PART I

BERNARD LONERGAN, S.J.

CHAPTER 1

PRELIMINARY EPISTEMIC CLARIFICATIONS

Lonergan, in his exposition of the problem of the eternity of God, distinguishes people of 'common sense' and 'philosophically minded' people.[1] This distinction will emerge twice in my analyses: First, the problem of the eternity of God is not of great concern (it has no real value) for common sense people. They might occasionally wonder about possible answers, but they do not have tools for justifying any of them. The problem is not a concern even for all Christians, or all Christian theologians or philosophers. It concerns only some believers in the existence of God: the theoretically minded theologians or philosophers. Second, the decision between temporality and non-temporality of God in its final stages of Lonergan's analysis is a decision between common sense ('time contains being'), and methodical intellectual, especially philosophical, inquiry ('being contains time'). Hence, the man of common sense tends to the affirmation of a temporal God, and the theoretically minded person would, according to Lonergan, rightly affirm God as timeless. The terms 'common sense' and 'intellectual' or 'philosophical' have a specific meaning in Lonergan, which has to be explored before we move to the scientific way of knowing and its

[1] See Lonergan, B., *De scientia*, 3b.

implications for the world-order, and then to God's knowledge of the concrete world-process.

One might suggest that common sense can be excluded from my exposition, since it has different interests, different goals, and different criteria of truth than philosophy and/or theology have. The problem is that the Christian religion, and perhaps any religion, seems to address primarily what is called 'commonsense' people. *Sensus fidei* of commonsense people has a considerable importance in Christianity. Even in the empirical sciences common sense is essential (even though not sufficient) for new discoveries and developments. Hence common sense and its influence on philosophy, particularly its influence on our topic, has to be explained. This necessity leads us to a difficulty – namely, the meaning of Lonergan's term 'common sense' is not the same as the meaning used nowadays. This is another reason why Lonergan's understanding of common sense has to be addressed.

I will divide the themes of this chapter into two parts. First, Sections 1.1 to 1.3 are concerned with Lonergan's explanation of the rise of common sense and scientific knowing from different elements of experience. In this context, several characteristics and limitations of Lonergan's conception of common sense will be briefly explored. Lonergan characterizes scientific inquiry – as opposed to common sense – by a set of specific heuristic structures. Since the meaning of Lonergan's 'heuristic structures' may be unknown to many readers, I will dedicate a whole Section 1.3 to its clarification. Second, in Section 1.4, I will explore Lonergan's general theory of human knowing, which is explanatory, and implements (strictly) scientific mode of inquiry. This general cognitive theory will be crucial for later metaphysical considerations in the Chapter Three. Heuristic structures of Lonergan's epistemic theory will be important for explanation of the world-order in the Second Chapter.

1.1. Patterns of Experience

The best approach to the elucidation of Lonergan's terms like 'common sense,' 'philosophical,' and 'scientific' seems to be through his understanding of different patterns of experience. The patterns of experience are organizing principles of various elements of experience: 'The pattern is a set of intelligible relations that link together sequences of sensations, memories, images, emotions, and bodily movements.'[2] These relations are conscious and they can involve different kinds of concerns.

Lonergan distinguishes biological, aesthetic, intellectual, and dramatic patterns of experience. The biological pattern designates sequences of experiences, which 'converge upon terminal activities of intussusceptions or reproduction, or, when negative in scope, self preservation.'[3] The biological pattern is concerned with basic evolutionary tasks like growth, nourishment, reproduction, and survival. Conscious activities of this pattern usually deal (rapidly, effectively, and economically) with external situations. Extroversion is a basic characteristic of the biological pattern dealing with external conditions and opportunities.

The aesthetic pattern of experience goes beyond the confines of biological purpose. There is spontaneous self-justifying joy in some experiences, which needs no biological justification. Play of children, for instance, or sports activities are

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[2] *CWL* 03 (*Insight*), p. 206.

experiences which occur for the sake of experiencing. This pattern is primarily concerned with feelings, in which some elementary meanings are involved, but not understanding (insights) in a strict sense. The next, artistic pattern of experience, arises when 'the artist exercises his intelligence in discovering ever novel forms that unify and relate the contents and acts of aesthetic experience.'[4] Art liberates the artist (his experience and intelligence) from the drag of biological purposiveness, and yet it does not constrain intelligence with mathematical proofs, scientific verifications, and common sense factualness.[5] Art exhibits the reality of the object without defining the truth and value, and without any practical goal. It is pre-scientific and pre-philosophic.

The intellectual pattern of experience is similar to the aesthetic pattern, since it involves a similar liberation that generates the spirit of intellectual inquiry. It is also similar to the artistic experience, since it exercises control of the flow of the emotions, sensations, and images. When a theoretician works on a problem 'even the subconscious goes to work to yield at unexpected moments the suggestive images of clues and missing links, of patterns and perspectives, that evoke the desired insight.'[6] Sensitive spontaneity is transformed through inquiry and insight with the help of memory and imagination. In the intellectual pattern,

> the detached spirit of inquiry cuts off the interference emotions and conation, …it penetrates observation with the abstruse classification of science, …it puts the unconscious to work to have it bring forth the suggestions, the clues, the perspectives, that emerge at unexpected moments to release insight.[7]

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[3] *CWL* 03 (*Insight*), p. 206.
[4] *CWL* 03 (*Insight*), p. 208.
[5] See *CWL* 03 (*Insight*), p. 208.
[6] *CWL* 03 (*Insight*), p. 209.
[7] *CWL* 03 (*Insight*), p. 213.

One spontaneously slips into intellectual pattern as a response to the exigencies of mind when confronted with a problem. All human life can become a constant absorption in the effort to understand.

In the ordinary human life, one can find a certain purposiveness, which is concerned with getting things done. Behind this concern, there are motives conditioned by memory and imagination, pleasure and pain. In these motives and purposes one can discern a specific artistic component, more precisely, a dramatic component. Human desires are not simply biological impulses. The satisfaction of the impulses of hunger for food, for instance, is accompanied by special usage of the equipment of the dining room, and by table manners. The biological pattern is transformed into a life with dignity. A lack of dignifying elements causes embarrassment and shame, and it invites to laughter and ridicule. This seems to be the reason why Lonergan calls this pattern 'dramatic.'

The dramatic pattern of experience is grounded in the plasticity and indeterminacy of the relation between neural and psychic processes. Neural processes are subordinated to psychic determination in the human subject. Human bodily movements are no longer determined rigidly by the conative, sensitive, and emotive elements. This plasticity and indeterminacy grounds dramatic variety. However, neural patterns and processes demand psychic representation and conscious integration. The relation between neural processes and conscious integration becomes much more complex, if one assumes that memory and imagination, conation and emotion, pleasure and pain, all have their corresponding counterparts in neural processes and originate from their specific demands. The elements of these demands enter consciousness within a certain pattern, which is integrated with interests, anticipations, and activities of the intellect. In Lonergan's system, it is the dramatic pattern of experience, which comprises this complex relation:

> The dramatic pattern of experience penetrates below the surface of consciousness to exercise its own domination and control, and to effect, prior to conscious discrimination, its own selections and arrangements.[8]

For our purpose it is important that there is a possibility of a negative influence of the dramatic pattern in intellectual inquiry. The demands of neural processes and desires enter consciousness in a pattern formed by a pre-selection and pre-arrangement.[9] Prepossessions and prejudices can vitiate theoretical investigations, and much more easily can elementary passions bias understanding in practical matters. In addition, an anticipated insight might not be wanted. Exclusion of an insight has further consequences: 'To exclude an insight is also to exclude the further questions that would arise from it, and the complementary insights that would carry it towards a rounded and balanced viewpoint.'[10] A lack of a fuller view results in misunderstanding.

To sum up, different elements of experience provide the context in which the intellectual pattern of experience develops. Intellectual inquiry starts with a self-justifying joy of liberation from biological purposiveness. In confrontation with a problem, the intellectual pattern exercises control over the flow of the emotions, sensations, and images in order to evoke the desired insight. On the one hand, neural processes and the dramatic pattern of experience are essential to the occurrence of an insight (understanding of the problem and its solution); on the other hand, they can disrupt or disorient intellectual inquiry through abnormality, repression, screening

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[8] *CWL* 03 (*Insight*), pp. 213-214.
[9] See *CWL* 03 (*Insight*), p. 214.
[10] *CWL* 03 (*Insight*), p. 214.

memories, prejudices, etc. The detached and disinterested spirit of inquiry, which is radically different from other desires, has to cut off the disruptive inferences of the dramatic pattern of experience to bring forth the needed suggestions and clues.

1.2. Common Sense and Explanatory Theories

The intellectual pattern of experience can evolve in two different ways, depending on the interest and goal of the subject. The goal of intellectual endeavor can be 'commonsense' knowledge or 'scientific' knowledge. Both these terms have a specific meaning for Lonergan. 'Common sense' is a vague name for the unknown source of 'elementary judgments which everyone makes, everyone relies on, and almost everyone regards as obvious and indispensable.'[11] Commonsense people, Lonergan says, are interested in the particular and concrete, immediate and practical.[12] They do not have theoretical aspirations (in the sense of a search for universal truths), even though they often are intelligent and their decisions are reasonable. Common sense is under the dominance of practical concerns, practical considerations and pragmatic sanctions. Despite its practicality, common sense is convinced that ideas work only if they are true. The pragmatic criterion of truth is success, or the absence of the failure that would reveal the necessity of self-correction. The self-correcting process of common sense is a circuit, 'in which insights reveal their shortcomings by putting forth deeds or words or thoughts, and

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[11] *CWL* 03 (*Insight*), p. 314.
[12] See *CWL* 03 (*Insight*), p. 202.

through that revelation prompt the further questions that lead to complementary insights.'[13]

According to Lonergan, commonsense judgments can be known to be correct only by individuals judging in individual situations, because an insight into a concrete situation is required in order to apply the previous set of insights. Thus the common element in common sense is not a list of universal truths, not even a list of particular truths. Rather, 'it is a collaboration in the erection of a basic structure by which, with appropriate adjustments, each individual is enabled to fill out his individual list of particular truths.'[14] Commonsense judgments form through a self-correcting process, the most basic structure of the realm of specific (mainly practical) meanings related to our everyday life. Commonsense knowledge is 'common without being general, for it consists in a set of insights that remains incomplete until there is added at least one insight into the situation in hand.'[15]

It is important to note that this understanding of 'common sense' can involve some common non-sense and false cultural beliefs. In addition, everyone can understand and apply particular commonsense judgments differently. Therefore, in the self-correcting process, one has to distinguish whether the origin of a failure is in a person's misunderstanding of the particular situation, or in misunderstanding of generally accepted commonsense judgments, or whether commonsense judgments of a whole society have to be corrected.

The dramatic pattern of a person's experience and egoistic interests are often at the root of bias, which undercuts progressive process of human intelligence driven

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[13] *CWL* 03 (*Insight*), p. 197.
[14] *CWL* 03 (*Insight*), p. 324.
[15] *CWL* 03 (*Insight*), p. 199.

by the pure desire to know. According to Lonergan, common sense is unable to rise completely above bias (especially above, what he calls 'general bias'). An attempt of dealing with bias is introduction of scientific thinking into the lives of individuals and/or society.

The specificity of scientific knowing, according to Lonergan, is that it moves through intellectual inquiry from description of the object's relations to us to the explanation of the relations of things among themselves. In Lonergan's words:

> The advance of science is from description to explanation, from things as related to our senses, through measurements, to things as related to one another. It is clear that common sense is not concerned with the relations of things to one another, and that it does not employ the technical terms that scientists invent to express those relations.[16]

Science tends to eliminate systematically all the relations between the object and inquirer, in order to ensure more objectivity and decrease of possible influence of personal and social bias and prejudice. Ordinary descriptions of common sense derive their terms from everyday experience, and this is why they are relatively constant. Sciences, on the other hand, tend to use exact technical language, and because of their development, they are involved in a constant and systematic revision of their fundamental terms. There is not, nevertheless, a sharp separation between common sense and science. Scientists have to be equipped with a certain degree of practicality. They need common sense to apply their methods properly in experimentation. Even logicians need common sense if they want to grasp the meaning of human utterance. The domains of science and common sense are, Lonergan explains, complementary:

> The whole of science, with logic thrown in, is a development of intelligence that is complementary to the development named common sense. Rational

[16] *CWL* 03 (*Insight*), p. 201.

> choice is not between science and common sense; it is a choice of both, of science to master the universal, and of common sense to deal with the particular.[17]

Lonergan also says that common sense and science function in two separate domains. They deal with reality from different viewpoints:

> All the affirmations of empirical science contain the qualifying reservation 'from the viewpoint of explanation.' Similarly, all the affirmations of common sense contain the qualifying reservation 'from the viewpoint of ordinary description.'[18]

Strictly speaking, science tends to eliminate any viewpoint. Different viewpoints exist only in common sense descriptions, or in scientific hypotheses that are not yet fully universal (explanatory). A theory is explanatory or it involves a viewpoint, not both.

There is also a methodological separation between these two domains. It is true that both ordinary descriptions and the sciences are involved in self-correcting process (circuit) of learning, but they have different goals and they work with different standards and criteria. The fundamental difference is in the criteria of relevance: What is a further pertinent question for science is not necessarily a further pertinent question for ordinary description.[19]

In addition to complementarity and separation of the two domains, Lonergan says that they cannot conflict:

> The intelligibility that science grasps comprehensively is the intelligibility of the concrete with which common sense deals effectively. To regard them as rivals or competitors is a mistake.[20]

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[17] *CWL* 03 (*Insight*), p. 203.
[18] *CWL* 03 (*Insight*), p. 320.
[19] See *CWL* 03 (*Insight*), p. 320.
[20] *CWL* 03 (*Insight*), p. 323.

These are the essential characteristics of Lonergan's explanation of common sense and scientific knowing. Some further clarifications have to be made before we advance any further. The specification of the 'scientific' in terms of the relations among the objects of inquiry, and 'common sense' descriptions in terms of relations of the objects to us (inquirers) seems too vague, and perhaps confusing. Likewise, saying that scientists are interested in universal explanations (universal principles and laws) is also too vague.

In fact given Lonergan's preliminary definition, there are three possible kinds of 'scientific' explanation. I will illustrate these different explanations by referring to the procedures involved in photography. The first one is an explanation that relates possible characteristics of the novice photographer, such as mastery of basics in making photographs, to the achievement of an interesting combination of two or more digital images:

> Once you have mastered the basics of digital imagining, it's a natural step to start combining several pictures into new and original compositions. And though initially you might find such montages challenging, you'll soon progress from bringing two or three subjects together to more ambitious projects. The key to success here, though, lies in having an interesting idea in the first place, rather than just throwing together a collection of disparate images.[21]

The second relates the photographer's presentation of colors to the natural conditions:

> A stretch of water can add considerable interest to a photograph – particularly if it is still. Its surface becomes a mirror, and therefore can change color depending on the color of the sky – turning from the deepest blue to the brightest orange, depending on the lightning conditions.[22]

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[21] Bavister, Steve, *Digital Photography* (London: Collins & Brown Ltd., 2000), p. 148.
[22] Hedgecoe, John, *New Introductory Photography Course* (London: Focal Press, 2000), p. 92.

The third relates dynamic ranges of different scanners to a scale of density units and to the composition of sources:

> Minolta claims a dynamic range of 4.2 density units. The range will be much less for silver images, because the highly collimated scanner light scatters from silver grains (the same effect that produces higher contrast with condenser enlargers). Scanning a calibrated silver step tablet showed the Scan Multi provided clean, good-looking black-and-white information up to 2.7-3.0 d.u.[23]

All three passages are 'scientific' and 'explanatory' on Lonergan's preliminary definition, because they relate things to one another. Since no one of the three examples requires any insight into a particular situation and no one is related to a specific reader, they do not belong to common sense descriptions. However, the first and second examples are written for ordinary people interested in improving their skills in making photography. They would normally be considered as common sense generalizations, but they do not match Lonergan's definition of common sense and (scientific) explanation.

The third example leads us to a consideration about Lonergan's concept of 'scientific' and 'explanatory' theory. The example is clearly a scientific one because of its technical language and exactness. It is also explanatory, since it relates the objects of inquiry among themselves. The first two examples show that a theory can also relate the objects of inquiry to general human cognitive operations or capabilities, such as human thinking or sense perception in general. Consequently, 'explanatory' seems to be a broader term than 'scientific.' The same idea arises when Lonergan claims that his metaphysics is explanatory and scientific, because it is methodical and it relates the objects of knowing to human cognitive abilities without any particular viewpoint (of common sense). This metaphysics, however, would not be considered scientific by many (like Swinburne), because it tries to integrate different cognitive abilities (such as sense perception and ability to judge) with the world-order. Human abilities and the world-order are objects of investigation of several particular (strictly) empirical sciences. They are integrated into Lonergan's 'scientific' kind of metaphysics. It seems to be quite controversial to say that it is a *science* that integrates other particular empirical sciences and/or their discoveries. Several aspects of this controversy will arise in the section on emergence of complex systems, and in my exposition of Swinburne's understanding of science as a theory of causal relations. I will use term 'strictly' empirical or scientific to denote particular empirical sciences as distinct from Lonergan's more general 'scientific' and 'explanatory.'

Explanatory theories tend to explain different relations among their objects. Lonergan deliberately avoids the language of causality for most of *Insight*, because there are not merely causal relations among the objects of cognitive inquiry. In a broader philosophical and/or metaphysical (explanatory) context, there are also the relations of higher integration and space-temporal relations of nonsystematic processes, which are important aspects of reality. It is a task of both science and philosophy in their own way to recognize and consider these relations, and thus avoid their reduction to causalities recognized in particular strictly empirical sciences.

1.3. Heuristic Structures of Empirical Inquiry

[23] Ctein, 'Minolta DiMAGE Scan – Multi-Pro Film Scanner,' *Photo Techniques* (November/ December 2002), p. 56.

The goal of this section is to explain in greater detail the scientific modes of intellectual inquiry and thus provide basic terms for Lonergan's explanation of the world-order. The world-order is composed of the orders found in nature and of the social structures introduced by human society (which can be ordered, or to some extent disordered). Lonergan recognizes that the explanatory account of the world-order is to some extent already implied in the basic principles (structures) of scientific or empirical knowing.

Lonergan distinguishes heuristic notions, structures, and methods in empirical sciences.[24] A heuristic *notion* of an object of inquiry is the anticipation of this object in the scientist's wonder, when he or she asks questions about it and anticipates insights into its relatedness to other things. It is 'the notion of an unknown content, and it is determined by anticipating the type of act through which the unknown would become known.'[25] For instance, the notion of the 'nature of' an object, which is the goal of classical inquiry, is already anticipated in the very first stage of inquiry. An heuristic *structure* on the other hand is 'an ordered set of heuristic notions.'[26] The manner in which heuristic notions can be ordered will be explained in the next sections of this chapter.

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[24] Photographer Sean Kernan explaines the meaning of 'heuristic' in his talk at the commencement of the photography and film programs at Rockport College: 'The word heuristic derives from the Greek word "eureka," which means *I have found it*. And it describes a process in which we give ourselves so deeply to our seeing that we take things right into ourselves and then give forth a new version of them from inside, tinted by all of the possibilities within us, transformed the way an oyster takes grit and makes a pearl.' *Lenswork*, No. 52, Apr-May 2004, pp. 31-32.

[25] *CWL* 03 (*Insight*), p. 417.

[26] *CWL* 03 (*Insight*), p. 417.

An heuristic *method*, as with any method, is 'a set of directives that serve to guide a process towards a result.'[27] The result of heuristic method is a relevant insight. It is a personal attainment of grasping an intelligibility. Occurrence of an insight is not a simple following steps, since it requires creativity, intelligence, and usually, if the insight is of a great significance, an extensive background knowledge and experience. Following the method cannot guarantee the occurrence of the desired insight, but it can significantly increase the probability of its occurrence.

Lonergan's terminology should not be confused with the expressions of other recent scientists and philosophers of science. When they speak about 'scientific method' they usually mean the concrete methods used to test hypotheses in different scientific fields. This is a more restricted conception of method than the Lonergan's heuristic method. Lonergan was primarily interested in the occurrence of insights (acts of understanding), which grasp intelligible aspects that can then be applied to the reality under investigation. Only when such insights occur, can the formulation of hypotheses and their verification follow. Hence Lonergan's method is concerned with a deeper and more personal aspect of empirical investigation. It is evident that this is not a standard approach to sciences, and it makes exposition of Lonergan's philosophy rather complicated. Modern sciences and philosophies use quite a different terminology and approach. Even the interest in the occurrence and psychological aspects of insight itself might seem to be odd.[28]

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[27] *CWL* 03 (*Insight*), p. 421.

[28] There seem to be very few articles (if any at all) about insight in psychology journals in the last sixty years. Lonergan was inspired by Eliot Dole Hutchinson, who published his articles in 1940's. ('Varieties of Insight in Humans,' *Psychiatry* 2 (1939), pp. 323-332; 'The Period of Frustration in Creative Endeavor,' *Psychiatry* 3 (1940), pp. 351-359; 'The Nature of Insight,' *Psychiatry* 4 (1941), pp. 31-43. Reprint: P. Mullahy, ed., *A Study of Interpersonal Relations*, New York, Hermitage Press, 1949 [Paperback: New York, Grove Press, 1957])

The most important aspects of the world-order for Lonergan are the systematic and nonsystematic processes. Lonergan approaches them in terms of classical and statistical heuristic structures. Exact knowledge of new laws of physics or physical cosmology is not essential to his explanation of these processes. What is essential, however, is Lonergan's explanation of heuristic structures of empirical methods, or, in other words, what scientists are doing when they engage in their investigation.

Lonergan recognized differences in the mentalities or intentional attitudes of distinct forms of investigation in empirical sciences. Among these are two distinct types of insights and explanations in the procedures of theoretically minded scientists: classical and statistical. The meaning of 'classical' is specific to Lonergan's philosophy,[29] and it is contrasted with what he calls 'statistical.' Before these meanings are explained, it is important to say that, according to Lonergan, there is a twofold scissors-like dynamic in empirical research, and especially in the classical and statistical heuristic structures, which culminates in the desired understanding (insight) of a specific kind. First, there is a lower-blade movement from data simply given in sense perception to described and sorted data, toward the understanding of the intelligibility of data. Second, there is an upper-blade process of narrowing down the range of applicable theoretical apparatus (conjugates and functions) from very general considerations toward a more specific solution, which best fits the classified data. This general dynamic is the same for classical and statistical inquiry.

I will start with the simplest heuristic structures of empirical (scientific) inquiry – classical and statistical – and then I will move to two more complex structures – genetic and dialectic.

1.3.1. Classical Heuristic Structures

Empirical inquiry starts with observations, description, and classification of what is known and unknown. The knowns are measurable data reported in tables and graphs. Anticipated unknowns are to be grasped by new insights and formulated in new conceptions and hypotheses. In classical inquiry, the unknown sought for is the 'nature of' data. A classical inquirer notes that 'nature of…' must be the same for all similar sets of data. The sets of similar objects have the same nature.[30]

Similarity of things in different sets can be of two kinds: First, similarities of things in their relations to us, such as similarity in color or sound. Second, there are similarities in their relations to one another, such as relations of proportions, antecedents or consequents, successive forms of development, etc. Inquiry begins with description of data, of their similarities in their relation to us, and through the cycle of inquiry, insight, and experiment, similarities and dissimilarities initially unnoticed by common sense of scientists take on ever greater scientific importance. The result of empirical inquiry into the nature of an object is explanation of similarities and dissimilarities in the relations of the things among themselves, and not the similarities and dissimilarities in their relations to us (similarities and dissimilarities of the experiential conjugates). Universality and the second kind of

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[29] Lonergan usually associates classical laws with natural laws of physics such as Galileo's laws of falling bodies or Maxwell's laws of electromagnetism.

[30] See *CWL* 03 (*Insight*), pp. 60-61. Lonergan should probably say that all sets with the same nature are similar, and not that all similar sets have the same nature. Sets might be similar in an accidental way. For example, there may be the same chemical component (viz. oxygen) in a living organism and in a mineral as well. It is difficult to see which 'nature' they have in common, even though they are similar in having this element.

similarity are implied in the intention and interests of the classical inquirer from the beginning of his research.

After the data of observation are classified according to their mutual relations, the second movement follows. The inquirer uses specific techniques such as infinitesimal calculus to enhance the transition from possible functional relations to measurements. The inquirer considers available equations and functions, which could relate the reported data, and 'moves towards the determination of his indeterminate function by writing down differential equations which it must satisfy.'[31] The most important achievement is the understanding or insight, which links the data with an appropriate function. This insight grasps a concrete intelligibility of the data through a specific function. Insight is then formulated in a hypothesis. This hypothesis is verified with new measurements. Attention paid to the data of new measurements often forces revision of initial viewpoints, insights, and formulations. The same procedure continues in a circuit for each new hypothesis until no further pertinent question arises.

Lonergan illustrates the process of determining the desired function in an example of a search for the general features of a fluid in motion.[32] There is a general equation, which describes the fluid, if this fluid is continuous and is not vanishing:[33]

$$d(ru)/\,dx + d(rv)/\,dy + d(rw)/\,dz = -\,dr/\,dt$$

where u, v, w are velocities, and r is a density.

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31 *CWL* 03 (*Insight*), p. 63.
32 See *CWL* 03 (*Insight*), p. 63. Illustration is taken from Robert Lindsay's and Henry Margenau's book *Foundations of Physics*, (London, Chapman and Hall, 1936), pp. 30-48. (Reprint Woodbridge, Connecticut, Ox Bow Press, 1981)
33 This general equation is in R. Lindsay and H. Margenau derived from a more general Taylor's theorem. See also *CWL* 03 (*Insight*), note g, p. 784.

The equation is adequately modified adding suitable assumptions and restrictions: If the motion is in only one direction, then $v = 0$, $w = 0$; if the density does not vary in time, then $-dr/dt = 0$; or if the fluid is homogeneous, then there is no r on the left side. Modification continues until the desired function is reached.

As a consequence of the fully explanatory character of the classical heuristic structures, scientific discoveries in chemistry, biology, etc. are claimed to be independent of place and time, independent of their origin, and they are claimed to be equally and uniformly valid irrespective of merely spatiotemporal differences. Their laws are invariant. Physical principles and laws, however, are involved in special difficulty. If a particular physical principle or law refers to motion, it also refers to the particular origin and orientation of a reference frame. A change in the choice of reference frame may result in change in the statement of the principle or law. If a special effort is made, the mathematical expression of the physical principles and laws can be found, which undergoes no change in form if moving from one reference frame to another one. They become invariant despite changes in the spatiotemporal standpoint. Lonergan says:

> (1) all scientists expect their correlations and laws to be independent of merely spatiotemporal differences, (2) physicists are confronted with a special difficulty inasmuch as they have to use reference frames, and (3) physics surmount their peculiar difficulty by expressing their principles and laws in mathematical equations that remain invariant under transformations of frames of reference.[34]

In addition to this principle of invariance, Lonergan explains, there also is ‘the most general principle of equivalence, which asserts that physical principles and laws are

[34] *CWL* 03 (*Insight*), p. 64.

the same for all observers,'[35] which is implied in scientific research. The principles and laws are reached by eliminating the relations of things to the senses of observers: 'principles and laws are the same for all observers because they lie simply and completely outside the range of observational activities.'[36] Explanatory character, invariance, and equivalence are the most basic characteristics of empirical (classical) knowledge.

1.3.2. Statistical Heuristic Structures

The goal of statistical investigation is not explanation of universal and invariant characteristics of the nature of things. Statistical investigators do not abstract from particular cases. They count the actual numbers of events or objects, but not because they are interested in such particular cases as particular. Common sense people try to understand concrete cases in their concreteness and particularity. Statistical scientists are interested in statistical regularities and frequencies, which lead to discovery of statistical laws of a different nature than the classical laws.

Lonergan explains statistical heuristic structures in three steps. First, he illustrates an example from the mathematical notion of limit; second, he considers a particular case of the tossing of a coin; third, he moves to the general heuristic structure, which embraces the notion of probability and the methods of determining the precise content of probability.

Lonergan first gives an example from the mathematical notion of limit:

> Let us consider the simple sum:

[35] *CWL* 03 (*Insight*), p. 65.

$$S = \frac{1}{2} + 1/4 + 1/8 + \ldots$$
$$= 1 - 1/2^n$$

where, as *n* increases, S differs from unity by an ever smaller fraction…[37]

The larger the number one assigns to *n*, the smaller the difference between *S* and one. One cannot write an infinite number of terms in *S*. One can, however, understand the principle on which each fraction in the series is constructed. There is nothing in the series that cannot be understood. Intelligence in the absence of further intelligibility, through the abstractive aspect of the insight, claims the whole series to be understood sufficiently for its limit to be equated with unity. Like a mathematical limit, 'a probability is a number that cannot be reached from the data of a problem without an intervention of an insight.'[38]

In the example of tossing of a coin, the actual frequency of 'heads' is the fraction obtained by dividing the number of times when 'heads' occur by the number of tosses. This fraction can differ from one-half, since the result of each toss is settled by the actual combination of determinants. The difference between actual frequencies and one-half is called 'coincidental.' 'Intelligence, then, can grasp a regularity in the frequencies by abstracting from their random features and by settling on the center about which they oscillate.'[39] More generally, intelligence reaches the probabilities of future events by abstracting from the random oscillations of relative actual frequencies to discover a set of universally valid constants (ideal frequencies) for all cases with the same characteristics.

After considering the mathematical notion of limit and examples similar to tossing of a coin, Lonergan explains more general characteristics of statistical

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36 *CWL* 03 (*Insight*), p. 65.
37 *CWL* 03 (*Insight*), pp. 82-83.
38 *CWL* 03 (*Insight*), p. 83.

investigation. The statistical inquirer starts with observation of events. Observation usually means counting the instances of one or more different classes of events. The attention of the inquirer is directed towards actual frequencies of what happens. The observations are classified in a table or graph (histogram). Procedures of statistical investigators like counting, classifying, tabulating, etc. tend toward the determination of probabilities. Investigators proceed first to determine 'relative actual frequencies' formed by dividing the actual number of occurrences by the total number of occasions.[40] Next, they note that actual frequencies vary. Since these variations are random, they seek an ideal numerical ratio, such that the differences between the ideal ratio and the relative actual frequencies are always random. The differences between the ideal and actual ratios form a coincidental manifold. When the number of observations of an experiment is sufficiently large, then – by the law of large numbers – a specific actual outcome will be close to the underlying probability of that outcome. The greater the number of observations, the closer the agreement.

In Lonergan's terms, the statistical inquirer seeks, instead of 'nature of…,' the 'state of…,' which is his or her heuristic notion. Specification of this notion starts with a pre-scientific description, which is later replaced by an explanatory one: 'mere sensible similarity gives way to similarities of conjunction and separation, of proportion and concomitant variation.'[41] Adjectives like 'ordinary' or 'exceptional' are replaced by the actual counting of events. Exact classifications are based on specifications of classical laws. Then the second movement follows. Just as classical inquiry uses practical techniques to aid the transition from possible functional

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[39] *CWL* 03 (*Insight*), p. 85.
[40] See *CWL* 03 (*Insight*), pp. 76-78.
[41] *CWL* 03 (*Insight*), pp. 86-87.

relations to measurements, statistical inquiry develops similar techniques to aid the transition from the theory of probability to the specific ideal frequencies. With the guidance of the calculus of probabilities, the sets of classified events are associated with corresponding sets of probabilities. A leap of constructive intelligence relating actual frequencies to the ideal probabilities is crucial. This grasp resembles Lonergan's illustration of the intervention of an insight in the notion of limit. Even there, one did not need to enumerate all actual instances of a set; it is important to grasp the general explanatory characteristics relevant to theory of probability.

In the following example, I illustrate procedures of statistical inquiry. Let us have thirteen contestants in a round-robin tennis tournament. Every one of the thirteen contestants meets twelve other players. Each meeting is between two players. In the context of the theory of probability, one can ask two questions: (1) What is the number of matches of the tournament? (2) What are the probabilities of 1, 2, 3, … 12 successes of each player? Note that even though we are in the field of statistics or theory of probability, the first question is classical and not statistical on Lonergan's definition.[42]

The given data are: Number of contestants: $c = 13$, a game is a combination of two contestants: $k = 2$, and each contest and plays with all other contestants.

The 'upper-blade of the scissors' of the classical method, or the second stage of the investigation, starts with considerations of the factorial notation, theory of combinations, and Binominal Theorem. The notation $C(c,k)$ or $(^{c}{}_{k})$ denotes the

[42] One can find terms like 'classical statistic' in some recent manuals of mathematics. For instance, Roy B. Frieden distinguishes classical and Bayesian statistics or view, and he also paraphrases J.R. Oppenheimer, 'The word "Classical" means only one thing in science: it's wrong!' Lonergan's understanding has to be carefully distinguished from the meanings used in literature nowadays.

number of combinations of k elements within a set of c elements. The formula of the Binominal Theorem is: $({}^{c}{}_{k}) = c! / [(c-k)!\ k!]$. The factorial notation $c!$ represents the product of all positive integers from 1 to c (inclusive): $c! = 1 . 2 . 3 . \ldots (c - 1) . c$

If these theories are applied to our tennis tournament, we can count how many matches will be played: $({}^{13}{}_{2}) = 13! / [(13 - 2)!\ 2!] = (13 . 12) / 2 = 78$

The total number is 78 matches.

In the calculation of the probability of k successes for each player, one needs to consider a more complex binominal distribution, which holds if there are two possible outcomes of an event (success or failure) and the probabilities of the outcomes are independent and constant:

$$C(n,k)\ p^k . q^{n-k} = n! / [(n-k)!\ k!]\ p^k . q^{n-k}$$

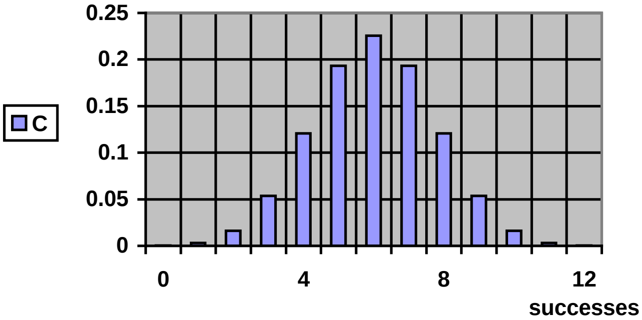
p is the probability of success and q is the probability of failure. Each player has 12 matches ($n = 12$). Hence the distribution is:

$$C(n,k)\ p^k . q^{n-k} = 12! / [(12-k)!k!]\ p^k . q^{12-k}$$

Let us assume that the opponents have the same probability of success ($p = 0.5$) and the same probability of failure ($q = 0.5$).[43] The results are:

k	0	1	2	3	4	5	6
C(12, k)	0.000244	0.00293	0.01611	0.05371	0.12085	0.19336	0.22558

k	7	8	9	10	11	12
C(12, k)	0.19336	0.12085	0.05371	0.01611	0.00293	0.000244



There are two aspects which need to be emphasized at this point. First, in the statistical heuristic structures, we do not seek the intelligibility which would explain the occurrence of each of the events. We only grasp a few relevant aspects in the relations between the events, which are important and sufficient for the theory of probability to determine the probability or frequency of the occurrence of events. In my example, we needed to know the number of tennis players and that every one is going to play singles with each and every participant. Second, Lonergan says that along with verification of probabilities, there also is probability of verifications: 'It is of no little importance to grasp that this second probability shares the name but not the nature of the first.'[44] The probabilities of successes in the chart will be verified in tennis tournaments. Actual probabilities will randomly differ because of the coincidental manifold, which was not taken into account. Probability of verification, however, is of a different kind. It reflects all necessary conditions (such as the number

[43] Note that the same procedure can be used for calculation of the probabilities of *k* successes for stronger and weaker players adjusting the number of probabilities *p* and *q*.
[44] *CWL* 03 (*Insight*), p. 90.

of tournaments, health of the players, weather conditions, etc.) in more general and hence more complex understanding and judgment. Probability of success is represented by a fraction, but, according to Lonergan, it is meaningless to represent the probability of verification by a fraction.[45]

Statistical vs. Classical

There is the same 'scissors-like' process in the classical and statistical procedures. The difference is that the statistical heuristic notion, with which statistical inquiry starts, is 'state of' and not 'nature of.' The objects of statistical investigation are the data that classical inquiry leaves behind.

The classical heuristic structures do not mediate a grasp or explanation of the complete intelligibility of reality. The set of classical laws is never sufficient for a complete explanation of physical reality. Even less does statistical inquiry mediate complete intelligibility; it finds only *ideal* probabilities. There is a random deviation of the actual events from classical and statistical explanations. This random aspect is due to the coincidental manifold in actual happening. Both classical and statistical laws tend to be universal and constant,[46] and each is achieved by a specific process of abstracting:

> In both classical and statistical constructions there is abstraction from the empirically residual aspects of individuality, of the continuum, of particular places and times, and of constant velocity. But classical laws… also abstract from coincidental aggregates…, statistical states express an intelligibility

[45] See *CWL* 03 (*Insight*), p. 90.
[46] See *CWL* 03 (*Insight*), p. 87.

> immanent in coincidental aggregates, and to reach this intelligibility they abstract from the random differences in relative actual frequencies.[47]

The classical laws are more abstract than the statistical, since their users also abstract from knowledge of the coincidental aggregates. On the other hand, statistical laws find some (general) intelligibility in coincidental aggregates.

Random deviation of the events from classical and statistical hypotheses is apparent in the process of verification. Verification has not the same meaning in both cases, since the predictions are different. Classical predictions regard explanatory relations between measurements which converge on the functional relations. Statistical predictions primarily regard the probabilities of events and secondarily determine the corresponding frequencies that in reality may differ at random from the predicted probabilities.

The Canons of Empirical Method

In addition to his analysis of classical and statistical structures of empirical inquiry, Lonergan analyzes the occurrence of insight in empirical inquiry also from another, more general, viewpoint, which gives us a unitary view of the two heuristic structures. The search for the intelligible unity in the diverse rules of empirical method lead Lonergan to formulate six canons of empirical science, which govern the fruitful unfolding of the anticipation of intelligence.[48] The heuristic structures generate the series of scientific theories and systems in accord with these canons.

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[47] *CWL* 03 (*Insight*), p. 87-88.
[48] See *CWL* 03 (*Insight*), p. 93.

(1) *A canon of selection* regards an indefinitely large group of correlations, laws, probabilities, theories and systems, which can be related to sensible data. Scientists have to exclude 'all the correlations and theories that cannot be relevant to empirical inquiry because they possess no sensible consequences,' and the canon of selection 'directs the scientist's effort to the issues that he can settle by the decisive evidence of observation and experiment.'[49] The canon of selection excludes considerations which are not within the confines of empirical science. (2) *The canon of operations* says that the laws provide the guidance for human activity upon sensible objects. This activity brings to light new data, raises new questions, stimulates further insights, generates revision of the known laws, and in due course the discovery of new laws.[50] The canon of operations describes the principle of cumulative expansion of discovery, analysis, verification, and systematization. (3) *The canon of relevance* states that empirical inquiry primarily aims at reaching the intelligibility immanent in the immediate data of sense. This intelligibility, according to Lonergan, 'resides in the relation of things, not to our senses, but to one another.'[51] (4) *The canon of parsimony* forbids the empirical scientist from affirming what he cannot know. Verification is essential for the empirical investigator; therefore, he cannot be said to know what is not verified and cannot be said to be able to know the unverifiable.[52] (5) *The canon of complete explanation* states that the goal of empirical method is the complete explanation of all phenomena or data. (6) *The canon of statistical residue* states that besides inquiry of the classical type there is need for statistical inquiry. The concrete cannot be deduced from any set of systematic

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[49] *CWL* 03 (*Insight*), p. 94-95.
[50] See *CWL* 03 (*Insight*), p. 97-99.
[51] *CWL* 03 (*Insight*), p. 101.

premises alone, because the concrete has a nonsystematic component.[53] The essence of probability explanations is that they set ideal norms, 'and from such an ideal frequency the nonsystematic cannot diverge in any systematic fashion.'[54]

The canon of complete explanation requires more detailed explication. There was, according to Lonergan, a mistake in understanding empirical method early in the history of modern science. For instance, Galileo distinguished primary and secondary qualities. Secondary qualities were regarded as merely subjective appearances, such as sound and heat. Primary qualities were the spatially extended dimensions of the data, presumed to be the real and objective, and characterized as matter in motion. Galileo placed scientific progress in the reduction of the secondary qualities to their 'real' and 'objective' sources in primary qualities. He refuted secondary qualities as mere appearances. Lonergan says that scientific progress consists in the movement from experiential to pure conjugates.[55] While the experiential conjugates remain with the advance of sciences they become less and less important for scientific explanations. Nevertheless, they remain essential for common sense knowing.

The canon of complete explanation, like the canon of relevance, implies the principle that scientifically complete and relevant theory must be explanatory. There are important consequences of the canon of complete explanation for understanding space and time:

> For Galileo they [space and time] were primary qualities, for there would be extension and duration if there were matter and motion, whether or not any animals with their sensitive experiences existed. For us, on the other hand, there is to be drawn the same distinction between extension and duration as

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[52] See *CWL* 03 (*Insight*), p. 102.
[53] See *CWL* 03 (*Insight*), p. 122.
[54] *CWL* 03 (*Insight*), p. 125.

> experiential and as pure conjugates as there is to be drawn between the two formulations of colors…[56]

In Lonergan's theory, experiences of extensions and durations stand to explanatory space and time as the experience of color stands to scientific explanation of the wave-lengths of light. This conclusion rests upon the canon of complete explanation:

> All data are to be explained. The explanation of data consists in a process from experiential conjugates towards pure conjugates. Therefore, from extensions and durations as experienced, there must be a process to extensions and durations as implicitly defined by empirically established laws.[57]

In order to fully explain the nature of extensions and durations, one has to reach explanatory and invariant theory.

1.3.3. Genetic Heuristic Structures

Classical heuristic structures are concerned with the explanations of regular events by means of classical laws or correlations. Genetic heuristic structures are concerned with sequences in which correlations and systematic regularities associated with classical laws change. The goal of genetic method is to explain development, 'the sequence of correlations and regularities of one stage to those of the next.'[58] Lonergan's more exact definition of development is as follows:

> A development may be defined as a flexible, linked sequence of dynamic and increasingly differentiated higher integrations that meet the tension of

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[55] See *CWL* 03 (*Insight*), p. 107.
[56] *CWL* 03 (*Insight*), p. 108.
[57] *CWL* 03 (*Insight*), p. 108.
[58] *CWL* 03 (*Insight*), p. 486.

> successively transformed underlying manifolds through successive applications of the principles of correspondence and emergence.[59]

The principle of correspondence says that the higher integration systematizes differing manifolds, but maintains a measure of flexibility within the limits of the same integration. The principle of emergence denotes coincidental manifolds' tension towards the higher integration.[60] There is an additional third principle; namely, the principle of finality: 'The underlying manifold is an upwardly but indeterminately directed dynamism towards ever fuller realization of being.'[61] Hence development is concerned with a higher integration, which 'is not content to systematize the underlying manifold but keeps adding to it and modifying it until, by the principle of correspondence, the existing integration is eliminated and, by the principle of emergence, a new integration is introduced.'[62] Development denotes the linked sequence of dynamic higher integrations.

Genetic method is implicit in the notion of development and it determines the course of development by the scissors-like action of both particular and general procedures:

> As classical method determines its functions both by the particular procedures of measuring and curve fitting and by the general procedures of invoking differential equations and principles of invariance and equivalence, so also genetic method determines the course of a development by the scissors-like action of both particular and general procedures.[63]

The general procedures involve general direction (transition from potentiality to specific determination of a higher integration), general mode of operation (higher

[59] *CWL* 03 (*Insight*), p. 479.
[60] See *CWL* 03 (*Insight*), p. 477.
[61] *CWL* 03 (*Insight*), p. 477.
[62] *CWL* 03 (*Insight*), p. 478.
[63] *CWL* 03 (*Insight*), p. 486.

integration modifies the lower manifold), and field, 'which may be described as the finality, the upwardly directed dynamism, of proportionate being.'[64]

Concrete instances of development are investigated in three steps. A first step is the descriptive differentiation of different parts. A second step consists in the accumulation of insights that relate the described parts to their operations, events and occurrences. Lonergan explains that 'the further knowledge constituted by the insights is a grasp of intelligibilities that (1) are immanent in the several parts, (2) refer each part to what it can do and, under determinable conditions, will do, and (3) relate the capacity-for-performance of each part to the capacities-for-performance of the other parts.'[65] A third step is the transition from the experiential to explanatory conjugates. (In Lonergan's terms: from the things-for-us to things-themselves). Through appropriate symbolic images of lower processes, the laws of the higher system are grasped. These laws account for regularities beyond the range of the lower system, and they coincide with the related set of capacities-for-performance that previously was grasped in a sensibly presentable way.

The higher system becomes integrator and operator, because 'it so integrates the underlying manifold as to call forth, by the principles of correspondence and emergence, its own replacement by a more specific and effective integrator.'[66]

In human beings, for instance, the sequence of different stages of human development is a sequence of correlations among higher (intellectual) and lower (psychic and organic) developments. Lonergan says, the sequence is 'intelligible inasmuch as each successive higher integration *modifies* the lower manifold it

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[64] *CWL* 03 (*Insight*), p. 487.
[65] *CWL* 03 (*Insight*), p. 489.
[66] *CWL* 03 (*Insight*), p. 490.

systematizes.'[67] The intelligibility grasped in development is the intelligibility of modification of lower levels. It is important to note that Lonergan does not use the notion of causality for relating two different levels, but terms like 'integration,' 'operation,' and 'modification.'

Genetic method explains potentialities of the emergence of higher integrations from lower levels and how the higher levels integrate and modify lower manifolds. Since genetic method involves consideration of potentialities, it calls for a more general metaphysical explanation of the structure of reality.

1.3.4. Dialectical Heuristic Structures

When he explained the differences between classical and statistical heuristic methods, Lonergan said that they represented two different 'mentalities.' He expanded this idea in explaining the differences among classical, statistical, genetic, and dialectical methods. These four heuristic structures can be distinguished based on the differences of the anticipation of inquirers:

> The anticipation of a constant system to be discovered grounds classical method; the anticipation of the intelligibly related sequence of systems grounds genetic method; the anticipation that data will not conform to system grounds statistical method; and the anticipation that the relation between the successive stages of changing system will not be directly intelligible grounds dialectical method.[68]

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[67] *CWL* 03 (*Insight*), p. 487. Italics mine.
[68] *CWL* 03 (*Insight*), p. 509. The dialectical method is grounded in the nonsystematic character of the vertical development.

Dialectical heuristic structures anticipate difficulties in investigating relations between successive stages of a change. A dialectical heuristic structure is a pure form of the critical attitude with general applications. '[I]t is adjustable to any course of events, from an ideal line of pure progress…, to any degree of conflict, aberration, breakdown, and disintegration.'[69] It constitutes a principle of integration for theoretical work about different aspects of human living and it can also integrate factual reports. In addition, with its distinctions between insight and bias, progress and decline, it integrates the critical attitudes essential to human science. Lonergan explains that a mature human science

> has ascertained the classical laws that hold at relevant stages of human development, the genetic operators that relate successive stages, the dialectical analysis that envisages different sets of consequences following respectively on reasonable and unreasonable human choices, and the statistical laws that indicate the probable frequencies of both types of choice.[70]

In humans sciences, dialectical method considers the consequences of possible human choices, and tends to integrate, or at least relate, aggregates and successive instances of common sense.

Before I conclude the section on heuristic structures, I have to note an important aspect of reality left behind in human intellectual inquiry. Lonergan calls it 'empirical residue.' Empirical residue consists in the aspects of empirical data that do not posses any intelligibility on their own. Nobody can (or wants to) explain data like particular places and particular times, since they differ just as a matter of fact. We have experiences of particular places and times, and we can describe them using

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[69] *CWL* 03 (*Insight*), p. 269.

different reference frames, but no explanation of them as particular is possible. The differences of particular places and times are given prior to any questioning and understanding. Lonergan adds a further corollary: ‘Because the differences of particular places and particular times involve no immanent intelligibility of their own, they do not involve any modification in the intelligibility of anything else.’[71] If the particularity of space and time implied an aspect which would modify our explanation (or intelligibility) of reality, there would be a different chemistry or biology for every place and time. Statistical heuristic structures rest on this empirically residual character of coincidental aggregates of events, and dialectical heuristic structures are necessitated by the lack of intelligibility in an empirically residual aspect of man’s unintelligent opinions, choices, and conduct.[72]

1.4. Cognitive Foundation of Transcendent Knowledge

The previous section was concerned with the general procedures (methods) of empirical sciences, which draw their data from sensible presentations. In addition to empirical method, Lonergan speaks about a ‘generalized empirical method,’ which stands to the data of consciousness as empirical method stands to the data of sense: ‘As applied to the data of consciousness, it consists in determining patterns of intelligible relations that unite the data explanatorily.’[73] The data are the consciousness of participating in biological, artistic, dramatic, and intellectual forms (or patterns) of experience. (The four heuristic structures are particular cases of the

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[70] *CWL* 03 (*Insight*), pp. 766-767.
[71] *CWL* 03 (*Insight*), p. 52.
[72] See *CWL* 03 (*Insight*), p. 54.

intellectual pattern of experience.) Generalized empirical method deals not only with the data of a single consciousness but also with the relations among different conscious activities, and relations of consciousness to objects, to environment, and to its neural basis. While common sense relates things to a particular view-point, the explanatory account of common sense based on generalized empirical method relates general cognitive activities of common sense to its neural basis, and it relates aggregates and successions of different aspects of common sense to one another.[74]

The conscious procedures involved in proceedings of the heuristic structures of empirical inquiry and common sense knowing consist of several basic cognitive activities, such as seeing, hearing, smelling, touching, tasting, inquiring, imagining, understanding, conceiving, reflecting, weighing the evidence, judging. These activities are organized into a structure and can be grouped into three categories or levels: first, the activities of sense experiences (seeing, hearing, etc.) along with those of imagination and memory; second, the activities related to understanding (defining, conceiving); third, the activities related to reflective understanding and judging (reflecting, weighing the evidence). The three levels are interdependent: If there is no presentation of sense or imagination, there is nothing to be understood. If one has no understanding of experience, there is nothing to be judged. If there is no judgment, there is no human knowledge in proper sense. The judgment makes a difference between knowledge and opinion, between philosophy and myth, history and legend, chemistry and alchemy. Lonergan summarizes his understanding of knowing as follows:

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[73] *CWL* 03 (*Insight*), p. 268.
[74] See *CWL* 03 (*Insight*), p. 268.

> Human knowing, then, is not experience alone, not understanding alone, not judgment alone; it is not a combination of only experience and understanding, or of only experience and judgment, of only understanding and judging; finally, it is not something totally apart from experience, understanding, and judgment.[75]

All three levels are involved in the processes of explanatory and common sense knowing. Elimination of any level would destroy the whole.

Consciousness is an awareness immanent in cognitional acts. If these acts differ, so also does awareness differ. Consequently, if we have three levels of cognitional acts, we also have three levels of consciousness: empirical (experience), intelligent (understanding), and rational (judging).[76] The three levels are related functionally. Lonergan says, 'each cognitional activity must be examined in itself and for itself and, no less, in its functional relations to other cognitional activities.'[77] Functionally, experience stimulates inquiry, inquiry leads from experience through imagination to insight and to concepts. Concepts stimulate reflection and rationality weights the evidence of truth, which is affirmed in judgment.

Lonergan's explanation of human knowing culminates in a self-affirmation of the human knower, which is the foundation of his philosophy. In the self-affirming judgment 'I am a unity who performs triple activity of knowing,' the cognitional structure is applied to itself; it is reduplicated. This self-affirmation is not an introspection in the sense of 'looking inside,' because

> if knowing is just looking; then knowing knowing will be looking at looking. But if knowing is a conjunction of experience, understanding, and judging, then knowing knowing has to be a conjunction of (1) experiencing experience, understanding, and judging, (2) understanding one's experience

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[75] Lonergan, B., 'Cognitional Structure,' *CWL* 04 (*Collection*), p. 207.
[76] See *CWL* 03 (*Insight*), p. 346.

> of experience, understanding and judging, and (3) judging one's understanding of experience, understanding, and judging to be correct.[78]

Human knowing is *necessarily* a triple activity, since negation of any part of this structure involves a contradiction between what one is saying and doing. If one negates the existence of experience, one becomes a person who does not see, hear, imagine, who has no sense perception. If one negates direct understanding, the subject of knowing does not understand abstract concepts, human language, and reasoning. With a negation of judging, any negation is impossible, since negation is also a judgment. In any of the three cases, negation is discredited; it cannot be taken seriously. [79]

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[77] Lonergan, B., 'Cognitional Structure,' *CWL* 04 (*Collection*), p. 208.

[78] Lonergan, B., 'Cognitional Structure,' *CWL* 04 (*Collection*), p. 208.

[79] Lonergan adds a fourth level of deliberation and choice. If there is no choosing, there are no values, there is no responsibility, and consequently the negation cannot be taken seriously. For the subject does not care if he or she negates something or does not. For the purpose of this chapter, we do not need to explore this fourth level of consciousness, but we will have to take it in consideration in Chapter 9.