual terms at each point in time but, rather, of overall unities of perception. An intuition is a *singular representation* and, while the intuition contains a manifold within itself, the composition and *nexus* of this manifold is *obscure* (unconscious). The "constituents within" the intuitions are not individually presented and can only be "broken out" later by being re-cognized into concepts (by the synthesis of imagination and the acts of determining judgment). This is what is meant by the intensive magnitudes of the four successive intuitions modeled by this metaphor. It is also worth noting that the individual terms "compounded together" are secondary quantities of facet B and only the intuitions as wholes are principal quantities of facet B.

From this metaphor we can now go on to explain the three transcendental schemata of Quality by combining the picture our example presents with the ideas of the three *modi* of time. The first thing we may note is the presence of the "elements of sensation" (H and O) at each moment in time, i.e., these factors are persistent in time. This is the **first schema of Quality: Sensation persistent in time**. Note well that we do not mean by this one and the same sensation; this is why we have carefully called H (and not H_1 or H_2) an "element of sensation." It is a factor (and a secondary quantity) of sensation and the schema schematizes the on-going presence of such factors in the synthesis of time.

Now let us examine the succession in time. Here we find a factor in the representation that does not persist in time, namely its *extensive* form (the pure intuition of outer sense, i.e. space). We said earlier that some of the qualities of the composition "appeared and disappeared" in time and, as well, that there were varying degrees for these qualities from moment to moment. These are *the factors in sensation that are non-sensational* and yet are still factors in the representations. They are, in other words, **factors of change** and this gives us the **second schema of Quality**: *kinematical form without sensation*. We may note that this aligns well with the general idea of opposition in the 2LAR of representation (transcendental topic) because non-sensational kinematical form is the opposite of sensational persistents. Likewise, the first schema aligns well with agreement in the general 2LAR since it is the presentation of sensational content in an intuition that stands as the condition for thinking the object of appearance as cause (agreement of *Dasein* of an object with sensation).

Finally, the sensational and the kinematical factors in sensibility are always coexistent in time throughout the entirety of the synthesis of apprehension. Kant was fond of saying that the "being" (*Sein*, i.e. the sensational factor) and the "non-being" (*Nichtsein*, i.e. the kinematical factor) of an Object are always both present in the representation of an appearance. The kinematical factor ("non-being") is represented as affecting the perception of the sensational factor ("being"). This schema of coexistence is our **third schema of Quality**: *perception as the coalition of sensation in a kinematic form*.

Taken together, the schemata of Quality schematize "what is in time" (exists) at each moment in time. Kant called this schematization the **determination of time-content**.

§ 3.3 The Transcendental Schemata of Relation

The transcendental schemata of Relation follow more or less directly from the Analogies of Experience in Rational Physics: (1) All appearances contain the persistent (substance) as the object itself and the changeable as its mere determination (the way the object exists); (2) Everything that happens (begins to be) presupposes something that it follows in accordance with a rule; and (3) All substances insofar as they are coexistent stand in thorough-going community. The alignment of the Analogies with the three *modi* of time is rather obvious here. From their union follow the schemata of Relation. The **first schema of Relation** is: *The Object persistent in time*. For the **second schema of Relation** we have: *Association in time-order*. The **third schema of Relation** is: *Co-determination in the manifold of an intuition*.

Relation is always the form of the form of a representation. Kant explained the schemata of Relation in *Critique of Pure Reason* in the following way:

The schema of substance is the persistence of the real in time, i.e., the representation of the same as a substratum of empirical time-determination in general, which therefore remains while everything else changes. (Time itself does not elapse, but the *Dasein* of the changeable elapses in it. Therefore to time, which is itself unchangeable and lasting, corresponds in appearance that which is unchangeable in *Dasein*, i.e. substance, and only in it can the succession and coexistence of appearances be determined in regard to time.)

The schema of the cause and the causality of a thing in general is the real whereupon, as soon as it is granted at one's discretion, something else always follows. It therefore subsists in the succession of the manifold as it is subject to a rule.

The schema of community (reciprocity), or of the reciprocal causality of substances with respect to their accidents, is the coexistence of the determinations of the one with those of the other in accordance with a general rule. [KANT1: B183-184]

Taken together, we can see that the schemata of Relation are schemata for the ordering of appearances in time, i.e. schemata of **determination of time-order** in appearances.

§ 3.4 The Transcendental Schemata of Modality

In some ways the schemata of Modality are the most challenging. After all, the first three titles cover the determination of time-series, of time-content, and of time-order. What could there be left to yet be determined in the overall idea of time-determination? Kant answers that this is the determination of *Zeitinbegriff*, a rather grandiloquent phrase that we will render into English as the **determination of time-quintessence**. This phrase could also be rendered "time-embodiment" or "time-essence" and, indeed, this is the way Kant seemed to describe his idea in other words, i.e., "time itself, as the correlate of whether and how an object belongs to time." Kant's word translated here as "correlate" was *Correlatum*, one of his more peculiar, undefined, and rarely used technical terms. From what he says of "time" in the *Critique*, his metaphysics lectures, the *Prolegomena*, and elsewhere, he seems to mean for us to understand this "correlate" in the context of the Latin *com relatum*, i.e. to judge something with reference to a standard.

What would be this standard? Kant described the schemata of Modality as time-determinations concerning "the *Zeitinbegriff* considering all possible objects" [KANT1: B185]. The word "quintessence" means, in one sense, "the most perfect embodiment of a thing," and here it is key for us to recall that the pure synthesis of the intuition of time (pure synthesis of inner sense) is a process of order structuring. There are many possible ways in which the order structure of a timescape *could* be performed, and many possible particular structures that could result. Furthermore, there is no judgment in sensibility and so the selection of which particular temporal structure will come to consciousness is left to *non-objective* reflective judgment. Even so, there must still be rules by which the structuring is constrained (else no structure would result) and such rules, as a schematism, would determine the possible "embodiment" of the form of time in consciousness. We will see later that the general process of judgmentation is regulated under

the standard of perfection (which we will define in more detail later), and so "time-quintessence" seems to be the most appropriate rendering of Kant's *Zeitbegriff*.

Modality, we now recall, speaks to metaphysical *nexus* and adds nothing to the judgment *of* an object or the apprehension *of* an empirical representation. Rather, in the present context of our discussion, the schemata of Modality will be determinations *of* determinations of time. The acroams under which these fall are the Postulates of Empirical Thinking in General: (1) What agrees with the formal conditions of experience is possible; (2) What coheres with the material conditions of experience (sensation) is actual; and (3) That whose context with the actual is determined in accordance with the general condition of experience is necessary (exists). In the theoretical Standpoint, the Postulates serve to define the Critical meanings of the words possible, actual, and necessary. A time-determination of the "quintessence of time" must be a schema that can present in some fashion a condition under which the structure of representations in time can be put together such that the condition of *unity in apperception* is met.

What are the schema that satisfy this metaphysical requirement? Kant tells us,

The schema of possibility is the harmonization of the synthesis of various representations with the conditions of time in general (e.g. that contraries in a thing cannot be together but can only be after one another), thus determination of the representation of a thing in any time.

The schema of actuality is *Dasein* at a definite time.

The schema of necessity is the *Dasein* of an object for all time. [KANT1: B184]

Put more succinctly, the **first schema of Modality** is the schema of non-contradiction: *Contradictory characteristics cannot exist in the same object at the same moment in time*. An intuition composed of equal and contradictory *materia in qua* is *nothing sensible* and so cannot exist in time, hence can occupy no moment in time.

The **second schema of Modality** is the schema of actuality: *The determination of a phenomenal object requires in the synthesis of sensibility contributions from both receptivity and imaginative reproduction*. An intuition cannot be the intuition of a phenomenon without concepts; it cannot be a real phenomenon without *materia in qua* (sensation) from receptivity being presented at some *definite* moment in time.

Finally, the **third schema of Modality** is the schema of necessity: *Possibility coherent in the sum-total of the actual in time*. This schema is the product of the synthesis of the first two, but to properly understand what is meant by this brief statement we must understand what the strange-sounding idea of a "necessary possible actuality" means. This is a metaphysical idea that Kant stated in the following way:

The congruence of an object with the conditions of thinking is the possibility of it;

actuality is absolute positing, i.e., it establishes the object with regard to itself, and not in regard to thinking. Actuality insofar as it can be known *a priori* is necessity. Now this necessity can be *hypothetical*, when the *Dasein* of a thing is known *a priori* in some respect, or absolute, when the *Dasein* of a thing is known *a priori* simply speaking. To know something *a priori* in some respect is: when I know something from concepts without experience but know the ground from experience. I can never know the *Dasein* of things fully *a priori*, from mere notions, for it cannot be derived from mere notions, but rather from the very beginning through experience. A ground must be given that still can be known through experience . . . Therefore I can never conclude to actuality from possibility, but perhaps to possibility from actuality . . . Perception is the representation of the actual. Thus cognizance of the *Dasein* of a thing is never possible without experience; either I know things wholly from experience, or I know the grounds of experience. It is thus wholly impossible to know absolute necessity . . . The cognition of necessity is therefore a hypothetical cognition. All things have derivative necessity. [KANT: 28 (556-557)]

We cannot throw out prior experience (in time) of the actual in judging a possible cognition as knowledge that "follows from" other knowledge. Thus the sum-total of the actual in the synthesis of experience is the *condition* that all determinations of possibility must satisfy and is the determining factor in Modality for the transcendental schemata.

§ 4. The Categories of Understanding

§ 4.1 The Categories Are Primitive Notions

The categories of understanding are the *momenta* of determinant judgment and, as such, there are twelve of them, three in each heading of Quantity, Quality, Relation, and Modality. Figure 5.4.1 is a 2LAR illustration of the categories and their places in representation. They are the functions of combination (representation) in the manifold of concepts and they have the significance of being the pure and *a priori* rules for the *construction* of empirical concepts. Combination of concepts in determinant judgments produce new concepts (as rules for the reproduction of intuitions). The categories are the pure "know-how" for doing this.

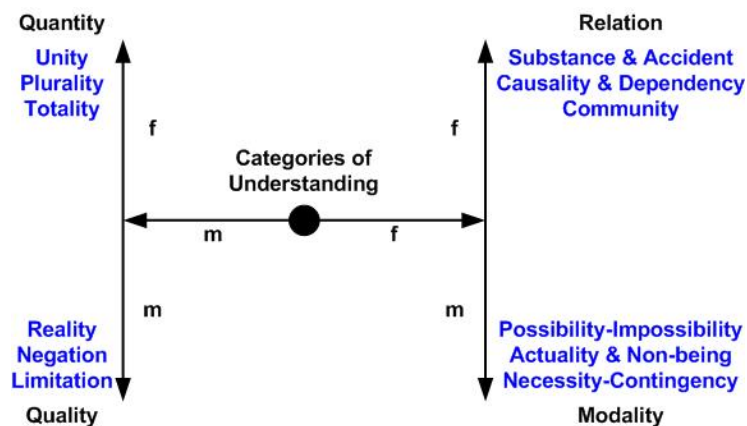


Figure 5.4.1: 2LAR of the Categories of Understanding.

As the *momenta* for representation in determinant judgments, every judgment that joins a pair of concepts in the manifold of concepts requires the application of one category from each of the four titles of representation. There are thus eighty-one possible distinct forms of judgment for each pairwise combination of concepts. An individual category, by itself, can represent nothing. Every representation requires, at the level of a 2LAR, matter and form of composition (Quality and Quantity) as well as matter and form of *nexus* (Modality and Relation). Each category also stands in one-to-one correspondence with one of the twelve transcendental schemata of imagination because any concept constructed by the making of a determinant judgment must be capable of being transformed into sensibility via the synthesis of reproduction in imagination.

The individual categories themselves *are not concepts*. As a pure and *a priori* notion of understanding, a category *as category* is incapable of being presented in a sensuous intuition. An idea is a concept constructed entirely from notions and so it is possible to *exhibit the idea of a category*, but not the category itself. Furthermore, the ideas by which we understand the categories have none but practical objective validity, i.e. the validity of these ideas lies in how we make use of them. Categories are denizens of facet B and, within this facet, they are secondary quantities.

Categories are absolute *primitives* of the theoretical Standpoint and cannot be explained in terms of anything more fundamental. Epistemology is logically prior to ontology in Critical metaphysics and the twelve categories *comprise* the primitive core ontology of determinant judgment and *construct* the ontology of Nature (the Organized Being's world model). As primitives, the categories admit to having no *Realerklärung* ("real explanation") because they are themselves the basis of the *Realerklärung* of all other theoretical ideas and constructs. Yet we must not presume that the names given to the categories are so self evident that no definition of the categories need be given. What we require for each of them is a *Realdefinition* and such a definition can only be essentially practical and not theoretical. The *Realdefinition* tells us how the category is *usable in application*, and since the only use of the categories is in the determinant judgment of objects, what we must understand is *what they do*. To ask, "What is a category?" is to ask, "What does it mean 'to know an object'?"

This primitive character of the categories of understanding has an important consequence for speculative reasoning and theorizing. Kant described this consequence in the first edition of *Critique of Pure Reason* in 1781:

There is something strange and even nonsensical that there should be a notion that must have some meaning but is not liable to explanation. Only in the case of the categories is there this special circumstance, that they can have a determinate meaning and reference to any object only by means of the general *sensible condition* but that this condition is

omitted from the pure category, since this can contain nothing but the logical function for bringing the manifold under a concept . . . Hence the categories need, beyond the pure notion of understanding, determinations of their application to sensibility in general (schema) and without these are not notions through which an object can be recognized and distinguished from others, but are only so many ways to think of an object in possible intuitions and to give it its meaning in accordance with some function of understanding . . . The pure categories are nothing other than the representation of things in general insofar as the manifold of their intuition must be thought through one or another of these logical functions . . . [Thus] without the condition of sensible intuition, the synthesis of which they contain, the categories have no reference at all to any determinate Object, thus they cannot define one, and consequently have in themselves no objectively valid concepts.

Now from this it follows irrefutably that the pure notions of understanding can *never* be of *transcendental* but always only of *empirical* use, and that the first principle of pure understanding can be related to objects of the senses only in reference to the general conditions of a possible experience, but never to things in general (without taking regard of the way in which we might intuit them).

The Transcendental Analytic accordingly has this important result: That understanding can never accomplish *a priori* anything more than to anticipate the form of a possible experience in general, and, since that which is not appearance cannot be an object of experience, it can never overstep the boundaries of sensibility, within which alone objects are given to us. Its first principles are merely principles of the exposition of appearances, and the proud name of ontology, which presumes to offer synthetic *a priori* knowledge of things in general in a systematic doctrine, must give way to the modest one of a mere analytic of pure understanding. [KANT: 4 (A244-247)]

§ 4.2 The Realdefinition of the Categories

Mathematician Mark Kac of Cornell University once remarked³, "There are two kinds of geniuses, the 'ordinary' and the 'magicians.' An ordinary genius is a fellow that you and I would be just as good as, if we were only many times better. There is no mystery as to how his mind works. Once we understand what they have done, we feel certain that we, too, could have done it. It is different with the magicians. They are, to use mathematical jargon, in the orthogonal complement of where we are and the working of their minds is for all intents and purposes incomprehensible. Even after we understand what they have done, the process by which they have done it is completely dark." Under this description, Kant seems to have been a genius of the "magician" class. Having presented his table of the categories in *Critique of Pure Reason*, he politely declined to offer any *Realdefinition* of them, assuring us that, while one could rightly be demanded of him, producing it would be easy (for us) to do. This was a homework assignment that vexed philosophers for the next two centuries.

If it is, as it seems to be, beyond the power of the rest of us to know the specific process by which Kant's mind worked in coming up with his categories, we can at least understand the meaning of the categories themselves. This deduction fills two full chapters (chapters 8 and 9) in

³ Quoted in *Genius: The Life and Science of Richard Feynman* by James Gleick, NY: Pantheon Books, 1992.

CPPM leading up to an encapsulated summary of their *Realdefinition* in the beginning of chapter 10 of that work. It is this encapsulation that will be provided in this book devoted to the principles of mental physics (rather than to the deduction of these principles). Let it here suffice to say that uncovering this *Realdefinition* involves looking at what each category is to accomplish in terms of each of the four reflective perspectives of metaphysics proper viewed from the theoretical Standpoint of Critical metaphysics. In his own handwritten notes Kant stated

Categories are general acts of reason whereby we think an object in general [KANT: 17 (492)]

and in *Critique of Pure Reason* he tells us,

[Pure] speculative reason is, in respect of principles of knowledge, an entirely separate and self-subsisting unity in which, as in an organized body, every part exists for the sake of all the others as all the others exist for its sake, and no principle can be taken with certainty in *one* regard unless it has at the same time been investigated in its *thorough-going* reference to the entire use of pure reason. [KANT1: Bxxiii]

Palmquist calls this idea of the reference of a principle to one part of the body of Kant's theory a **reflective perspective**, as we have previously noted. Perspective analysis is a key and fundamental part of the doctrine of method in Kant's system (as is analysis from the Standpoints) and, as Palmquist discovered,

[The] full significance of the "perspectival" approach [to Kant's theory] is rarely appreciated. To counteract this neglect, I will argue that the general transcendental assumption which guides the Critical method implies most fundamentally a thorough-going "perspectival revolution" in philosophy . . . For the Transcendental Perspective in general includes within it several levels of systems and subsystems which compose Kant's System. Thus, what I shall call the "*principle* of perspective" (i.e., the general rule that the truth is always relative to some perspective) can be seen functioning throughout the System. [PALM: 28]

There are four reflective perspectives, one for each title of metaphysics proper, and they align in the following way⁴:

Logical reflective perspective	⇔	Rational Physics
Transcendental reflective perspective	⇔	Rational Psychology
Hypothetical reflective perspective	⇔	Rational Cosmology
Empirical reflective perspective	⇔	Rational Theology.

Each perspective contributes to the real meaning of the category. The full import – that is, the *Realdefinition* – of each category is understood by taking account of all four perspectives and understanding that each perspective applies to the categories at all times and together with all the

⁴ In fairness to Stephen, it needs to be noted that he and I disagree on the alignments of the hypothetical and empirical reflective perspectives and he reverses the assignments shown above. I note this only to note that reader criticisms of this alignment should be directed at me and not at Palmquist, *ceteris paribus*.

others.

With this as our introduction, we now proceed to the statements of *Realdefinition* for each category. The notions of the categories carry the following meanings.

§ 4.2.1 The Categories of Quantity

Each category of Quantity is a notion of a logical scheme (not schema) for the representation of extensive magnitude in a determinant judgment, of association in the determination of concepts, of structural context, and of what is symbolic in the application of the concept it produces. A **logical scheme** is the structuring function for the action of thinking in constructing the manifold of concepts. These categories are conditions necessary for the possibility of *objective* unity in apperception of the concepts so constructed. What is structured in the act of thinking is a determinant judgment and the category determines *the logical function of judgment* achieved by the structure of the manifold of concepts. The *Realerklärung* of each logical *momentum* in the representation of concepts *as logical functions of judgments* will be provided in Chapter 6. For the categories of Quantity, these *momenta* are called the logical functions of singular, particular, and universal judgments.

Association is the function of aesthetic Quantity producing a relationship of commonality for two or more representations contained in a conscious presentation. The representations in an association have commonality in an interest, desire, purpose, or as matters of an act, and their association is the unity of this commonality.

Context is the sphere of concepts, combined by judgment with the concept said to have the context, which delimits the applicable scope in Reality involving that concept. The **sphere of a concept** is the sum-total of all representations contained under that concept. The **scope of a concept** is the sum-total of all objects of representations contained under the concept.

A **symbol** is an intuition so far as it serves only as a means of representation through concepts. A symbol is given a meaning through the presentation of an object. With these definitions in hand, we may now state the *Realdefinition* for each category of Quantity.

The **category of unity** is

- from the logical perspective, the notion of the scheme for representing extensive magnitude in a singular judgment;
- from the transcendental perspective, the notion of association in the determination of concepts as the *materia ex qua* of the synthesis of reproduction concordant with an aesthetic Idea insofar as this association pertains to identity in the extensive magnitude of the sphere of a concept;
- from the hypothetical perspective, the notion of the common context in the *Existenz* of all appearances;
- from the empirical perspective, the notion of a determined object.

A new term, the aesthetic Idea, appears in the transcendental perspective here. The immediate object for all applications of the categories is the concept the categories produce, but the mediate object of the categories (immediate object of the concept produced) is always an intuition in sensibility. We have already seen that the synthesis in sensibility calls upon both the process of reflective judgment (immediately) and the actions of the adaptive *psyche* (mediately). The **aesthetic Idea** is the function of continuity in perception; this is to say, it is the synthesizing function of Quality in judicial continuity for the organic unity of reflective judgment and adaptive *psyche*. We will be discussing the aesthetic Idea in much more detail later on. For now let it suffice to say that the aesthetic Idea belongs to sense, representation *through* an aesthetic Idea belongs to the power of imagination, and the aesthetic Idea serves as a kind of catalyst for thinking. The aesthetic Idea provides a link between the theoretical Standpoint (from which we view the categories and the process of determining judgment) and the judicial Standpoint (from which we view the overall process of judgmentation in general). To be concordant with the aesthetic Idea means the free play of imagination and understanding in the making of a cognition is subjectively expedient for the making of an aesthetical reflective judgment of sensibility.

The **category of plurality** is:

- from the logical perspective, the notion of the scheme for representing extensive magnitude in a particular judgment;
- from the transcendental perspective, the notion of association in the determination of concepts as the *materia ex qua* of the synthesis of reproduction concordant with an aesthetic Idea insofar as this association pertains to difference in the extensive magnitude of the sphere of a concept;
- from the hypothetical perspective, the notion of sub-contexts in the form of every concept;
- from the empirical perspective, the notion of determined appearances.

The **category of totality** is:

- from the logical perspective, the notion of the scheme for representing extensive magnitude in a universal judgment;
- from the transcendental perspective, the notion of association in the determination of concepts as the *materia ex qua* of the synthesis of reproduction concordant with an aesthetic Idea insofar as this association pertains to the completion of the extensive magnitude of the sphere of a concept;
- from the hypothetical perspective, the notion of a complete context as the integration of all sub-contexts into one context in the given whole of all appearances;
- from the empirical perspective, the notion of a real Object symbolizing a *res ipsa* ('thing in fact') under the principle of the Ideal of an *entis realissimi*.

The category of totality is a notion of unity in a plurality of appearances, i.e. the thing-in-the-appearances regarded from the empirical perspective. The acroam of the Axioms of Intuition tells us that all appearances (as regards their intuition) are extensive magnitudes. Now, the object-

concept of an individual appearance is singular, i.e. the concept has no sphere. It is a root concept in the manifold of concepts. If the appearance is to be *understood* as an object, higher concepts are required that contain the concept of this individual under them. The individual object-concept terminates the series of marks *a parte posteriori* in the manifold of concepts, but the Object (and the real thing represented in the Object) is a point of convergence *a parte priori* and in this concept the Organized Being understands the Object as a thing-in-fact (*res ipsa*) within Reality in general. The individual object of the individual object-concept is an appearance; the thing-in-fact is the phenomenon so far as its sensible character is concerned and the *noumenon* insofar as its intelligible character is concerned. The **Ideal of *entis realissimi*** is: **a real object is (has) a one-ness (unity) in the sum-total of all the representations of its appearances**. The principle is a regulation of Reason legislating the form of Reason's employment of the process of determining judgment. To represent this *in the structure* of the manifold of concepts is to synthesize from the many concepts of appearances (plurality) a unity in a highest concept of the real Object, and this is the empirical function of the category of totality. Our general ideas of representation in Quantity – identification, differentiation, and integration – owe their fundamental objective validity to the notions of unity, plurality, and totality, respectively.

The *Realdefinition* of each category calls upon each of the four titles of Critical metaphysics proper. Rational Physics, Psychology, Cosmology, and Theology are the divisions of metaphysics into Quantity, Quality, Relation, and Modality, respectively. In this context we can regard the *Realdefinition* as a 2LAR of the category. This same structure will repeat for all the remaining categories as well. The categories of understanding are the primitives of Critical ontology, and what we have in the structure of the *Realdefinition* is *the genesis of Critical ontology from its basis in Critical epistemology*. This is a practical illustration of what has been said numerous times already in this book: the Critical system is epistemology-centered.

§ 4.2.2 The Categories of Quality

Each category of Quality is a notion of a logical scheme for the representation of intensive magnitude in a determinant judgment, of the form of compatibility in the determination of the *materia in qua* of intuition, of transcendental context, and of transcendental affirmations and denials of what the concept predicates of its Object. **Compatibility** is the coalescing function for comparates in aesthetic Quality (in sensibility) by which the *Verstandes-Actus* of reflexion is referred to the faculty of knowledge (the systematic structure of the ability to make representations of knowledge). **Transcendental affirmation** signifies being-in-time (i.e., that something fills time in the intuition) while **transcendental denial** signifies non-being-in-time

(i.e. that something does not fill time in the intuition). Like the other categories, the categories of Quality determine logical functions of Quality in determinant judgments. In their case, these *momenta* are called affirmative, negative, and infinite judgments.

The **category of reality** is:

- from the logical perspective, the notion of the scheme for determining the intensive magnitude in an affirmative judgment;
- from the transcendental perspective, the notion of the form of compatibility in the determination of the *materia in qua* of intuition as agreement in the synthesis of comprehension and apprehension;
- from the hypothetical perspective, the notion of sensible context of the appearance in an intuition;
- from the empirical perspective, the notion of making a transcendental affirmation of the quality of "being something."

The **category of negation** is:

- from the logical perspective, the notion of the scheme for determining the intensive magnitude in a negative judgment;
- from the transcendental perspective, the notion of the form of compatibility in the determination of the *materia in qua* of intuition as opposition in the synthesis of comprehension and apprehension;
- from the hypothetical perspective, the notion of the intelligible context in the concept of an appearance;
- from the empirical perspective, the notion of making a transcendental denial of the quality of "being something."

The **category of limitation** is:

- from the logical perspective, the notion of the scheme for determining the intensive magnitude in an infinite judgment;
- from the transcendental perspective, the notion of the form of compatibility in the determination of the *materia in qua* of intuition as distinction in the synthesis of comprehension and apprehension;
- from the hypothetical perspective, the notion of the real context in a cognition of an appearance;
- from the empirical perspective, the notion of the divided Object in Reality and symbolizing in this Object an *ens priorem* under the principle of the Ideal of an *ens originarium*.

By **divided Object** is meant an object understood in terms of both transcendental affirmations (judgments of reality) and transcendental negations (judgments of negation). These attach or un-attach predicate concepts of appearances to the Object but are not by themselves sufficient to distinguish among different Objects in Reality in general. The category of limitation is the rule for understanding "this is not-that" in the *discrimination* of the multitude of objects in Reality. *Ens priorem* means the transcendental object itself, not as mere differences of *appearances* but as *real* differences that make the one object distinct from all other objects. The **principle of the Ideal of *ens originarium*** is: the *Existenz* of an object is predicated from grounds. Again, this

principle is a regulative principle of Reason in the employment of the process of determining judgment. The general ideas of Quality in transcendental topic – agreement, opposition, and subcontrarity – owe their objective validity to the categories of reality, negation, and limitation, respectively. Note that subcontrarity is, empirically, a means of distinguishing (distinction).

§ 4.2.3 The Categories of Relation

Each category of Relation is a notion of a logical scheme for representation of the objective form of connection in a determinant judgment, of the *materia circa quam* of transcendental anticipation, of connections of conditions, and of the form of *Existenz* of things at the boundary of experience. The logical functions of judgment determined by the categories of Relation are called the categorical, hypothetical, and disjunctive judgments.

The **category of substance & accident** (also called subsistence & inherence) is:

- from the logical perspective, the notion of the scheme for determining the objective form of a categorical judgment;
- from the transcendental perspective, the notion of the *materia circa quam* of transcendental anticipation in the determination of the connection of a concept in inner sense as immanent in the synthesis of reproduction;
- from the hypothetical perspective, the notion of the object as the formal condition of every context;
- from the empirical perspective, the notion of subsistence and inherence at the boundary of experience signifying the *Existenz* in Reality of a *Sache*-thing.

The **category of causality & dependency** is:

- from the logical perspective, the notion of the scheme for determining the objective connection as antecedent and consequent in a hypothetical judgment;
- from the transcendental perspective, the notion of the *materia circa quam* of transcendental anticipation in the determination of the connection of a concept in inner sense as transeunt in the synthesis of reproduction;
- from the hypothetical perspective, the notion of a series of conditions in the appearance of contexts;
- from the empirical perspective, the notion at the boundary of experience signifying the *Existenz* in Reality of an *Unsache*-thing.

The **category of community** is:

- from the logical perspective, the notion of the scheme for determining the objective form of a disjunctive proposition;
- from the transcendental perspective, the notion of the *materia circa quam* of transcendental anticipation in the determination of the connection of the concept in inner sense as reciprocal in the synthesis of reproduction;
- from the hypothetical perspective, the notion of the World as the formal context of all objects;
- from the empirical perspective, the notion at the boundary of experience signifying *Existenz* in Reality of a state of Nature in the concept of an Object as an *ens superiorem* under the Ideal of *ens summum*.

The category of substance & accident is the *a priori* rule of transcendental anticipation in immanent Relations. An **immanent Relation** is an inherent connection, i.e. a connection in which the constituent concepts in the connection are thought *as the make-up* of an Object. The transcendental anticipation is an *a priori* determination of what conceptual representations are necessary in the synthesis of reproduction for the determination of a perception. In cognition, the possibility of categorically perceiving a phenomenal object (rather than a merely singular appearance) requires something that holds together the diversity of sensible perceptions across multiple moments in time. This something is called substance and so substance is the matter in which perceptions as appearances (accidents) inhere. The category provides a "focal point" or "center" for attentiveness in judgmentation.

A **transeunt Relation** is a cause-and-effect relationship between two Objects (which can equally well be two different transcendental objects appearing in succession or the same transcendental object at two different moments in time). The transcendental schema for the category of causality & dependency is succession in time and the category in application to the synthesis of reproduction gives a rule for the synthesis in time-order for transeunt connections in the synthesis of *comprehension* (apprehension in thinking).

The transcendental schema for the category of community is coexistence in time. This means the reciprocal co-determinations of the accidents of substances in the same moment in time. The rule of the category provides the *materia circa quam* of reciprocal Relations among the members of a disjunction such that a determination of one member also determines the others at the same moment in time. It *organizes the connection* of appearances to objects *as a context in Nature*.

The World is the transcendental and *noumenal* object held-to-be all-that-exists ("the universe"). The context of the *idea* of World is one of composition, i.e. the object stands as the transcendental matter in the manifold form of Nature, and the World is regarded as the mathematical entirety of all appearances. It is the ultimate context for "everything."

Every object connected in Nature by a connection of substance & accident is regarded as a thing-in-the-world (*Sache*-thing). An event is a "something" we place "in Nature" rather than "in the World." Regarded as a *thing* (*Unsache*-thing) it is a "happening" rather than the object that the event "happens to." The *Dasein* of any *Sache*-thing is known in no other way than by a succession of changes in appearance, and the category of causality & dependency is the notion by which this *Dasein* becomes known to the Organized Being. The category is a rule for synthesis *a parte priori* in the manifold of concepts. The idea of an ***ens superiorem*** is the concept of an Object regarded as a state of Nature. The regulative principle of Reason in the employment of determining judgment is the **principle of *ens summum***: All real things have a context within All-

of-Reality. This means the representation of a thing-in-Reality must contain a notion of substance & accident and be connected in a series of conditioned to condition.

The categories of Relation (substance & accident, causality & dependency, and community) are, again, the ground of the objective validity of our general ideas of the internal, the external, and the transitive Relations, respectively, in our general 2LAR of representation.

§ 4.2.4 The Categories of Modality

Modality in judgment is a judgment of the judgment. It adds nothing to the concept of the object except the connection of what is thought of the Object to the synthesis of *apperception*. The categories of Modality are notions of Modality schemes for propositions, of signs of expedience (or inexpedience) for a purpose in the determined concept that can be made a symbolic meaning for apperception, of context (or non-context) for experience, and of the manner of coherence for the context of the Object. A **proposition** is an aggregate concept of a determinant judgment in which the concepts of two or more objects are connected in Relation according to the schema of a categorical, hypothetical, or disjunctive logical *momentum*. The logical functions of judgment for which the categories of Modality are the schemes are called the problematic, assertoric, and apodictic judgments.

A **sign** is that in the determination of Modality for a concept that makes possible the judgment of the expedience of that concept during the *Verstandes-Actus* of reflexion. A **meaning** is the coherence of perceptions and activities. **Coherence** is the necessary form of complete congruence among all Objects in the *nexus* of judgments under the acroamatic **principle of thorough-going determination**: *Of all possible predicates of things insofar as they are compared with their contradictory opposites, one of these predicates must apply to the thing*. Coherence is a *sine qua non* for understanding the unity of *one* Nature.

The **category of possibility & impossibility** is:

- from the logical perspective, the notion of the scheme for determining a problematic proposition solely through the power of spontaneity under the inducement of an aesthetic Idea in the synthesis of comprehension;
- from the transcendental perspective, the notion of the determination of a sign of possible expedience (or inexpedience) for a purpose in the determined concept that can be made part of the symbolic meaning vested in an intuition in the synthesis of apperception;
- from the hypothetical perspective, the notion of a possible (or an impossible) context;
- from the empirical perspective, the notion that predicates the manner of a merely conceptual coherence of the concept in the context of Nature.

The **category of actuality & non-being** is:

- from the logical perspective, the notion of the scheme for determining an assertoric

- proposition through the combined powers of receptivity and spontaneity under the inducement of an aesthetic Idea in the synthesis of apprehension;
- from the transcendental perspective, the notion of the determination of a sign of actual expedience (or inexpedience) for a purpose in the determined concept that can be made part of the symbolic meaning vested in an intuition in the synthesis of apperception;
- from the hypothetical perspective, the notion of an actual context (or non-context) of real experience;
- from the empirical perspective, the notion that predicates the manner of phenomenal coherence of an object in the context of experience.

The **category of necessity & contingency** is:

- from the logical perspective, the notion of the scheme for determining the marks of the conditions of experience in an apodictic proposition;
- from the transcendental perspective, the notion of the determination of a sign of necessary expedience (or inexpedience) for a purpose in the determined concept that can be made part of the symbolic meaning vested in an intuition in the synthesis of apperception;
- from the hypothetical perspective, the notion of a context made necessary (or made not-necessary) by the condition that the context of every object must be true;
- from the empirical perspective, the notion that predicates the manner of systematic coherence in Reality under the principle of the Ideal of an *ens entium*.

The transcendental Ideal of the **principle of *ens entium*** is: **all real things are necessarily coherent in Reality**. This is a standard gauge for the direction of determining judgment by pure speculative Reason. Viewed from the empirical perspective, the marks laid down by the category of necessity & contingency are marks of coherent direction by which the process of perfecting understanding is guided and by which understanding can be made systematic.

All categories of Modality are notions of the metaphysical *nexus* of the manifold of concepts. As such they are notions of the connection of cognitions as forms of empirical knowledge in the Organized Being's faculty of pure consciousness. The empirical idea of this metaphysical *nexus* is the form of coherence in thinking.

Every determinant judgment in the manifold of concepts is subject to the following acroamatic condition in the synthesis of apperception: **The combination made by a determinant judgment must be judged to be formally expedient by the process of reflective judgment**. However, the ground for this judgment of expedience is merely subjective (because reflective judgment deals in affective perceptions rather than cognitions). Merely because the aggregate concept of a determinant judgment was judged to be expedient upon a previous occasion at some particular moment in time, this is by itself no guarantee that the aggregate concept will likewise be judged expedient when it is reproduced via reproductive imagination in some other synthesis of apprehension at some other moment in time. The affective perceptions in sensibility might be different on this occasion from what was perceived before during the first making of the

aggregate concept, and these affective conditions affect the outcome of reflective judgment. Thus if this subjective power of judgment is to be able to provide such reflective judgments as to make possible the construction of a *systematically objective* Nature in the manifold of concepts, then among the signs determined for concepts there must be one such sign that in the synthesis in sensibility *guides the judgment of formal expedience*. This is the sign provided for under the rule of the category of necessity & contingency. From the transcendental perspective, the rule of this category provides what we might call a "reminder" that there is a more global expedience presented in the aggregate concept and, thus, *preservation* of the aggregate concept is itself a condition of formal expedience. By this sign the investment of meanings *in a system of meanings* is made possible for the Organized Being.

Previous assertoric connections of causality & dependency and of community set conditions in the manifold of concepts for later judgments. Subsequent problematic judgments that are conditioned by these previous judgments – and especially those problematic judgments made in anticipation of actual experience (and which are therefore relatively *a priori*) – must cohere with these conditions and not produce contradictions in the spheres of these assertoric conditions. When a problematic judgment has such coherence in the manifold of concepts and when also its contradictory opposite sets up a real opposition⁵ in this same sphere, the problematic judgment is not merely possible but rather is *made necessary* by those previous assertoric judgments. On the other hand, if the problematic judgment and its contradictory opposite can both be made to cohere with previous assertoric judgments then the connection is contingent. The category of necessity & contingency as a scheme is a rule for determining and keeping track of relationships of coherency *in the manifold* of concepts.

An assertoric proposition is one that admits of no consciousness that things could be otherwise than is asserted in the proposition. Such a judgment can rightly be called a judgment of belief. Under the regulative principles of Reason, the condition of validity for such an assertion is actual sensation in perception. Because the immediate apprehension of sensibility through receptivity alone carries no mark of determining judgment, assertoric propositions always involve a synthesis employing both receptivity and spontaneity through imagination. This is the synthesis of

⁵ **Real opposition** (*Realentgegensetzung*) is opposition in Relation (*Entgegensetzung*) accompanied by negation in sensibility produced by the opposition of compare *materia ex qua* (*Widerstreit*). A combination of concepts that sets up real opposition in sensibility cannot produce an intuition and, therefore, that combination is impossible because "it cannot make sense" (e.g. a "four-sided triangle" in plane geometry). *Entgegensetzung* is a Relation of reciprocal causality (community) for which *Widerstreit* is transcendental negation in Quality. When we say an Object admits of no opposite, this means that the representation is made such that no combinations in contradictory opposition are contained in it because such opposing concepts are structured in such a way as to be reconciled without real opposition. The categories of limitation and community are always involved in such a reconciliation.

comprehension that determines an Object.

§ 4.3 Remarks

One might feel surprised or uncomfortable that the categories – the primitive rules that ground all of Critical ontology – should each have such a lengthy *Realdefinition*. After all, aren't primitives supposed to be "simple" things? Only the long-standing habits of scientists can make it seem so. This is not because scientific primitives have simple definitions; it is because ever since the rise of positivism in the nineteenth century science has not defined its primitives *at all*. The wistful hope at work here is that primitives should have a character of "self evidence" about them. Indeed, the philosopher Husserl tried to make "self evidence" the ground of his philosophy of phenomenology – another failed example of ontology-centered metaphysics. Your author thinks it is a bit curious that scientists generally have drawn no lessons and taken no warnings from the experience of mathematicians when the "self evidence" of mathematical axioms – which for centuries were supposed to be "self evident truths" – was demolished during the period in the late nineteenth and early twentieth centuries known today as "the crisis in the foundations" in mathematics [DAVI: 330-338]. If Socrates were around today, he would quite likely excoriate scientists for this practice – or, better, non-practice – and denounce the lot of us as the worst sort of learned fools. We would not win this argument unless someone should again fetch the hemlock.

The *Realdefinition* of a category is at root practical (what does the category do?) and also transcendental (what is necessary for the possibility of experience as human beings know experience?). It must be so for all primitives. Nothing else can define what "objective validity" means and without objective validity we know *nothing* about objects. Ask yourself this physics question: What is mass? Mass is currently a primitive and ontologically undefined idea in physics.⁶ It is far easier to say what it is *not* than what it *is*. It is not weight; weight is defined in terms of mass. It is not "quantity of matter"; that was Newton's definition and was overturned by the Theory of Relativity. The "working definition" of "mass" in physics basically amounts to this: Mass is what makes acceleration proportional to force.⁷ This is a *practical* definition. It lets us *make use* of the idea of mass. Practical definitions are what make the successful practice of

⁶ Even as this is being written, efforts are underway to ground the idea of "mass" in something regarded by speculative physics as being "more primitive." This "more primitive thing" is called the Higgs field. Attempts are being made to experimentally discover its "signpost entity" (the Higgs boson). If physicists should succeed in this endeavor, a Nobel Prize will be forthcoming and the mystery will be pushed back a foot or so (the question will then become: What *is* the Higgs field?).

⁷ More correctly, mass is what makes "momentum" in physics proportional to velocity and "force" is the time rate of change of momentum. This better "definition" came after Newton but it is still a practical definition and in it "mass" remains an undefined *ontological* primitive.

science possible despite the metaphysical ignorance in which most scientists operate.

However, even the practical definitions of scientific primitives are at root empirical and contingent. Were this not the case, scientific theories of long standing and with excellent track records would not be overturned, as they are from time to time, by new discoveries; the history of science teaches us that this is true. We say the object of an idea is **transcendent** if it stands beyond the horizon of possible experience. We say it is **transcendental** if its idea is necessary for the possibility of experience. The categories of understanding are practical, pure, and *not* contingent precisely because these notions are necessary for the possibility of experience as human beings "come to have" experience.

The real definitions of the categories presented above are non-simple precisely because they are required, as practical definitions, to explain how and in what way these notions *produce* cognitions of experience. The Critical system and its Critical ontology is relevant for all the special sciences because, to put it bluntly, there can be no science without the scientist. Human understanding grounds all sciences. Scientific truths are not implanted in our minds by a god nor stamped as an impress in our minds by a fictitious copy-of-reality mechanism; they are synthesized in the labors to understand Nature carried out by the *human* efforts of scientists.

The phrase "real definition" does not mean "what the definition really is." Broadly speaking, a *Realdefinition* is *what it means to be real*. This is the epistemological-centeredness of Critical metaphysics. Nature (the Object of Rational Cosmology), Reality (the Object of Rational Theology) and all the composed Objects in the *nexus* of Nature-Reality are objectively understood by and through rules of thinking that are nothing else than the categories of understanding. Thinking is cognition through concepts and the categories are the rules for the construction of concepts.

How, then, is *error* possible? That each of us makes errors of judgmentation (not "errors in judgment") is a fact so common we need not belabor the proof of their existence. Determining judgment does not make errors; that would be tantamount to saying the process of determining judgment does not obey its own rules (the categories), and to say that is to say determining judgment is not a process at all. So how are errors possible? The answer to this is quite easy. Every cognition requires, in addition to concepts, the presentation of an intuition and intuition is presented as a sensible representation marked by reflective judgment. But reflective judgment is non-objective; the matter of a reflective judgment is affective perception. Its principle is the principle of expedience. Every item of objective knowledge begins as an inference of reflective judgment (see Figure 5.2.1) and this is a representation based on merely *subjective* grounds of inference. To be *objectively valid* as a representation of knowledge, the entire context of a

concept must have complete coherence with all other concepts in the manifold of concepts. Coherence of the *nexus* is the condition *sine qua non* of formal *truth* in understanding. This is why Joad's "chair" is a chair and not a rhinoceros.

At the moment of its making, every judgment of cognition has this coherence *so far as the Organized Being knows*. The judgment is expedient for a purpose of pure *practical* Reason (which knows no objects and no affective perceptions) and at the moment of its making it is a *belief*. But the manifold of concepts is an open system, an on-going construction project of pure speculative Reason, and all concepts are liable to the later discovery of lack-of-coherence in the manifold. This discovery is, judicially, the discovery of error – a mental event contradicting the law of practical Reason's categorical imperative – and is itself a condition of inexpedience requiring corrective actions to be taken. This action is not taken to "re-establish truth"; it is taken to remove the inexpedience and replace it with an expedient representation. The grounds for judgment in reflective judgment are entirely subjective. **Truth** is the congruence of the cognition with its object, and reflective judgment is non-objective. In a manner of speaking, "Reflective judgment does not care about truth; it only cares about happiness." Happiness is just as possible through **ignórance**⁸ (the consciously deliberate act of ignoring something) as through knowledge. To paraphrase Thomas Gray, "ignórance can be bliss."

To understand this and the other phenomena of empirical cognitive psychology, we must turn to the mental physics of structuring the manifold of concepts. This takes us into the topic of transcendental Logic viewed narrowly from the logical reflective perspective in the theoretical Standpoint. Here we will examine the logical functions of judgment to which this chapter has referred above. This topic is the topic of Chapter 6, to which we will proceed shortly. But before doing so we shall deal with one last bit of ontological business.

§ 5. Negation, Opposition, and Negative Magnitudes

The categories of negation and community introduce into ontology two important and closely associated ideas, namely those of real-opposition-in-Quality and real-opposition-in-Relation. It is an unfortunate shortcoming of the English language that we have but a single word, opposition, for both of these ideas. I call this a shortcoming because while these two ideas are closely associated, they are nonetheless quite different ideas and so "opposition" in English has two quite homonymous usages. The ontological importance of these two brands of opposition is this: These ideas require the introduction of the concept of "negative intensive magnitudes." Let us recall that an intensive magnitude is a unity in which the idea of multiplicity can be represented only by an

⁸ pronounced ig nōre' ānce. It is the mental act to which corresponds the action of ignorance.

approximation to negation. A **multiplicity** is a composition of parts joined to each other. If these parts are homogeneous the multiplicity is called a **quantum**. A **measure** is a unit that makes the size of a magnitude knowable by counting [KANT: 29 (989-994)].

A magnitude for which a measure exists can only be an extensive magnitude; an intensive magnitude has no measure. For example, in mathematics there is no smallest "real number" capable of being used as a measure and so, as we discussed earlier, the "real numbers" in mathematics provide an example of intensive magnitude. What, then, does it mean when we say we can only represent the idea of a multiplicity in an intensive magnitude "by an approximation to negation"? We do not speak here of the *category* of negation; we are speaking here of the *idea* of what it means *to negate* an intensive magnitude. This is where the two ideas of real-opposition-in-Quality (**Widerstreit**) and real-opposition-in-Relation (**Entgegensetzung**) become crucial. *Widerstreit* and *Entgegensetzung* stand as members of a disjunction under the idea of opposition-in-general (**Opposition**). Kant tells us,

"Opposed to one another" is about what the one cancels which is established through the other. This *Entgegensetzung* is two-fold: either *logical* through contradiction, or *real*, i.e. without contradiction.

The first *Opposition*, namely logical, is that upon which one so far has purely and simply concentrated attention. It subsists in that something is simultaneously affirmed and denied of the very same thing. The consequence of this logical conjunction is *nothing at all* (*nihil negativum irrepraesentabile*⁹), as the law of contradiction asserts. A body in motion is something; a body which is not in motion is also something (*cogitabile*¹⁰); but a body which is both in motion and also, in the very same sense, not in motion is nothing at all.

The second *Opposition*, namely real, is that where two predicates of a thing are opposed but not through the law of contradiction. Here, too, one cancels that which is established through the other but the consequence is *something* (*cogitabile*). Moving power of a body in one direction and an equal tendency of the same in the opposing direction do not contradict one another, and as predicates are possible at the same time in one body. The consequence from it is rest, which is something (*repraesentabile*¹¹). It is nonetheless a genuine *Entgegensetzung*. For what is established by the one tendency, when it is on its own, is cancelled by the other, and the two tendencies are genuine predicates of one and the same thing, and they belong to it at the same time. The consequence from it is also nothing, but in another sense to that in which it occurs in a contradiction (*nihil privativum*¹², *repraesentabile*). We shall in the future call this nothing zero = 0, and its meaning is the same as that of negation¹³ (*negatio*¹⁴), lack, absence. [KANT: 2 (171-172)]

We have here the *Realerklärung* of the idea of "zero" – an idea that has had an interesting

⁹ "an irrepresentable negative nothing"

¹⁰ "conceivable"

¹¹ "representable"

¹² "a nothing of privation"

¹³ Kant's word here is "*Verneinung*"; for the category of negation he uses the word "*Negation*."

¹⁴ "negating"

history in mathematics. In pure mathematics the number 0 is properly called "the additive identity element of an additive group"; it is the "number" such that $A + 0 = A$ for any "number" in that group. *Practically*, this is little else than a very precise way to say "leave A unchanged."

But if we wish, as we do, to apply arithmetic to the description of Nature, the objectively valid *real* use of "the number 0" is as Kant described above: to denote a lack or absence that can still be said "to be something" without contradiction. In this context, to write $A + B = 0$ means that one something (A) and another something (B) cancel each other's effects on the Object and this is the *Realerklärung* of the mathematical idea of "additive inverses." Any junior high child taking algebra will be taught to immediately rewrite this as $B = -A$ and conclude B is "a negative number." But in order for this B of facet B to correspond to a something β in facet A we must regard this β as a magnitude and then we are faced with the task of explaining how any *real* magnitude can be "negative."

This explanation, however, is very easy to make. β is a "negative magnitude" *only in Relation to the magnitude A*. Put in other words, all magnitudes are negative only in regard to some other magnitude which, when predicated of the same object at the same time, produces a cancellation (i.e. a lack or an absence of effect). Such a Relation is always a Relation grounded in the category of community. This is because of the condition that A and B are predicated of one and the same Object at one and the same time (coexistence in time). It is worthwhile to note that we could just as well have written $A = -B$ earlier, been equally correct mathematically, and concluded the very same thing about A , i.e. that it is a negative magnitude. The only difference is which of the two magnitudes we choose to call "negative" and this is nothing but a relative difference. This sort of conjunction, i.e. $\{B = -A \text{ and } A = -B\}$, is characteristic of a Relation of community.

This cancellation of magnitudes *as an outcome* is a real-opposition-in-Quality, i.e. *Widerstreit*, and this gives us the idea of Quality subsisting in the mathematical idea of zero = 0. In our organization of transcendental topic (that is, the general 2LAR of representation), Kant's word for opposition under Quality in that 2LAR is *Widerstreit*.

For real *Widerstreit* is everywhere met where $A - B = 0$, i.e. where one reality combined with another in one subject cancels out the effect of the other, which is unceasingly placed before our eyes by all hindrances and countereffects that nonetheless, since they rest on powers, must be called phenomenal realities. [KANT1: B329]

There are ontological consequences that follow from this real understanding of *Opposition*. Two of them are ontological theorems we shall call the first and second **rules of real opposition**. The first of these is:

By this real *Entgegensetzung* the following law as a **fundamental rule** is to be noted. Real repugnance is found only in so far as for two things, as *positive grounds*, one

cancels the consequence of the other. Suppose moving power be a positive ground; a real *Widerstreit* can be found only insofar as another moving power is connected with it such that the consequence is reciprocally cancelled. The following may serve as the general proof. One and another conflicting determinations must *firstly* be met with in the very same subject. For supposing that there is one determination in one thing, another, whatever it may be, in another; in this way no actual *Entgegensetzung* arises. *Secondly*, one of the opposing determinations cannot be the contradictory opposite of the other; for if it were the *Widerstreit* would be logical and, as we proved above, impossible. *Thirdly*, a determination cannot negate something other than what is established through the other; for otherwise there could be no *Entgegensetzung* at all. *Fourthly*, insofar as they conflict with one another, they cannot both be negative for, if they were, through neither is something established which through the other is cancelled. Accordingly, in every real *Entgegensetzung* the predicates must both be positive in such a way that in connection each reciprocally cancels the consequence of the other in the same subject. [KANT: 2 (175-176)]

The second ontological theorem is as follows:

The **second rule**, which is really the reverse of the first, runs thus: Everywhere where there is a positive ground and the consequence is nonetheless zero, there is a real *Entgegensetzung*, i.e. this ground is in connection with another positive ground which is the negative of the first. . . In the general sense this is as much to say that the cancellation of a positive ground always demands a positive ground as well. Suppose there were a positive ground for a consequence b ; then the consequence can never be 0 except insofar as there is a ground for $-b$, i.e. there is something genuinely positive which opposes the first: $b - b = 0$. [KANT: 2 (177)]

A straightforward corollary to these is: Because sensation is that in sensibility that corresponds to the matter of a real object said to produce the sensible effect, the lack of sensibility in an intuition can never prove the non-existence (non-*Dasein*) of the object because there could be another object in *Entgegensetzung* to the consequence of the first in the sensibility of the Organized Being. We will later see that this has important consequences for mental physics. As it turns out, it also has important consequences for physics as well (especially for the quantum theory), but since this was discussed in some depth in *CPPM*, I will not go into it here and we will move on to Chapter 6.