Foundations of Philosophy

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Introduction

This work now being offered is the 1st Internet edition of Fr. Brian Cronin's Foundations of Philosophy: Lonergan's Cognitional Theory and Epistemology, written primarily as an introduction to the first half of Fr. Bernard Lonergan's Insight: A Study of Human Understanding. The print edition first appeared in 1999 as a publication of the Consolata Institute of Philosophy, based in Nairobi, Kenya (PO Box 49789). Hence, it is not readily available for purchase in Europe or America although orders for purchase can now be placed with the Newman Bookstore in Washington, D.C. The full postal address is as follows: Newman Bookstore; 3329 8th Street NE; Washington, D.C.; 20017; U.S.A.; tel. 202-526-1036. On Internet, Fr. Cronin's book can be ordered from the Newman Bookstore at orders@newmanbookstore.com.

In the preparation of this Internet edition, to synchronize the pagination in tandem with the print edition for reference purposes, numbers within square brackets have been inserted in the text to indicate where the pages break in the print edition, as in [267] or [viii]. The Table of Contents above has been similarly synchronized. The numbers cited within square brackets indicate the pagination of the first print edition.

"In preparing this edition, many thanks are owed to Mr. Robert Gumm, Mr. Jaime Gonzales, Mr. Timothy Dobiac, Mr. James Werner, and Mr. William Koerber. Bob introduced the pagination with square brackets to synchronize this Internet edition with the print edition; Jaime initiated the process of file conversion for Internet publication; Tim converted almost all the files into html format; Jim scanned and inserted images for those chapters with diagrams and tables; and Kin completed this process and edited the remaining chapters prior to posting."

1. Foundations. To my surprise I discovered that there are a group of contemporary philosophers, who not only do not have foundations for their own philosophy, but even claim that any search for such foundations is an illusion, a chimera, a psychological hang-up which we must grow out of. Marx has apparently revealed the political bias underlying class consciousness and a philosophy is merely the expression of class ideology. Freud has uncovered the psychological need for God, for stability, for a view of the world but these are merely props and have no value in themselves. Nietzsche combined these attacks with his own blistering indictments of any form of knowledge morality, or claim to truth. We would seem to be condemned, like characters in an existentialist play, to continue to philosophize but with no hope of ever reaching any kind of coherent conclusion.

It is indeed a strange scenario. You have the so-called anti-foundationalists claiming that it is an illusion to seek for philosophical foundations; yet they are fairly clear and explicit about where they stand themselves, about their own foundations or lack of foundations which amounts to the same thing. You have relativists claiming that all is relative, that there is no such thing as absolute truth; and yet they seem to be very dogmatic in propounding their views. You have skeptics explaining that we can [5] know nothing; but yet they are convinced of the truth of their own position. It is then clear from

the contemporary situation that it is not an easy thing to establish foundations for a philosophy without falling into dogmatism, relativism or nihilism.

In a stable traditional society it was relatively easy to know where you stood. You accepted the beliefs and values of the society and handed them on to the next generation. It was a matter of repeating the past: no initiative was required, emphasis was on the community rather than the individual, it was a matter of conformity, the individual was not expected to show innovation or personal discrimination.

But nowadays everything seems to be changing. Technological developments impose changes on our economic modes of production; social and cultural changes follow to integrate new ways of doing things into a whole way of life. Historical studies have familiarized us with the idea that the past is different from the present, not only in political and social institutions but also in their meanings and values; cultures are changing, intermingling, shifting, incorporating new elements all the time. Languages have a history: the English of the nineteenth century is not the same as that of the twentieth. Meanings change with these changes of language.

Is there anything that remains the same?

Is there any permanence to truth?

If so, where is that permanence to be found?

Philosophy has traditionally been the area for solving these overall problems of truth and value. But nowadays there is a plurality of philosophies; even there one finds oneself faced with a choice of philosophies. In order to become a student of a philosophy one must also decide which university to attend, which books to read, which courses to follow, which position to adopt. We seem to be caught in a catch twenty-two: we need to be already wise in order to learn about wisdom; we have to be already good in order to learn about goodness. Philosophies are many and we already need criteria in order to discriminate among them. [6]

An alternative might be to 'Follow Science.' Science has been so successful; scientists have a method, they have technology, they can do so many things, solve problems of the universe; they seem to be able to do anything. However, scientists do not seem to have much to say about morals; they are not great at giving an account of their own method; something beyond science seems to be demanded. Since this is not very convincing as a worldview, you might be attracted to a benevolent eclecticism, namely, pick and choose from science, philosophy, New Age, Eastern meditation, etc. This might satisfy for a time, but like the house built on sand it will eventually fall.

The thesis of this text is that personal philosophical foundations are possible and indeed obligatory. By foundations I simply mean taking a position on the basic issues of

knowing, being, the universe, truth and values and being able to defend that position intelligently and reasonably. These foundations are not to be found in the formulated propositions of a philosophy or a tradition. They are to be found in a patterned set of mental activities by which we think and know and decide. This set of cognitive activities is common to all philosophies, cultures and traditions; this set of activities by which we discern the truth and evaluate moral and religious questions is, in fact, the source of all philosophies, opinions, truths, and beliefs. We all perform these cognitive activities whether or not we are yet able to identify them clearly. By identifying these activities we can make explicit the foundations of our own intellectual life while at the same time honing a tool for discriminating between the various philosophies present in contemporary culture.

It is also our thesis that this cognitive analysis reveals the way we *should* think and know; implicit in the procedures of thinking and knowing are the norms or imperatives which are the source of all logics, moral laws and methods. Our examination of mental processes manifests not only how the mind works, but how it should work. The mind is dynamic, developing, pushing towards a goal of better understanding and knowing. If we can recognize its imperatives we can recognize the source of all logics, methodologies and procedures; we will have found the foundations [7] we are seeking, the underlying dynamic, the source of both permanence and change.

This can be done fully only step by step one issue at a time; it cannot be done all at once. There are no facile solutions. The process demands personal self-examination; it takes time and effort. But it is an enormously liberating experience to find that the key to truth and goodness lies in our hearts and minds. We do not have to depend on any Authority or Teacher or Philosophy, to attain to it.

2. Clarifications and Presuppositions. Let us just be clear about the aims and presuppositions of this text. We are not just proposing another theory or possibility but suggesting a journey of self-discovery.

Starting point. Where do we start? Euclid started his great work in geometry with a set of axioms, definitions and principles; he then applied these to simple straight lines, triangles, circles and later to three-dimensional bodies such as spheres, cylinders and cones. His approach is a model of system, and the presupposition of many disciplines is that all respectable study must emulate it.

Some modern philosophers (Kant and Hume for instance) started with principles and definitions regarding the extent and possibility of human knowing, and worked on

from there, but in this case that procedure seems rather bizarre. How can one reasonably lay down the preconditions for knowing without being already engaged in the activity of knowing? Can we step out of ourselves with our prejudices and limits in order to establish what these limits are? Other contemporary philosophers have tried to work out a presuppositionless philosophy, for example Husserl. But is there such a thing as a philosophy with no definitions, principles or axioms that have been learned within a tradition? These more recent ventures do not seem to have been successful, either.

Our approach is to start with the subject in his native bewilderment and confusion - with you and me. Start where we are in the present situation in the unfolding drama of history. Philosophy is not just learning about a system of definitions, principles and conclusions; it is more a matter of a series of spirals, movements forward and backward. Let us move slowly towards clarity, [8] comprehension and depth. Let us sort out slowly and painstakingly what we actually know and how we have come to know it. Let us learn from our mistakes, identify why we made them, and root them out with all their implications. Let us look at the actual unfolding of knowing and not at the abstract possibility of knowing. Human knowing is contingent: it is not as it is of necessity and could have been different. Hence the only way to discover the power and limits of human knowing is to observe the facts: what it can do, what it can not do. Let us try to discover the possibility and limits of human knowing from within the process. It is in actually knowing that we discover the criterion for correct knowing.

Get to the Source. What are we looking for? We are looking for a unity behind the diversity presented to us by contemporary culture. We are looking for foundations to guide us through the challenges and difficulties we encounter. When faced with a series of conflicting theories, or even a succession of successful theories, there comes a point when we have to ask: where do theories come from? What purpose do they serve? We live in a state of cultural diversity. Why are there so many cultures? Are they all equal? Can we criticize the culture of another? We are surrounded by pluralism of cultures, lifestyles, moral values, levels of education, class differentiation, ethnic diversity, specializations, job stratifications: what is legitimate and what is not legitimate? What is authentic and what is not authentic? What is the source of our intractable disagreements about a philosophy of life? Particularly, why are there so many alternative theories of knowledge and how do we choose between them?

All these questions invite us to look at the human mind, to examine the process of understanding, to observe how scientists actually operate in actually formulating and verifying theories and judging the success or failure of these ideas. Instead of producing armchair epistemological theories we mean to look at the data, the experience of

knowing. In this case the data happen to be how the mind operates in its movement from questions to conclusions.

Subjectivity. Where are these foundations to be found? We ground our search within the knowing subject. Some contemporary philosophies rule out of court any appeal to subjectivity. The [9] empiricist tradition in particular demands an appeal to sensible data for verification; they wonder how can you appeal to invisible, private, mental operations; how can I be sure that your mental operations are the same as my mental operations? For existentialists the subjective means the world of feelings, experience, drama and tragedy - to be explored by all means but it is not for them the place to look for the first principles of philosophy. Others fear that if you start your philosophy in the field of the subjective you will never be able to get out of it to the objective world.

Nevertheless, we maintain that one must look to the knowing subject in order to find the facts. There are facts about the material universe which are studied in the natural sciences; there are also facts about the workings of the human mind which are equally true, equally important, and very accessible if you use the right approach. To the objection that this study of the activity of knowing is simply psychology, I would counter that any discipline that can help us to answer the above questions should be used to do so. Here we use the insights of cognitive psychology but only to go beyond psychology to an invariant cognitional structure, a cognitional theory and an epistemology.

Certain/Probable. What kind of foundations? Sometimes there is an assumption that knowledge to be knowledge must be absolutely certain, completely necessary and permanently true. If we set unreasonable expectations we will never reach the goal; let us see what we can know and then judge whether that knowledge is necessary or contingent, probable or certain, permanent or temporary. Let us not presume that we must proceed by deduction or by induction; let us rather look at how in fact great thinkers have proceeded, what methods they have used, how they verified their conclusions and whether the conclusions are certain, probable or merely possible. There is a growing realization in today's intellectual climate that most of our life and knowledge deals with varying degrees of probability. Maybe Descartes was asking too much when he set indubitability as the criterion of knowledge.

Integrating framework. Do these foundations include everything? If a philosophy is not comprehensive, it fails in its task. We have many specialized areas of study but the point of philosophy [10] is surely to see how all the pieces fit together; philosophy must give us a view of the whole, an integrating framework; it must be the broadest of all disciplines. If philosophy cuts off some aspect of life, such as language, or logic or texts

and claims 'this is our field of study,' then it has reduced itself to the level of a specialized science. The philosopher cannot know everything but he must be able to fit everything together -- a whole in knowledge but not the whole of knowledge. That is what Aristotle meant when he insisted that 'first philosophy' must not be like the specialized sciences in cutting off parts of being but that it must deal with being as being, that is, with everything from the widest possible viewpoint.[i]

Transcultural. Is there a Western philosophy, an Eastern philosophy, an African philosophy? Are there then three different foundations for three different philosophies? For us, culture is the set of beliefs and values expressed in a common way of life. A philosophy is a formal, critical, systematic presentation of a set of methods and conclusions. It is legitimate that there be different cultures. But I would hold that all human beings have something fundamental in common and that that is the foundation for one philosophy which is neither Western nor Eastern nor African in that it is common to all. Behind the pluralism of cultures there is our common humanity. The patterned set of mental activities to which we appeal is part of this common heritage.

Concentrates on knowing; brackets choosing. In some cases you can only do one thing at a time; in this text we make the difficult decision to concentrate on intellectual foundations and leave question of values, ethics and religion aside. To retrieve a philosophical foundation for truth in the present climate of opinion is no small task; it will require slow, steady concentration on difficult matters, a certain asceticism, and discipline. Hopefully the text is adequate to that challenge. In our epilogue, however, we will briefly suggest how our method could be extended to establishing a moral philosophy and religious values.

Who are we to learn from? Are we on our own? Do we have to start from scratch? We are looking for foundations which do not depend on any Authority, but rather on what we are as human [11] beings. Nevertheless we do need a guide. The one I have found most helpful is Bernard Lonergan.

3. Life, Writings and Ideas of Bernard Lonergan.[ii] Bernard Lonergan (1904-1984), a Canadian of Irish ancestry, entered the Society of Jesus completing the normal stages of formation -- novitiate in Guelph, scholastic philosophy along with the classics and mathematics at Heythrop College, three years teaching, and four years theology at the Gregorian university in Rome. Assigned to do his doctorate in theology, Lonergan was given, by chance, the topic of grace and freedom in the writings of Aquinas. Previously he had shown little interest in Aquinas, being more drawn to Plato, Augustine, Newman, and the themes of method and the philosophy of history.

Lonergan spent the next eleven years of his life 'working up to the mind of Aquinas,'[iii] first on the theme of grace and freedom, and then on cognitional theory. He found in Aquinas a very sophisticated and dynamic account of the activity of human understanding as it grasps the intelligible in the sensible and moves on to form a judgment as a result of a process of reflection. Since current accounts of Thomist cognitional theory neglected the activity of understanding and overemphasized the role of concepts and of judgment as a connection between concepts, Lonergan was amazed to find that Aquinas' own account squared with his personal experience of knowing. Further, Aquinas had found in human knowing the analogy for the processions of the Trinity. This historical research was first published in five articles in *Theological Studies*[iv] and later in book form, *Verbum: Word and Idea in Aquinas*.[v]

Lonergan was acutely aware of the situation of the Catholic Church in the 50's and 60's as it experienced the transformation of the Second Vatican Council. His conviction was that the Church had isolated itself from the world of science, technology, social change and modern philosophy since the time of the Council of Trent and, thus, had a certain amount of catching up to do. However, Lonergan was interested in long-term solutions and in laying the basis for a truly contemporary and effective theology, not in squabbles over specific issues. This required, first, some groundwork in philosophy, so he started work on his great masterpiece, *Insight: A Study of* [12] *Human Understanding*.[vi] This formidable tome of 785 pages transposed the metaphysical categories of Aquinas on human knowing into psychological categories more familiar to a contemporary reader.

One could summarize *Insight* as answering three basic questions: What am I doing when I am knowing? Why is doing that knowing? and What do I know when I perform these activities? These three areas of inquiry could be called, respectively, cognitional theory, epistemology, and metaphysics. The reversal of the order here was significant, as most Scholastics presumed that metaphysics had priority and that epistemology was to be understood in metaphysical terms. Lonergan disagreed; his account begins with the actual process of coming to understand as experienced in mathematics, in the empirical sciences, in psychology. This approach confirmed what Aquinas had to say on the process of knowing and transposed the issue into contemporary terms. Lonergan then added chapters to show the possibility of ethics, of a natural knowledge of God, and of an openness to religion. *Insight* was written over a period of five years, from 1949 to 1953.

Appointed to teach dogmatic theology at the Gregorian University in Rome, Lonergan then turned his thoughts to the problems of a theology now absorbing the after-effects of the decrees of the Second Vatican Council, as well as German advances in historical studies, the specializations needed for studying biblical languages, new emphasis on literary forms and cultural variations. This period was to culminate in the publication of *Method in Theology*[vii] in 1972. He spent the remaining years of his life teaching Macroeconomics mostly at Boston College.

My conviction is that *Insight* will eventually finds its place in the history of philosophy alongside such classics as the *Metaphysics* of Aristotle and the *Critique* of Kant. It is original, groundbreaking, rigorous and comprehensive. It is not just another plausible or even correct theory of knowledge; rather, it is an entry into another way of doing philosophy which makes it personal and verifiable. It is an invitation to a personal appropriation of our own intellectual potential and the implementation of norms which are immanent and operative in each one of us. Lonergan's thought enables us both to [13] keep our balance amidst the difficulties of the contemporary public forum and to find the foundations we must have for a coherent theological worldview.

4. Communications. *Insight* is a text that will be studied, appropriated and eventually appreciated for what it is: a work of genius. It has the potential to transform our way of thinking and verifying and philosophizing. The long-term implications are vast. Just as Aristotle's metaphysics and logic was the foundation for the Middle Ages, the time will surely come when *Insight* grounds the cultural development of another age hopefully not too far from now. But to appreciate the riches of *Insight* is not so easy. Lonergan's writing is serious, uncompromising, and rigorous. He appeals to mathematical and scientific examples which are beyond the ken of many of us lesser mortals. In a text nearly eight hundred pages long we find one diagram, no sex, no jokes, much difficult and new terminology. *Insight* is not written for the fainthearted. It was written with the deliberate intention of leaving no stone unturned, and no gaps in the argument. It was written by Lonergan at the height of his intellectual powers in four short years as a propaedeutic to work on method in theology. It seems to have been addressed to his intellectual peers in the field of philosophy and theology, professors, specialists. It was not written for the popular market of best sellers. It needs a commentary rather than a summary.

Lonergan's work is known and appreciated by an increasing number of enthusiastic followers. There are many publications, journals, centers of research, courses, study groups and Internet websites. Publication of the collected works in twenty-two volumes is well advanced. Although belonging to a fairly narrow tradition of

Catholic scholastic philosophy and theology, Lonergan's work has relevance to the whole of contemporary culture. He has much to say that is of value, he offers answers to many contemporary problems. Yet, he is little known outside the immediate circle of Catholic theology and philosophy. There seems to be a communications gap. While Lonergan's treatment of such concepts as foundations, mental acts, metaphysics and god, does fly in the face of much contemporary wisdom, it is my conviction that the real difficulty in communication Lonergan is that he is asking us to move into the [14] third stage of meaning. He is inviting us to become aware of intellect at work in our own discovery and learning. This is not just another cognitional theory, however difficult, in a long line of theories from Socrates to Sartre; it is a shift in our way of thinking, a move to a higher perspective, a discovery of our own minds and their potential. It is essentially a call to a personal discovery of how our own minds work, what understanding produces and how we can be sure of our knowing.

If Lonergan were formulating another theory of knowledge, it would be relatively easy to explain it, reduce it to its parts, give examples, agree or disagree, quote his works, refer to commentators and interpreters, and write a learned tome covering his system, its antecedents and its implications. But if Lonergan represents a move into a whole new stage of meaning, and if he is inviting you and me to follow, we do so not by understanding a theory but by appropriating, making our own, the activities and products of our minds. Hence, if one is to communicate Lonergan's ideas, it can only be by sharing personal experiences: me communicating to you my own experience of intellectual development, giving you every help to follow and using Lonergan as a prop or guide which can be dispensed with once you discover the greater Authority of your own mind.

But there is also the other aspect of the matter, the need to make the thought of Lonergan accessible to a wider audience. That too is the aim and conviction guiding this text. There are genuine difficulties in communicating this philosophy; none the less it can be done at the level of University undergraduate studies. *Insight* fits in well with a traditional seminary curriculum, where cosmology becomes cognitional theory, epistemology deals with judgment and objectivity; metaphysics, ethics, philosophy of religion can be guided by the later chapters. My experience teaching has convinced me that this is not only possible but a liberating experience for the students and a joy and satisfaction to teach. It is possible to substitute more rudimentary examples better suited to the educational level and culture of the students than the somewhat difficult examples of *Insight*. [15]

It is a hazardous task to simplify and popularise a great thinker; there is an ever-present danger of missing the point, of leaving out important ideas, of distorting the import of his argument. The danger is there and no one of lesser stature that the original thinker can claim to be immune from it. But the attempt is made with the hope that any possible distortion will be removed when the student is enabled to take up the original text for himself and go beyond our initial oversimplifications.

I write, then, not as a scholar but as a teacher. If this were primarily a work of scholarship it would involve much quoting, explaining, comparing with other authors, giving historical references, displaying one's expertise in the details and subtleties. But I write as a teacher, trying to simplify difficult matter, to use helpful examples, to proceed step by step, to focus on the really important matter of self-appropriation. This text is an effort in communications,[viii] to make accessible the riches of *Insight*.

This is not a book about Lonergan as an Authority, rather we use him as a guide to a way of thinking. It is not written for Lonergan scholars and specialists but for teachers and students. There are some basic quotations and references so that we can keep in touch with his thought; it may be used as an introduction to his thinking. If you can tackle the original so much the better. Concentrating on essentials inevitably involves simplification, eliminating certain materials. This has been most difficult and may offend some experts. I have concentrated on the notion of intellectual self-appropriation as the key to all Lonergan's thought and the strength of his position.

For whom is this text written? For the educated reflective person trying to take stock of his cultural or philosophical foundations. For the student of philosophy similarly bewildered by the variety of positions presented to him. For teachers of philosophy who want to communicate some personal foundations for a way of life as well as information about philosophy and philosophers. For those who want an introduction to the thought of Bernard Lonergan. For anyone concerned with cultural foundations. For students of theology, science, historical sciences, who want a framework within which their discipline can flourish and contribute to progress rather than [16] decline. For the philosophy of education and those concerned with the preservation and communication of truth and values.

The style of this text is necessarily more personal and informal than is usual in a book on philosophy. It is about discovering your own potential to understand and know, a kind of do-it-yourself approach: its essential aim and purpose is to help you to become aware of the activity of understanding and the norms inherent in the proper unfolding of the desire to know. I will consistently appeal to my own experience of coming to

know as the basis for helping you to make the same transition. Self-appropriation is the foundation of the ability to communicate and that effects the style of writing and presentation.

Each chapter begins with some preliminary exercises. Although you will save time if you skip them, you will then be in danger of missing the whole point. The exercises are offered to stimulate the intellectual experiences which are the subject matter of that chapter. In its primary focus the book is about you; not about theories of knowledge in general, or foundations for philosophy, or about Lonergan, or about mathematics, but about you. Some comments are added at the end of each chapter about these preliminary exercises. These are only sample exercises and can be supplemented with examples from your own area of expertise.

Endnotes are given to help hook into more technical presentations of Lonergan's thought and also to help those who may not be familiar with philosophic problems and terminology. Each chapter is a unit for reflection, appropriation, discussion and implementation. The text can show the way, propose the exercises, lay out the definitions, but it is the reader who has to do the exercises and recognize what the definitions refer to in your own personal experience.

5. Summary of the Argument. The text is divided into two parts referred to in rather loose terms as 'Thinking' and 'Knowing'; more technically they could be called 'Direct and Inverse Insights' and 'Reflective Insights and Judgment'. The first part identifies a level of intellectual activity in which we think up bright ideas, explore the possible connections and causal relations between [17] things, and formulate hypotheses. The second part considers how we affirm or deny these hypotheses as true or false. We focus on the rational process by which we come to know something as true; because our culture has such problems with this aspect it is necessary to spell this out in great detail.

We start with the framework of the three stages of meaning because it helps us to grasp the necessity of moving individually and collectively to the third stage of meaning. It is very enlightening and unifying to view our intellectual history from this perspective and helps immensely to understand the malaise of our present time as one of transition. Intellectual self-appropriation is the method we propose for the process. Because it is new and difficult it needs to be explained and justified; we come to know about the activity of understanding by adverting to what we do when we understand something correctly. In chapter two our method is applied to the simplest, clearest

examples that we can find and the characteristics of this activity are identified. The constant challenge to the reader is to recognize these activities in his own knowing.

Describing and explaining are two different but valid ways of understanding; they are distinguished as two different perspectives on the same thing. Description is the easiest; it comes most naturally but does not encourage precision or definition. Explanation is a leap to relating things to one another, giving explanatory precision and accuracy of measurement. We explore how these activities are related; why does describing always move to explaining; what kinds of insights are involved? In chapter four we note the peculiar type of insight which grasps not what is there to be understood, but the absence of an expected intelligibility; this is the basis for knowing probabilities rather than systematic regularities.

In chapter five we identify how understanding develops; it is dynamic; insights cluster into unities, higher viewpoints, generalizations; understanding deepens, becomes more comprehensive, more flexible, more discriminating. Individual insights pass into the habitual texture of the mind and form the habits of inquiry and research, leading to mastery of a field. We get some idea of the infinite flexibility and potential of our human intelligence. [18]

In part two the text shifts from thinking to knowing by noting the differences between a proposition entertained simply as a possibility and a proposition affirmed or denied as true. Judgment emerges from a reflective insight which grasps the sufficiency of the evidence for the positing of a judgment. This is a grasp of unity in a multiplicity, a sweeping together of very diverse elements to see in their unity the necessity of affirming the judgment. As we dwell on reflective understanding we discover certain norms which are immanent in that activity.

Finally, we take stock of our progress by putting together in summary form the interrelated series of activities which we have discovered to constitute human knowing. We note that our resulting account of cognitional structure is not open to basic revision. We critique the processes of scientific knowing and find them much inferior to our grasp of cognitional structure. In that unrevisable normative structure we find the personal foundations for each one of us to stand on our own two feet and proclaim that this is true.

We then discuss intellectual conversion. For the first time we recognize and identify the dialectic that operates in human understanding: imagination struggles with intelligence, looking with understanding, the immediate of sensation with mediation of intelligence. We use four different images or terminologies to explore and objectify this

experience of intellectual conversion, hoping that at least one will click for every reader. Intellectual conversion gives us a base for discriminating between correct and incorrect philosophical and scientific positions. Even mistaken philosophies can make a contribution to the clarification of the ultimate goal of a comprehensive wisdom.

As a result of our odyssey in cognitional self-appropriation we come to see that objectivity and subjectivity are not polar opposites but mutually complementary. We move from subjective to objective not by way of an imaginary bridge but by way of a set of judgments that implicitly define the subject and the object. Our philosophy is one of critical realism: the real is what is affirmed in a true judgment.

The concluding epilogue gives an indication of the possibilities opened up by this breakthrough to the third stage of meaning. It [19] indicates how our method can be used to build a metaphysics and an ethics. We discuss the role of philosophy in relation to culture in general with special reference to Africa. We are living in an age of transition from 'common sense' and 'theory' into the world of interiority; because it is a transition it is accompanied by confusion and controversy; but because it is a breakthrough it is full of opportunity and hope for development, progress and wisdom.

1

Searching for Foundations

In the first stage conscious and intentional operations follow the mode of common sense. In a second stage besides the mode of common sense there is also the mode of theory, where the theory is controlled by logic. In a third stage the modes of common sense and theory remain, science asserts its autonomy from philosophy, and there occur philosophies that leave theory to science and take their stand on interiority.[ix] [23]

Preliminary Exercises.

(1) Spend five minutes with your mind fixed on one idea only. Afterwards ask yourself, did you succeed? What happened? Describe the experience.

(2) Choose a paper or essay that you have written recently. Review the rough notes you wrote from the beginning in the original plan; work through the different revisions, additions and subtractions to the final product. Note the blind alleys that you explored; the insights when things fitted together; the frustration of not finding your way out of the confusion; the joy when it was all accomplished.

(3) What goes on in your mind when you study? Are you sometimes distracted? What kind of an activity is daydreaming?

(4) Enumerate in writing all the mental activities that you can identify from your own internal experience.

There seems to be a fundamental obligation upon us to live at the level of our times. The foundations of our philosophy must be up to the challenges and level of our times. The present state of philosophy has been described as a wasteland, a crisis, a disaster area. It is certainly characterized by major disagreements and much confusion. In order to assess our times, it is necessary to be clear about where we are coming from, where we are now, and what successes and failures are characteristic of contemporary

culture. We will offer here a panoramic outline of Lonergan's three stages of meaning as they have unfolded in history,[x] for the sake of noticing, not the myriad detailed ups and downs of the history of philosophy, but the fundamental mentalities underlying all this diversity. One can discern distinct stages; these are stages of development. Our analysis will help to identify the pattern of this development, to recognize that, as a world culture, we are now in transition from the world of common sense and theory to the age of interiority, the third [24] stage of meaning. Our foundations must be, not from the world of common sense or of theory, but from interiority.

Our first analysis is historical in that we review stages of historical development. But it should also be personal in that each one of us experiences these stages in our own intellectual biographies. We emerge as conscious, thinking, acting, learning human persons acquiring the mentality which we will call 'common sense' from our family and society. Our first painful encounter with the world of theory usually occurs through mathematics, geometry, algebra, or one of the sciences. If we continue to study the sciences, philosophy, theology, mathematics, or specializations within these fields, we become accustomed to the rarified atmosphere of theory. Later perhaps we wonder whether theory gives us the final truth, if there is something beyond theory. And so we are led on to interiority.

The final sections of this chapter introduce us to that new possibility by shifting our attention away from the content of what we know to the activities by which we know. Our aim, then, is to take cognizance of what is going on around us, to learn from failures, seize opportunities, and reorient our own thinking towards the third stage of meaning with all that it promises.

1. Stages of Meaning

The psychologist Kohlberg has identified six stages of moral development which he calls punishment and obedience, instrumental relativist, good boy/nice girl, law and order, social contract legalistic, and universal ethical principle. He is open to the possibility of a seventh.[xi] His claim, which seems to be verified, is that the unfolding of these stages is invariant and successive: that each stage occurs one after the other, no stage can be skipped, the order cannot be reversed or changed. The dynamic to move from one stage to the next stage is the experienced inadequacy of the present stage. Development is towards autonomy, integration and interiorization of moral norms and behavior. However, one can become fixated, can stop developing, at any stage. [25]

Kohlberg's principles of moral development provide us with a useful model for our consideration of the stages of intellectual development. We, too, hold that our stages are invariant, successive, and directed towards of interiorization and autonomy. Every person and every culture starts with the mentality of *common sense* and may remain there. It is the inadequacies of the commonsense mentality that call forth *theory*, whether it be of the metaphysical, epistemological or scientific type. Theory solves the problems of the inadequacies of common sense but eventually reveals its own inadequacy and calls forth the additional realm of *interiority*. To concretize this progression we will briefly identify the unfolding and emergence of these three stages of meaning in history. We will then be in a position to assess our current situation.

1.1 Common Sense in Traditional Cultures

The term 'common sense' usually refers to a down-to-earth, practical, sensible attitude. Webster's defines it as 'sound and prudent but often unsophisticated judgment.' Here we will employ a slightly different meaning: that of an undifferentiated, practical, short-term mentality. What follows is an anthropological account of the characteristics of this mentality. Later, we will analyze what is at the root of this mentality of common sense and why it differs from theory; in that context we will give a technical definition of description and explanation.

Under the term 'traditional cultures' we include the early Greek mythologies, the people of the Old Testament, early American-Indian cultures, African traditional cultures, the early Celts, Australian Aborigines, early Egyptian and Babylonian civilizations, and many others. Despite the enormous diversity of languages, beliefs and achievements of these cultures, we are justified in classifying them together because they all share a commonsense mentality in our meaning of that term.

These were simple societies in the sense of being undifferentiated or compact.[xii] There was a fluid overlapping and intermingling of political and social, religious and moral, economic and practical affairs. Specialized institutions were not yet needed; education and socialization were an informal handing on of traditions in songs, [26] ceremonies and prescribed or ritual ways of doing things. Economic institutions consisted simply of practice in how to cultivate, to cook, to exchange and to develop in certain skills.

Oral cultures developed languages rich in proverbs, nuance, personal relations, and attention to the practical details of food and work, but lacking in precision, definition and distinction, mathematical terms of reference or abstractions. The

predominant reality was personal relations: the primacy of the community, belonging to the group, identifying with the clan. The wider cosmos tended to be interpreted along the lines of the family: the Sun as the father, the Moon as the mother, the stars as the children. Symbols and myths appealed to feelings and imagination; they were easy to remember and pass on. These provided the answer to global questions about God, life, death, sickness, origins and destiny.

Compactness of all areas of life did not allow of clear differentiation and so we note dangerous confusions between symbol and symbolized, image and real, dreams and waking consciousness, desire and fulfillment. The sun, the mountains, the moon, or a Golden Calf may be used to symbolize the divine, but in such cultures they frequently become the object worshipped rather than a symbol of the divine. Frazer coined the phrase contagious magic to describe damage inflicted on the image of a person which is supposed to affect the person himself.[xiii] Dreams in the Old Testament can be so impressive that they are understood to make meaningful reference to what is going to happen in the future. Blessings or curses are expressions of strong desires of love or hatred; they must be effective of what they signify; they are sent out and cannot be called back. Thus, wishes are confused with fulfillment.

The rhythms of nature are mostly cyclical: the day, the month, the seasons, the year, birth and death. One generation succeeds another. Life is lived in harmony with these recurrent cycles; a linear historical idea of progress is quite alien. The Gods, the divine, the Spirits of the Ancestors, Spirits of places, Earth, River -- all inhabit a spiritual universe which is very close to the physical one. Religion, superstition and empirical thinking overlap and intermingle; the failure of a crop might be attributed to bad farming methods, anger [27] of an ancestor, witchcraft of a jealous neighbor, punishment from God, or any combination of these.

The languages of such traditional cultures are poor in terms like conscience, consciousness, intention, feeling, psychic tension, soul, intellect and will, freedom and responsibility. Internal states are usually alluded to by using symbols of reference such as head, heart, breath or bowels. The internal tends to be projected into theophanies, conversations with the Gods, divine signs, and commandments on stone. Freedom is usually understood as submission to Fate. Beliefs were expressed in myth and ritual and handed on from generation to generation.

These cultures were practical in that the struggle to survive was the first priority. The environment was often quite hostile; technologies were primitive; challenges were

many. Some achieved extraordinary feats, such as the pyramids or the cities of the Maya.

Common sense does not exclude the distinction between true and false, right and wrong, good and bad. These criteria were operating, but only implicitly, and they could not be made explicit. The criteria were operating, but not in all areas, not at all times. Inadequate distinction between image and idea, dream and reality, the symbol and the real, results in permanent confusion. Disasters, for example, were sometimes attributed to natural causes, at other times to superstition, sorcery or divine punishment. These inadequacies eventually called forth the realm of theory.

1.2 Threefold Breakthrough to Theory

We seem to have a limited tolerance for confusion and ambiguity, especially if it threatens our survival. The need for clarity, for distinction, for control, for something better than common sense, leads to the breakthrough to theory. We will consider in turn, (1) the early Greek breakthrough to logical, metaphysical thinking; (2) the threefold philosophical breakthrough to modern epistemological theory; (3) theory in what we call the Scientific Revolution.

1. Greek breakthrough to metaphysical theory. The early Greeks had a rich mythology much of it borrowed from their neighboring cultures.[xiv] Critical questioning of these myths about the [28] gods and their intervention in human affairs was the beginning of the end for them, however. It did not seem reasonable or fitting that Gods should get drunk, or marry and have children, let alone that thunder should be Gods' indigestion. There emerged schools of thinkers attempting to give alternative explanations as to why things happen as they do in our universe, how the heavenly bodies move, why do some things change and others do not, how one element can change into another, what everything is made of. Gradually, different answers were given to these questions; these positions were discussed, refined and the new way of philosophy emerged. Philosophy became fully theoretical at the time of Aristotle. Words and meanings were clearly defined in grammar, rhetoric, the logic of propositions and arguments. Principles and definitions and distinctions were clearly drawn and laid down; these were then expanded into a system of interrelated terms and relations. Having once developed a theoretical system for his philosophy, Aristotle applied it to physics, ethics, astronomy, biology, botany and all the known sciences of the time. This was an achievement of enormous importance; it provided the intellectual basis of our western civilization: all Aristotle's books became standard textbooks for the universities of the Middle Ages.

The development of geometry is a good example of shifting from commonsense descriptions to systematic theory. Starting with clear definitions, axioms and principles, Euclid applied these to the straight line, triangle, circle and other plane figures; then on to three-dimensional figures. In the process he applies his principles, develops, expands, explores, deduces, tests, proves, until he arrived at the required conclusion. This impressive example of theory has acted as a model for many theoreticians and even today is often our early introduction to theoretical thought.

What has happened? A new control of meaning has emerged, has become explicit. Words are given a precise meaning, arguments are formalized, systems are set up, deductions are made, politics is differentiated from ethics, logic from grammar, and the practical from the theoretical. Many of the basic confusions of the common sense stage are cleared up. It is now possible to say what you mean and mean what you say. Arguments can be settled by appealing to [29] forms of correct argument rather than just repeating traditional beliefs. Many great achievements in architecture, literature, and technology become possible.

The Greek legacy of theory was incorporated in the Christian vision of the Middle Ages. Aristotle's texts became the basic textbooks for the medieval universities. In Aquinas theology became theoretical and relied on metaphysical categories; some aspects of Aristotle's system had to be refined or corrected to fit in with a Christian interpretation of the world. This development in theology brought to it all the advantages of theory in clarity, precision, and appropriate distinctions between faith and reason, theology and philosophy, nature and grace. Used as a handmaiden of theology, the philosophy of Aristotle made possible a better understanding of the divine mysteries of the Trinity, the Incarnation, the sacraments and the action of grace.

This legacy was carried forward within the tradition of Scholasticism in universities and seminaries under the influence of the Catholic Church, until the time of the Second Vatican Council. But it has to be said that the openness of earlier thinkers was lost in the formalization and systematization of the textbooks. Theory was considered to be the final answer; it was thought that truth could be permanently sealed in immutable propositions and definitions, that uniformity was unity, that truth could be controlled by deductive logic. There was only one culture; all cultures had to conform to that ideal model. This was the predominant attitude in the context of Scholasticism at the time of the Vatican Council.

2. Threefold breakthrough to epistemological theory. Modern philosophy began by rejecting the confused Scholasticism that emerged from the Middle Ages, and setting up a system of philosophy independent of theology or the authority of the Church. The pillars of this movement were Descartes, Hume and Kant. These founded systems of philosophy which were self-sufficient, theoretical and critical; they did not need any religious belief, only a belief in reason and sensation. Three quite different systems emerged with consequent traditions being established. The focus of all of them was the limits and power of human knowing; epistemology became the beginning and end of philosophy. All [30] three systems are theoretical but they reject the metaphysical thinking of Scholasticism and concentrate on epistemology.

Descartes (1596-1650)[xv] was optimistic about the powers of human reason alone and held that by applying his method you could arrive at clear and certain conclusions about man, God, the sciences and mathematics. He used his way of methodic doubt to eliminate all presuppositions and establish his philosophy on indubitable foundations. The one thing you cannot doubt is your own existence and so he coined the famous dictum, 'I think, therefore I am.' From here he proved that God must necessarily exist and because he is good could not allow us to be fundamentally deceived by our senses. If the senses can be trusted then the discoveries of science and mathematics can be accepted. Descartes aimed at a total single integrated system incorporating philosophy, the empirical sciences, mathematics and medicine. He produced a theory of rationalism which has had an enormous influence on subsequent generations. Descartes is often called the father of modern philosophy because of this turn to the subject with which he began his whole work.

We can take David Hume (1711-1776)[xvi] as typifying empiricism. This theory of human knowing starts on an opposing premise, namely, that all knowledge is sense knowing. Surely the closer we stick to the obvious observable evidence of the senses, the more certain our knowledge and the less disagreement there can be. This involves abandoning metaphysics, theology, ethics, and even challenging the empirical sciences. The human mind is very limited in its capacity to acquire truth. Whatever ideas we have are derived from sensation and they are put together by laws of imagination rather than by intelligence. Hume studied the activities of the mind in order to show how all our knowing can be traced back to sensation and is valid only if we can do so. His is an alternative theory to that of Descartes; it is a theory in that there is a first principle and a method of procedure. Empiricism has also been very influential, even up to the present day.

Immanuel Kant (1724-1804)[xvii] felt that both these systems were extreme, so he

set about establishing a synthesis. He was preoccupied with the a priori conditions for the possibility of human knowing. He accepted Hume's principle that our only contact with [31] the world is through sensation, by which we know the phenomena. But he could not accept that this was the whole of knowing; surely the mind contributes something, constructs or imposes forms on reality. Kant showed how sensation and the mind combine in the knowing of sensibility, understanding and reason, establishing a highly sophisticated theory of knowledge that might be called *subjective idealism*. It incorporated elements from rationalism and empiricism but set up a coherent alternative to these extremes.

These three figures are the pillars of modern philosophy; each established a tradition of followers who developed or refined or corrected his position. Even contemporary philosophers define themselves by whether they agree or disagree with these basic positions. Each position is theoretical and systematic; there are principles from which they start, methods to be followed and rules of logic to be observed. Each claims to be true, to be the one and only truth and is incompatible with the others. Each tradition developed with constant refinements, adaptations, changes. Each manifests the advantages of the theoretical mode in having coherent, systematic, precise principles and method. But each also shows the disadvantage of the theoretical in that it cannot account for itself, cannot deal with contrary theories, and is subject to constant revisions and changes.

3. Theory in the Scientific Revolution.[xviii] Concurrently and not entirely unrelated to these epistemological efforts there emerged theories concerning the physical world in the Scientific Revolution. This is yet another form of theory with five particular characteristics: induction, mathematics, measurement, technology and method.

The first scientists appealed to the data of sensation as their authority, either by direct observation or by the creation of experiments to produce the significant data. They no longer appealed to authority figures such as the Church or Aristotle. This meant an emphasis on inductive methods, that is, moving from particular observed cases to generalizations about all cases. The development of astronomy illustrates the importance of systematic, precise, long-term observation; only such observations could establish the heliocentric as opposed to the geocentric system. Using [32] data from observatories that were set up from the 14th century onwards, Copernicus, Kepler, Galileo and Newton were able to formulate and verify their theories. Galileo illustrated the importance of experimentation with his laboratory of pendulums, levers, inclined planes, etc.

Mathematics began to develop on its own and to be applied to the material world. The Greeks had been content with geometry. Now there emerged trigonometry, algebra, and calculus. Pythagoras had dreamed of reading the universe in terms of mathematical laws; now it seemed to be possible. Aristotle had concentrated on using the four causes as his schema for reading the material world. Now it was mathematical correlations which seemed to unlock the mysteries of how matter behaves.

Measurement became important for accurate observations and precise experiments and for useful applications of inventions. The Greeks had produced profound geometrical systems which were coherent, systematic, rigorous, deductive and brilliant. They were fascinated with the intrinsic properties and relations of geometrical figures, but obversely, they showed little interest in actual measurements. It would not strike them to solve a problem by actually measuring or counting. Compare this to the obsession of Galileo in measuring the distance and time traversed by his falling bodies.

Many scientific discoveries had immediate practical applications in making of instruments, in aiding navigation, in building pumps, weapons, houses, roads, etc. This slowly produced a technology which changed the way we live but also was a principle of verification and progress. Every time a new machine worked, it proved the theory on which it was designed. At the same time it produced a new situation and new data so that improvements could be successively incorporated. The history of the motor car shows a constant stream of refinements and improvements based on actual experience.

The early scientists had nobody to tell them what method to follow; they rejected philosophy and Aristotle and had to work things out for themselves. Their method emerged by a process of trial and error; what was important was what worked. It was only [33] later that they began to reflect on the principles underlying their procedures.

Science evolved its own form of theories verified by observations or experiment. It has been highly successful and continues to develop.

4. Common Sense after Theory. While theory brings a new way of thinking into the world, it does not replace common sense. However, when theory is applied, it adds to the objects or content considered by common sense intelligence. The mentality we identified as that of common sense continues with its emphasis on the practical, the short-term, the lack of clear definitions and distinctions. But the content inevitably changes. There is a trickle-down effect of theories of philosophies and sciences through

education, through the mass media, through popular culture. There are the skills which must be learned to participate in a technology governed by scientific theory. Most tasks which were performed by farmers or fishermen or the like have been transformed by technology and require a minimal understanding of the principles behind them.

But the undifferentiated nature of common sense remains, with its confusions. For common sense, images can be more important than verified facts, appearance more important than substance; how a politician presents himself on television may be more important that what he is really like in actuality. The function of the psychiatrist is often similar to that of the witchdoctor in traditional societies; the astrologer is similar to the diviner; belief in Alien abductions is on a par with belief in witches changing into animals. The medicine man of traditional society can be compared to practitioners of fringe medicine today, full of assurances and comfort but offering remedies of dubious efficacy.

1.3 Transition to Interiority

1. Crisis in Theoretical Mode. It seems that all the theoretical realms that we have identified are in crisis today.

First, the huge structure of Catholic Scholastic philosophy and theology has collapsed under the influence of historical studies, and [34] exposure to modern sciences and modern philosophies. It has almost disappeared. What is to take its place in the universities and seminaries, in the moral arguments and doctrinal articulation of the Christian faith? Some have recourse to modern philosophies, some to a benevolent eclecticism, some claim that we do not need theories any more. I would suggest that the only way from now on to articulate the Christian faith in a manner appropriate to these times is to move into the world of interiority, the third stage of meaning.

Secondly, each of the three competing epistemological theories developed a tradition which has evolved and changed, borrowed and rejected, improved, added and subtracted. It is openly admitted that contemporary philosophy is in a state of crisis;[xix] a vast variety of quite contradictory positions are proposed. There is even a problem of communication between the groups as they have no common tradition, terminology or beliefs underlying them. Philosophy seems to have become a wasteland where deconstruction is more evident than construction. Why is it that these classical epistemological systems have collapsed? What is the common base on which all philosophers can unite? What are they all doing by which we call them philosophers? Is

there a way that philosophy can become verifiable?

Thirdly, while scientific theory continues to develop, there too problems have arisen. The early rejection of philosophy by scientists and the declaration of independence of Galileo actually led to the assumption of a philosophy of materialist determinism, i.e. that there is only matter and it obeys laws of mathematics. But the old problem of what is real resurfaced and could not be answered. Are the laws of physics real even though we cannot see them? In what sense are they real? Which is the real world, that of common sense perception or the world of atomic particles and scientific laws? Varieties of positions are taken, from hard realism, to soft realism, to idealism.[xx]

The discovery of uncertainty in quantum mechanics was the occasion for a further crisis. The assumption that everything was determined and followed the classical type of law was now in question. Could probabilities be included in science? Does God play dice with the world? To what extent does the scientist construct or [35] invent his laws; does the mind or person contribute anything to the knowing process? Is the logic of discovery a matter of being objective or do subjective elements intervene?[xxi]

The very rationality of the procedures of science was called into question by Kuhn.[xxii] He claimed that the paradigm shifts which mark the history of scientific discovery were not simply a matter of intelligence, but of chance and community influence; that the dynamic of science is governed by Foundations which decide what research will be funded, rather than by the intelligence of the individual scientist.

The basic attitude of scientists had been reductionist, an attempt to explain the whole in terms of the part. That attitude began to be challenged by holists, who hold the reverse opinion, and process philosophy, which holds that there is only process and no stability of things at all.

The naivete of the claim that science can do without philosophy is revealed in this morass, and the discipline of philosophy of science arose in this century to try to deal with these kinds of problems. It is clear that scientists have provided no satisfactory answers and that science does need a comprehensive philosophic framework if it is to flourish and solve these theoretical problems.[xxiii]

The advantage of theory over the commonsense stage of meaning is the clarity, the precision, the control that it confers by way of mathematics or logic over the field covered by its principles and method. But the disadvantage is that theory cannot account for itself. Theory cannot account for a succession of theories, it cannot identify

the criteria for choosing between conflicting theories. Theory cannot account for its origins or compare itself with common sense. For that something more is needed: interiority.

2. Towards Interiority. Many positive elements in contemporary philosophy point in the direction of interiority. Existentialist philosophies have accustomed us to examining subjective experiences: they reject the system builders and return to the concrete, existential subject in all his drama of choice, death, boredom, anxiety, meaninglessness, creating of meaning, and internal struggles. It was immensely popular and appealed to a felt [36] need to articulate inner experiences. The phenomenologists incorporated the systematic description of mental activities into their method; it was Husserl who coined the term 'intentionality analysis,' meaning a description of mental activities as these intend external objects.[xxiv] Phenomenological method is often focussed on subjective states: feelings, mental activities, artistic expression, etc.

We have become accustomed to talking about consciousness, conscience, subjectivity. Eugene Webb identifies six philosophers of consciousness, Michael Polanyi, Bernard Lonergan, Eric Voegelin, Paul Ricoeur, Rene Girard and Soren Kierkegaard.[xxv] Consciousness is central to the thought of each of these philosophers, even though each has a different notion of consciousness. Study of the human sciences has made us more aware of our existence in history, how meaning and language change over time, that no static system can escape the ravages of history. Cognitive psychology has made some contribution to the study of knowing and learning processes.

In the mentality of common sense there is a process of discernment between what is true and false, what is moral and immoral, what works and what does not work. But the process is implicit. It is difficult to put it into words, to check on how it operates, to objectify the procedures to be followed; hence the application of this commonsense discernment is haphazard and uneven. In the mentality of theory the procedures of discernment are stated explicitly either in logic or in mathematics. Enormous clarity and rigor can be attained within the scope of its principles, procedures and conclusions. But, as we have seen, theory is nevertheless incapable of giving an account of its own limitations, its relation to common sense, and the criteria by which we discriminate between conflicting theories. The crisis in classicism, contemporary philosophy and contemporary science seem to be rooted in the intrinsic limitations of the theoretical mentality. The crisis of contemporary times seems to cry out for a further perspective, a third stage of meaning, the realm of interiority.

3. What is Interiority. Interiority is not just another theory but a 'theory' about theories; it is not more of the same but is rather a shift to a new perspective, a different approach, a total reappraisal. It is a [37] going beyond common sense and theory, not in the sense of negating their value and leaving them behind, but in the sense of appreciating their specific but limited contributions. Let us state briefly four characteristics of this third stage of meaning.

Firstly, interiority is characterized by awareness of the actual processes of human intellectual knowing and by reflection on the multitude of mental activities which together constitute human knowing. It calls for a self-knowledge not just of our feelings and dreams, our motivations and character, but of the very processes by which we see, hear, think, imagine, remember, criticize, evaluate, conclude, and judge. Grasping the activity of human understanding is the main characteristic of interiority; not as it happens in others but as it happens in oneself. This is not just another theory about human knowing; rather, it is judging of all theories about human knowing in the light of the data of consciousness.

Secondly, if we grasp the activity of human intelligence then we understand the source of all languages, cultures, common sense conclusions, philosophical systems, empirical science, historical knowledge, mathematics and the multitude of products of human intelligence. Grasping the source of this infinite variety of products means that we can see that they have something in common, they conform to a common structure, that even though they seem to be contradictory they can also contribute to a single goal of comprehensive understanding of all things in the unity of a single perspective. Nothing is beyond the intention of understanding; nothing can be excluded in principle. We cannot fully understand everything but we can intend, desire, name, point at, move towards an understanding; we can grasp our unlimited desire to know and compare it with the limits of achievement.

Thirdly, awareness of how understanding unfolds reveals that there are norms which are immanent and operative in that unfolding. The rules for correct understanding are immanent in intelligence; this is how the mind works, how it is designed. We can know when we have reached a correct conclusion; we do not need somebody to tell us. We do not need to depend ultimately on an Authority, on a Teacher, on a Tradition. We can attend to the data; think the matter through to the end; assess the relation between the conclusion and [38] the evidence for the conclusion; ask all relevant questions; exclude all alternatives; and posit the conclusion as certain, highly probable or just probable. We can take responsibility for our own conclusions. Conclusions are reasonable, defensible, and demonstrable; they are not the result of an arbitrary choice, nor of blindly following a tradition. We have a criterion for being authentic in our common sense, our theory and our

interiority: it is to be faithful to the deepest and best inclinations of our heart and mind.

Fourthly, we do make mistakes, but strangely we can reflect further and discover our own mistakes. Systematically, then, we can investigate the typical sources of misunderstandings and false judgments. We can notice that we did not attend to all the data, and read all the reports, or that we jumped to conclusions on insufficient evidence. We can recognize that we did not think the thing through, realize the implications of a statement, clarify precisely what we meant, delimit clearly the extent of our competence. We can recognize when temperament interfered either rashly in pushing us into premature conclusions, or timidly in unreasonable hesitation in positing a conclusion. We can recognize many biases, prejudices, ulterior motives, much twisted affectivity, which interferes with the proper unfolding of the process of knowing. And going to the basic root of all misunderstanding in philosophy and science, we can recognize the dialectic operating in our knowing between elementary animal knowing with its criterion of the real in sense and properly human knowing with its criterion of the real in correct understanding and affirmation.

2. From Content to Activities

The crucial breakthrough to interiority involves shifting our attention from the *content* of what we know to the *activities* by which we do the knowing. So that there will be no misunderstanding, we first deal here with the notions of shifting attention, of awareness, of being conscious, and of consciousness. Then we will distinguish how conscious activities can be grouped into various patterns of experience. Employing our method of systematic self-appropriation, we focus our attention upon becoming aware of the intellectual pattern of experience. We [39] conclude the chapter with a kind of slogan that summarises the essence of the method and what it promises to achieve.

1. Awareness, consciousness. A number of terms can be used here and they are almost synonymous. To be aware of, to attend to, to be conscious of, are expressions we use when we are focussing our attention on something. We will give a very precise meaning to the terms 'conscious' and 'consciousness' and use them always in that sense.

Most of us have no difficulty distinguishing between being conscious and being unconscious. If you are sound asleep and not dreaming you are unconscious. If you get a severe blow to the head, you will probably be unconscious. If you are undergoing a major operation, then you hope that the anaesthetist will make you unconscious. When

you are conscious you are aware of what is going on around you, of who you are and what you are doing. When you are unconscious you are not aware of anything, neither of yourself nor of objects other than yourself.

Consciousness is simply the abstract noun taken from the experience of being conscious. When you are unconscious, you have lost consciousness; when you recover from a blow on the head you slowly regain consciousness; when you are put under anaesthetic you slowly lose consciousness. There is nothing esoteric or complicated about consciousness; it is an experience with which we are all familiar.

To be conscious, of its very nature, means not only to be aware of objects but in the same act, at the same time, to be conscious of the self as the subject being aware of the object. These are not two separate acts, one of awareness of objects, another of awareness of the subject. The crucial thing about being conscious is that in the same act by which we become aware of objects we are concomitantly aware of ourselves as the subject. In a sense you can say that machines can be aware of objects: radar ‘sees’ objects, sonar ‘hears’ sounds, check-out machines ‘read’ bar codes. But few would suggest that such machines are conscious; they can react to objects but there is no concomitant awareness of the self. When we are aware of objects we are at the same time implicitly aware that we are the subjects of this awareness. 'To be conscious' does not refer to [40] any specific mental activity but to a quality that pertains to many mental activities. It simply refers to the experience that in all our daily activities from waking to working to eating to studying to going to sleep again we are indirectly aware of being the subject of all these activities.

The term consciousness is often given other meanings: sometimes it refers to ‘anything that goes on in the head’; sometimes it refers to the activities themselves of thinking, feeling or knowing. There are a variety of theories about consciousness which make it very mysterious and complicated. For us, it is simply a given that we can attend to our surroundings and at the same time be aware of ourselves as the subject who is attending.

There are also degrees of consciousness. There are things of which we are fully conscious, others on the periphery of our consciousness, and still others of which we are completely unconscious. We can be totally unaware of an empty stomach; or slightly aware of hunger; or we can be totally preoccupied with hunger to the exclusion of all else. It is a little like vision. We are looking at a central spot or focus of seeing and are directly and fully aware of that; additionally, we are aware of a penumbra around that particular focus, but only if something moves or catches our attention within that

penumbra do we notice it. Then, there are things on the periphery of our vision that we hardly notice at all.

We could perhaps talk of layers of consciousness. We are conscious of many things at one time, but only one thing is fully in focus; the others are at various degrees of awareness. If we are driving a car and answering the phone at the same time, we are aware of many things but in varying degrees; we put the driving on automatic and attend to the call; but if there is a pedestrian crossing we forget the caller and attend to the brake.

To some extent we can control this focussing of our consciousness. We are not normally conscious of our breathing, but if you are training to become a professional singer you learn to control your breathing. A proficient typist will not normally be conscious of the movements of the fingers; but if you are changing to a new keyboard you must make a conscious effort to control finger movements. Studying a classic painting we can shift our [41] awareness from the colours to the proportions, to the shapes, to the feelings expressed. Doing research in the library, on the other hand, we strive to focus our attention on our work but are distracted by plans for the holidays or images from movies we have seen recently. We have not as much control as we would like. Try to concentrate on one image or idea for five minutes and you will discover how hard it is.

Our account of consciousness is not a philosophical theory but a matter of experience. To be conscious is something that is given, not something acquired by learning. To be conscious is simply to be aware, to be attentive, to be experiencing. If you do not recognise the experiences to which I have been referring, then, you have either misunderstood the terms or have failed to refer them to your own experience. There are not many people who would claim to be reading a book and unconscious at the same time.

2. From content to activities. Usually the orientation of our conscious activities is outwards towards external objects. The infant is almost entirely oriented by way of the senses towards objects to be grasped, touched, thrown, or put in the mouth. We are most at home in the world of objects in that sense. Our senses orientate us massively outwards towards what can be seen, heard and touched in the external world. When asked to give examples of acts of understanding, most students give practical example, e.g. how to mend a leaking pipe, how to control mosquitoes, discovering short cuts to make work easier, how to fix a computer glitch.

Piaget traces the intellectual development of the infant in terms of what kind of operations he/she can perform on objects.[xxvi] In the sensorimotor period (1-2 years of age) the infant can grasp, hold, suck, walk, etc. In the preoperational stage (2-7 years of age) the infant can apply these basic abilities to a new range of objects through assimilation and adaptation; talking, comparing, connecting means and ends. In the concrete operations period (7-11 years of age) the young child can deal with groups, classify, number, and judge. It is only in the formal operations period (11-15 years of age) that the young person can apply abstract laws to a variety of objects to determine, for example, which objects will float in water and why; this presumes the ability to apply the laws of specific [42] weight and flotation correctly. Piaget's analysis illustrates how powerfully we are orientated to objects, and how our intellectual development is linked to the kind of operations we can perform on objects. Even in calculus, physics and the human sciences, we are merely using more and more sophisticated techniques and laws to perform further complicated operations on objects.

Can we go a step further than the 15 year old capable of formal operations on objects to focus on the operations, the activities themselves? Can we become as aware of the mental activities by which we perform operations as we are of the objects upon which we perform operations? If we can talk intelligently about our dreaming, can we similarly talk intelligently about our thinking, understanding and knowing? It is our contention that we can; this is the key to moving from the world of theory to that of interiority. What actually happens when we understand something? What kinds of activities are involved? What comes before and what comes after and what is the usual sequence of events? These are all questions which can only be answered by shifting our awareness from the contents to the activities of our minds.

This does require a special technique. It is easy to focus on objects because they are sensible and relatively permanent. But the activities of our minds are fleeting, passing, hard to pin down. We cannot freeze an act of understanding like a biologist and put it under the microscope. How then can we pin down such an intangible operation? We can only do it at a second remove. First, we work on a puzzle, attempt various solutions and finally find the correct solution; secondly, we shift our attention from the problem to the activities by which we solved it. A football player will normally focus on getting the ball, marking the opponent, seeing a gap, tackling, defending, attacking, etc. But the following day he can replay the videotape and discuss why he did this, what was in his mind when he did that, etc. He can think back and become more aware of what was going on. We play football and we can analyse how we play football. Similarly, we first focus on understanding some problem; secondly, we analyse how we moved from

the problem to the solution; what strategies and tactics we used; which were successful and which were failures. [43]

Can we divide all mental activities into rough groups even at this early stage? When students are asked to name mental activities they can usually list thirty to forty, and it is not difficult to sort these out into groups. The external senses are the most obvious. We can group the activities of seeing, hearing, tasting, touching, smelling and feeling together; these are activities of senses operating on external sense objects. But there are also the internal senses, principally imagination and memory. Remembering is an activity of calling to mind events and objects of the past. Imagining is usually an activity of picturing some absent object or constructing an image of something that does not exist. In addition to these, we have a great variety of activities such as questioning, evaluating, conceiving, perceiving, classifying, defining, judging, knowing, understanding, meditating, contemplating, choosing, loving, and hating. All of these seem to be transitive; they are activities that must have an object.

Even though it is difficult to shift attention from objects to activities, there is a preliminary indication that this could be a very fruitful way to go and might give us some kind of integrating unity for which we are seeking. Objects which can be seen are for all practical purposes an infinity; there is no limit to the number, shape, colour or size of the objects that might be seen; but the seeing is the same one single activity for all the objects. Concepts are also a quasi-infinity, but if we have a grasp of the activity of conceiving, then we have grasped something that is in common to them all. Judgments are many but one activity produces them all. Our knowledge of objects overflows libraries and encyclopaedias, but there is one set of activities by which they are all known. If we can get a grasp on how these different activities of seeing, understanding, conceiving, judging combine into authentic human knowing then we will in some way be able to grasp a unity behind all the difference of objects.

3. Data and Facts. First of all let us differentiate data from facts. 'Data,' (sing. datum) is derived from the Latin verb ‘to give’ and simply means ‘what are given, the givens’. We will use the word data to refer to what are simply given in experience. We are using it in the sense of raw data, what are given by way of experience, before [44] the intervention of intelligence or interpretation or systematisation. 'Data' is often used in the sense of information stored on index cards or in economists' reports; for the sake of clarity we will try to avoid this usage.

Facts are much more complicated and involve affirmations of what is and what is

not the case: for example, this is a table; GNP has increased by 5%; it is not raining. Facts include affirming the truth and presuppose many activities of intelligence and reason. Justifying the activity of affirming the truth of factual statements comes much later in the text, where we deal with judgments and reflective understanding. Hence in our usage data are given in experience and are preintellectual, preconceptual and prejudgmental. Facts on the other hand are judgments and presuppose the cognitive operations of understanding and judging.

4. Data of sense and of consciousness. Data of sense refers to the data given in the experience of the external senses. They are what is seen, tasted, heard, felt, and smelled. The first part of scientific method is to get the data, by observation, experimentation or exploration. Data are given at the level of experience before interpretation or selection or interference. Data of sense are data about the external world, usually about objects and their properties. They constitute the subject matter of the various empirical sciences.

As we have seen above, we can shift the focus of our consciousness from the objects of the external senses to the activities by which we apprehend these objects and to the subject performing these activities. Data of consciousness, then, are the data given in the awareness of mental activities and the awareness of the subject of these activities. We can become aware of the activities of dreaming, feeling and understanding, and so these are as much data as are the data of sense. Just as the biologist will describe his specimen, dissect it, study its structure and its parts, so we can describe the activities by which we come to know, we can distinguish different activities from one another, we can relate them together in an intelligible sequence. That is the purpose and aim of this text. [45]

Our approach is empirical without being empiricist. An empirical scientist will normally appeal to the data of sense to verify his theories; the data of sense are his proper domain. Our subject matter is the data of consciousness, the myriad of mental activities of which we can become conscious. We focus on such activities, become aware of them, describe them; we classify the different activities, we note similarities and differences; we understand the relationship between the parts and eventually present an explanation of what I am doing when I am knowing. But our first task is to attend to the data; our interest is in the data of consciousness; our focus is on the activities we perform when we are studying and coming to understand. Everything that we say is verifiable by reference back to personal experience; the invitation is to check everything that is said about the activity of knowing against your own experience of coming to know.

In contrast to this there is a common mistaken empiricist position which claims that only the data of sense are real. There is also a common assumption among many contemporary philosophers that mental activities are private, therefore not observable, therefore not verifiable. Some even claim that it is meaningless to talk about mental acts. There is a massive prejudice that brushes aside this whole area of data as if they did not exist.

The Greek sceptics used complicated, convoluted arguments to claim that movement was impossible; the most effective answer was simply to walk across the room; let us do just the same with the data of consciousness. Let us show that it is possible and fruitful to apply the principles of empirical method to the data of consciousness. Just as the claims of empirical science can be verified in the data of sense, so all our statements about knowing can be verified with reference to the data of consciousness.

3. Patterns of Experience

Even a cursory glance at our mental activities reveals a chaos of fantasies, images, desires, memories, anxieties, hopes, feelings, affections, symbols and ideas. Doing some of the exercises at the beginning of this chapter will help you to become aware of this [46] buzzing, blooming confusion of activities in our minds. A literary device called 'stream of consciousness' is often used by modern writers to catch this confused movement of interrelated elements that constitutes the polyphony of our psyche. Perhaps James Joyce and William Faulkner have given us the most vivid portrayals of this internal drama.[xxvii] Our internal experience does encompass a multitude of activities and it will be our first task to disentangle these so that we can focus on the activities related to thinking and knowing.

What is our own experience of this 'stream of consciousness'? Is it a chaos? Are we controlled by our instincts? Can we disentangle this confusion? Our aim in this section of the text is to pick out certain patterns of experience, i.e. typical constellations of activities that usually go together. We need to identify these different patterns so that we will be able to recognise and isolate the pattern in which we are most interested, namely, those activities related to human understanding. All we mean by a pattern is that a number of activities are interrelated with one another in such a way as to form what could be called a group. These are not watertight categories and they allow for a certain flexibility and overlapping.[xxviii]

One can distinguish a *biological pattern of experience*¸ namely, a group of activities, purposes, and feelings which form a certain unity in terms of the person as an animal who has inherited the basic instincts, sensations and needs of the higher animals. The higher animals have both internal and external senses, the five external senses as well as rudimentary memory, imagination and instinct. Animals can react to stimuli and co-ordinate activities towards a goal such as building a nest or catching a prey. Goals are determined by the needs of survival: food, self-preservation, propagation of the species, security. Konrad Lorenz has studied aggression in ducks in its relation to mating, self-preservation, pecking order and territoriality.[xxix] In his final chapter he wonders whether what he has discovered in ducks applies to human beings, and he finds that it does. We are animals; we share the same basic senses, external and internal, with animals; we have to solve the same problems of survival, security, and propagation of the species as animals. There [47] is, then, a pattern of activities at this level which we share with animals.

Humans, however, are more than animals. One can distinguish a *practical pattern of experience*, the aspect of getting things done. It would seem that, historically, the use of tools, fire and weapons was the first manifestation of human difference. In our modern lifestyle most of our time is spent in the practical mode of experience, working in the factory, office, school, home, field, etc. Here there are typical activities interrelated in view of achieving a common purpose of producing, making, constructing, building, etc. Here we are concerned with usefulness, efficiency, practicality, producing results with a minimum of input and labour. In this pattern of experience we develop skills, technologies, tools, co-operation, progress in practical affairs. We are being intelligent, but it is for the purpose of solving practical problems, making life easier and better.

We can further distinguish an *interpersonal pattern of experience*. There is a set of activities and feelings which are characteristic of humans relating with humans. I suppose the average person spends about twenty years being socialised before he can be considered a mature, responsible and autonomous person in society. Most of this is learned from parents and siblings, by imitation, by correction, by peer pressure, by friendship and love and hate. We are formed by all these kinds of relationships; and in turn we will form others by the way we relate to them. We are socialised into our family, our local community, and enculturated into our ethnic group and our nation. There are a great variety of different kinds of relationship; a man and a woman are present to one another in a different way as strangers, as an engaged couple, as celebrating their golden anniversary. A child is present to its parents in a different way

than it is present to a stranger. The interpersonal gives colour, tone, and feeling to our behaviour.

We can also distinguish an *aesthetic pattern of experience*. This is the joy of sensing and understanding liberated from the discipline of logic or verification and guided simply by the search for beauty and harmony. It is playing with images, contrasts, unities and disunities, whether in the field of colour or sound or shape. It is the difference between poetry as opposed to prose, literature as opposed [48] to history, painting as opposed to map making. It involves feelings, sensing, skills, intelligence, inspiration and catharsis. We all have some experience of enjoying music, the release of play after work, the beauty of a magnificent sunset. It is this freedom for joy and beauty which distinguishes the aesthetic pattern of experience from the intellectual.

We can distinguish a *mystical pattern of experience* in which the activities of worship, prayer, adoration, love, exercises of charity, spiritual reading and meditation form an interrelated series of activities. It is an orientation towards mystery, God, the ultimate, not by way of thinking but by way of admiring, worshipping, being in love and praying. The mystical pattern can be peripheral to our lives or actively cultivated. In the monk or mystic it normally is the dominant pattern. When in the mystic pattern cognitional activities are present but are sublated to the goal of mystical union with God.

One could go on distinguishing other possible patterns of experience, but let us concentrate on the one that most concerns us: the *intellectual pattern of experience*. Here we want to disentangle that basic set of operations which are interrelated with one another and constitute our understanding and knowing. It is the pattern of activities centering on questioning, understanding, studying, doing research, writing reports, gathering information, stating facts. It starts with questioning and moves forward under the influence of further questioning in a relentless search for knowledge and truth. The intellectual pattern of experience is not a single activity, but a related set of activities in which we include seeing, imagining, remembering, relating, understanding, classifying, conceiving, expressing, defining, stating, affirming and denying. It will be our task to concentrate on this pattern of experience, to disentangle it from the myriad of other psychic activities and impulses and, in time, to define how the various operations of this pattern coalesce to form the unity of a single knowing. Our interest for the moment is to become aware of this distinct set of operations in our own experience, and to disentangle it from all other psychic activities. [49]

4. Intellectual Self-Appropriation

If you make an effort you can usually recall and recount a dream you have had. With some practice you can describe in detail the sequence of images in the dream, the feelings which were associated with the images, the connection between the events, and your role as spectator or participant in the dream. Since the original work of Freud on *The Interpretation of Dreams* many other books have been written about dreams; it has become a basic method of psychotherapy to work through dreams; many theories have been spun about the cause of dreams, the significance and function of dreams, principles for the interpretation of dreams. Everyone presupposes that we can remember and study our dreams.

Dreams are relatively easy to remember because they are composed of images and feelings and usually, in their own bizarre way, describe some sort of narrative. Our aim in this part of the text is to apply the same methodology to the study of the activity of understanding. If we can describe our dreams why should we not be able to describe our own activity of understanding? Admittedly, the images of a dream are very vivid and leave a strong impression. The activity of understanding is more difficult to capture, more recondite, more spiritual, more abstract; but, in principle, it is the same sort of procedure as recalling one's dreams. In this section we establish more clearly the methodology involved in studying the act of understanding in this way.

To 'appropriate' means to take possession of, to make one's own. In some contexts, unfortunately it means to steal, to manipulate, to instrumentalize. For us, to appropriate one's intellectual activities is to become aware of them, to be able to identify and distinguish them, to grasp how they are related and so to objectivize or make explicit this process. Therefore, we will sometimes use the term intellectual self-awareness instead of self-appropriation. First we perform the activities; then we shift the focus of our attention from the content to the activities; then we name, describe and classify the activities into groups of operations; finally we identify the unity of these activities which constitutes knowing. [50]

It is common enough in spirituality and counselling to become aware of one's feelings, motives, character and personality. A large area of psychotherapy seems to be concerned with bringing unconscious repressed feelings and traumas back to consciousness so that they can be dealt with. Becoming aware of one's feelings puts one in a position of being able to identify and heal those that are damaging and to reinforce and enhance those that are positive and loving. There are various movements based on

techniques to achieve self-awareness in these different fields. It seems to be very acceptable and even fashionable.

Intellectual self-appropriation is a more difficult challenge. In itself it is not entirely new, but to make it the explicit base of one's whole philosophy is new. It does seem to promise a great deal; if the appropriation of one's feelings and motives can be so healing and rewarding for psychological growth, then may we not expect that the awareness of our activities in understanding will be able to purify, strengthen and guide those activities as well?

We use the term 'intellectual' because what makes us different from animals is that we can think, understand, know and decide freely. The operations we intend to make explicit here are the operations which constitute us as human beings; they are nearer to the self than are our feelings. To be human is to think, to know, and to decide for oneself. Our focus here is upon this most critical aspect of our being.

For us the privileged place where we have access to the intimate experience of knowing is our own consciousness. The data which provide the basis for any explanation of human knowing are the data of consciousness. I cannot experience what is going on in your mind, but I can describe what is going on in my own. I can relate that to you and we can see whether we are talking about the same thing. The privileged place of reference for the study of knowing is not in books but in one's own mind. That is where we have direct and immediate access to the activities that constitute human knowing. Earlier in this chapter we outlined three opposing and contradictory theories of human knowing. Are they correct or not? Just as the scientist verifies his theories by pointing to data of sense, so we propose that these theories can be shown to be correct or not by [51] referring to the data of consciousness. On that criterion, as we shall see, all three systems seem to be inadequate.

We have already indicated how we can shift the focus of our attention away from objects in the external world to the activities by which we sense, understand, and know these objects. That is something that you can only do for yourself. You cannot do it while you are reading this text because then you are focusing on objects; but you can do it after you have read a passage, as you quietly reflect on whether it squares with your own experience of knowing. This is not a text that can be skimmed; it is not intended that you to memorise, or learn, or pick out the concepts for the purpose of repeating in an exam. It is in invitation to an intellectual journey. It calls for personal effort, involvement and reflection.

The journey starts with the simplest possible examples of the joy of direct insight. We have all had such insights; it is just a matter of adverting to them. The aim of the text is to bring to awareness the experience of thinking and knowing, to make explicit the criterion that is operating, and then to make that criterion a guide for all our knowing of what is real. We will work our way, step by step, through the experiences of direct insights, inverse insights, formulating and conceiving, affirming and reflecting, and end with the experience of intellectual conversion and the implications that has for metaphysics, for the physical sciences, for the human sciences and for theology.

If you are a biologist who wants to study the anatomy of a frog, it is relatively easy to get a dead frog and start dissecting. If you do not finish you put the frog back in the refrigerator and resume the work at any time you wish; the body of the frog will be there to dissect. However, if you are studying the activity of understanding, the subject matter is not so readily available. The act of understanding is intangible, internal, dynamic, spiritual. How do we get hold of it?

The technique we are suggesting to promote this self-awareness is to ask you to do some preliminary exercises before each chapter. The first thing is to do the exercises; the more important aspect is to reflect afterwards on what went on in your mind as you were solving the problems. We cannot focus our awareness on objects and activities at the same time; what we are proposing is to attend to the [52] problem or puzzle or exercise first, then, later, to reflect back on the images, clues, frustration, drawings, rough work, which lead eventually to the solving of the problem. The second part is more important than the first.

The examples are chosen specifically for each chapter and the subject matter of the chapter will be those experiences. If you have done the exercises we will have something to talk about; you will recognise the meaning of our terms in your own experience and will be able to check the validity of what we say against that experience. The reason for choosing a majority of examples from mathematics and the sciences is that such examples are the clearest and most precise available. There is understanding in the study of history or literature but it is harder to find isolated, clear and precise examples to illustrate the process of reaching it.

There is nothing sacred about these particular examples; you can substitute examples from your own experience, from your own profession or specialisation. We are performing acts of understanding all the time; it is a matter of isolating these activities where they occur in a relatively pure form and becoming aware of them.

Formal education often emphasises memorising, learning and techniques, smothering the joy of understanding so that we don't even notice it. It may help to to look at other areas where the joy of discovery is more evident. Games of chess, cribbage, solitaire, bridge, crosswords, and mathematical puzzles of various types are not a bad place to start. But there must be some personal experience of problem-solving, whether of those in the text or those of your own devising, which is to be the subject matter of each chapter.

We conclude with a slogan that expresses succinctly what we are about:

> Thoroughly understand what it is to understand, and not only will you understand the broad lines of all there is to be understood but also you will possess a fixed base, an invariant pattern, opening upon all further developments of understanding.[xxx]

The subject matter of our study is 'what it is to understand.' We intend to isolate this activity, describe it and understand it. The act of understanding is the moment of illumination, the flash of insight, the experience of finding the correct solution. It is the central activity of us as human, the key to everything else. The kind of understanding attained in math, in literature, in history, in philosophy, may be slightly different; but it is the one activity of understanding. Astronomers study the stars; biologists study frogs and insects; we, in our task of intellectual self-appropriation, study acts of understanding.

The phrase, 'the broad lines of all there is to be understood,' reminds us that there is something in common in all areas of human investigation. If it is the same act of understanding that is operating in the empirical sciences, in philosophy, in literature and in history, then there will be something in common in all these areas. If the activity is the same, then the objects understood must in some way be the same.

If we discover the basic pattern of operations involved in knowing, then, we will have found 'a fixed base, an invariant pattern, opening upon all further developments of understanding.' We are looking for a foundation for our philosophy ; perhaps this 'fixed base' is what we are looking for. It is an invariant pattern because no matter how much the objects may differ the act of organising intelligence maintains the same structure. If we can become aware of that structure of the act of understanding we will in some way be able to anticipate all further developments of understanding. Whatever new discoveries are made in the future, whatever new technologies, whatever progress may

be made in science or philosophy, it can only be done through deeper understanding. But if we already know what understanding is, then these new discoveries cannot be entirely new; they may be new in content but they won't be new in the activity by which they are understood. [54]

Comments on Exercises.

(1) It is very difficult to concentrate on one idea for any length of time. You will usually find that your mind wanders, that it is distracted, that it moves along from image to memory to fantasy almost at random. You realise with a start that you are miles away and bring yourself back to the starting point only to find that such concentration cannot be sustained. There is a ceaseless activity of images, memories, desires, fantasies, ideas, persons, questions, emotions, worries, all fighting for attention. The intellectual pattern of experience introduces some measure of temporary control and direction over this stream of consciousness.

(2) To catch intelligence at work, we have to go behind the finished product. Understanding is usually a matter of moving from confusion to clarity. To appreciate the act of organising intelligence it is useful to go back to the beginning when all was confusion and trace your steps as little by little you sorted out the confusion, picked out the key elements, saw how they all fitted together, and reached a conclusion. It is useful to preserve your notes in order to be able to recapitulate this process. When we have understood we tend to forget the difficulty and the struggle that we went through; we are surprised that other people do not catch on. But understanding makes a slow and bloody entrance.

(3) The human mind can be active at different levels at the same time. When you are studying you should be thinking, concentrating on the matter at hand, learning and remembering. The flow of images and memories should be under control. When we look for an example it should pop into our minds; when we seek a suitable image we should be able to construct or find it under the influence of intelligence. But often imagination takes over and we find ourselves daydreaming about football, friends, holidays, etc. Strangely it can be just when we are relaxing that we come to understand.

(4) You might come up with something like the following: hoping, listening, waiting, imagining, seeing, feeling, fearing, [55] wishing, desiring, smelling, hearing, hating, loving, thinking, concluding, defining, knowing, believing, deciding, choosing, valuing, talking to yourself, dreaming, longing, arguing with yourself, pretending, intending, wanting, affirming, denying, assenting, deducing, counting, enumerating, naming, calculating,... to

name but a few.

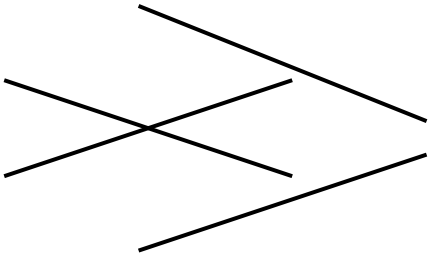
2

Identifying Direct Insights

Intelligence and intelligibility are the obverse and reverse of the second level of knowing: intelligence looks for intelligible patterns in presentations and representations; it grasps such patterns in its moments of insight; it exploits such grasp in its formulations and in further operations equally guided by insights.[xxxi]

Preliminary Exercises.

(1) Move only three of the eight sticks and reverse the direction of the fish.



(2) Join all nine points using only four straight lines which must be drawn continuously - without lifting the pen and without retracing your steps**.** [58]

. . .

. . .

. . .

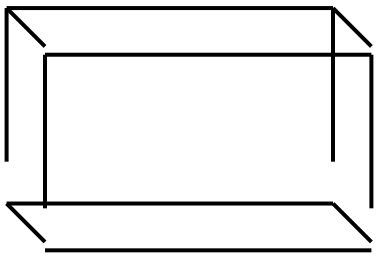
(3) Given that **D = 5** what are the values of the other letters in this addition sum:

D O N A L D
G E R A L D
R O B E R T

(4) Give the next number in the following sequences: -

(a) 5, 15, 25, …..
(b) 7, 3, -1, …..
(c) 1, -2, 4, -8, …..
(d) 1, 7, 25, …..

(5) Are you looking at this box from above or from below?



(6) Identify and describe an insight that you have had recently.

1. The Experience of Insight

In 1993 Nigel Short qualified to play Gary Kasparov, the reigning World Chess champion, for the World Title. As the games were in London and Nigel was a local boy, the BBC decided to televise the series live. As chess does not present much visible action, they assembled a team of commentators and analysts to fill in the gaps. However, during the sixth game Kasparov spent fifty-five minutes thinking about one move: almost an hour, motionless, transfixed, impassive, staring at the board, uttering an occasional sigh. Commentators soon ran out of chatter and the chess experts [59] exhausted their analysis. Still no move. BBC does not have commercial breaks, so you could feel the tension rising. Finally, one of the commentators cries out in exasperation,

What on earth is he doing?

That is precisely our question also in this chapter: what is thinking? What are we doing when we are thinking? Why does it take so long? What brings it to an end? What kinds of activities are involved in understanding? It is clear that it takes time: fifty-five minutes to be precise in this case. It is clear that it is an activity: Kasparov was not asleep, he was not relaxing, nor daydreaming. There is a limit to the time allowed; he wanted desperately to win; he had to use his time wisely. It is not a visible activity that you can catch on a television camera but it is an activity which we can describe, analyze, define, break into its parts and put them together again as a whole. That is what we will be doing in this chapter.

What was Kasparov doing for those fifty-five minutes? Well, he was thinking; he was considering possibilities, analyzing three or four main lines to a depth of six or ten moves, involving hundreds of possible end positions. He was using his *imagination* to picture the board with pieces removed or advanced; he was using his *memory* to call up similar games and situations; above all he was using his *intelligence* to relate, combine, put together sequences of possible moves and corresponding replies; he was being systematic, eliminating this line, exploring alternatives, looking at the situation from his point of view and that of his opponent. He was evaluating positions, advantages, material loss, attacking possibilities, balancing tactics and strategy. Finally, the whole movement coalesces into the judgment: this is the best move. Much to the relief of the commentators he moved a piece. The game ended in a draw but he won the series.

Our interest in Kasparov, chess, and what he was doing is marginal. Our primary focus is our own modest efforts to think things through, to understand correctly, to find correct solutions to problems. The exercises given at the beginning of the chapter are designed to provoke a simple insight.[xxxii] The main purpose of doing the problems is to reflect back afterwards and to identify the experience of an act of understanding and the factors which help or [60] hinder understanding to occur. We are not primarily interested in the content, whether it is chess or mathematics or practical problems; we are vitally interested in the activity or activities involved in the process. We are not interested in the *what* is being understood; we are interested in the activities *by which* something is being understood. We are starting the work of intellectual self-appropriation, taking it step by step, slowly assembling all the pieces, until finally we will be able to identify and discriminate with ease our own cognitional operations.

Direct insights are simply acts of understanding; we call them ‘direct’ to

differentiate them from inverse and reflective insights, which we consider later. Direct insights are the normal, straightforward acts of understanding involved in working out a chess problem, a mathematics question or a puzzle. Thinking normally involves a series of insights, a series of connections, relations, and possibilities. Thinking is like a conversation that we conduct within ourselves, considering, rejecting, arguing, referring to examples, invoking images, working things out. Sometimes we reach a solution; sometimes we remain frustrated.

We are now discussing the intellectual pattern of experience and so we can expect to discern a pattern of related activities that form some kind of a unity. At first there is puzzlement even in grasping what is the problem. What are the elements to be solved? What is the question? What has to be taken into account? It is tantalizing; it is a challenge to one's intelligence. If it is a game, there can be considerable aggression, a will to win, pride, fear and other emotions involved. If it is work, research, a practical problem, then all sorts of other factors motivate us to solve it. But in that first stage of puzzlement, we cannot see the solution; we can get very annoyed at the author or the teacher or the opponent, who has confronted us with such a challenge.

The next moment everything falls into place; you ‘see’ the solution. It is like a light going on in your mind. It is a release of tension, a spurt of adrenaline, something clicks. You 'see' what is relevant and what is irrelevant; you breathe a sigh of relief; you feel confident. The pieces on the chessboard remain the same, but you 'see' how they relate in a different way. You 'see' something that [61] you did not see before, even though it was staring you in the face. We use a variety of metaphors to express this experience. To ‘see’ is the most common but we also use the expressions, ‘to grasp the point’, ‘to get it ‘, ‘it dawned on me’, an ‘aha’ experience, a ‘eureka’ experience. These are merely metaphors, that is, loose ways of using what is familiar to talk about what is difficult less familiar.

The person of intelligence is the one in whom these acts occur easily, frequently and with regard to a variety of subjects. We are not geniuses, but we are all blessed with a minimum of intelligence and are performing acts of understanding all the time. The not-so-bright person is one who has difficulty understanding; it takes a longer time, and happens less frequently. We all know people who are very quick to catch on, to get the point, to grasp the essential. Others are dull, susceptible to having their legs pulled; we describe them as slow, dense, thick. The intelligent person learns faster, concentrates better, absorbs material easily, and gets ahead in his subject.

We are performing acts of understanding all our waking life; but for the most part

we take them for granted. When we are reading, we are performing a complicated series of acts of understanding the letters, the words, the sentences, and the meanings. When we are involved in practical work we using means to achieve ends, applying the law of the lever, exploiting the principles of mass and momentum etc. The difficulty is to be able to isolate the experience of a single act of understanding so that we can describe it, identify it, and pick out its salient characteristics. The purpose of this chapter is to make a start in identifying this experience of insight in our own minds. Later we will be able to expand on the implications of this for understanding, generalization, abstraction and other processes.

Just a cautionary note on what insight is not. It is not an intuition; it is not a direct, single, simple vision of intelligible objects. Understanding involves is a series of related activities, all of which are part of the process of having an insight. Think of what was going on in the mind of Kasparov for those fifty-five minutes; why did it take so long? What was he doing?

Insight is not in itself a religious experience. Religious experiences can be very dramatic, overwhelming, conversion experiences; such experiences may involve activities of [62] understanding, a change of world view or of concepts, but of themselves they primarily refer to God, prayer, behavior, choice, etc. There is nothing mystical or esoteric about acts of understanding in themselves; they are very common place; we are performing them all the time.

Finally, insight is not just remembering. We can wander around for hours looking for our spectacles - especially when we are old. Suddenly, we remember that we left them in the garden. It comes suddenly and unexpectedly but it is not an insight. This is simply an act of remembering at the level of sense.

2. Examples from History

Fortunately, history provides us with many examples of acts of understanding. Let us take some dramatic, clear cases to see if they can help us to analyze and identify the activities involved in understanding. Although they are experiences of historical figures our questions is always, does this resonate in your own experience?

1. Archimedes, a Greek mathematician, was given a problem by Hiero, the king. The king had received a chalice of gold, which was beautifully decorated, from a visiting dignitary. The king wanted to know whether the chalice was made of pure gold or

whether it was mixed with lead. He asked Archimedes to find out, without melting down the chalice. Archimedes knew that lead is heavier than gold. He could easily find out the weight of the chalice but he still had not enough information to work out how much lead and how much gold. We are told that he tired of the problem and decided to relax and go to the public baths. Floating in the water, perhaps wondering why he was floating, he suddenly realized that if he weighed the chalice in water he would get the further information he needed to solve the problem. He ran naked through the streets of Syracuse, shouting, 'Eureka, Eureka, I have found it, I have found it.' Later on, in his calmer moments, I suppose, he worked out the principles of specific weight and displacement, and realized that they could be applied to all and every material body to determine whether they would float.

2. A more modern example is that cited by the mathematician H Poincare. This is an insight into mathematics, but we do not have to understand the mathematics; what we are interested in is the experience of insight, which he calls illumination and describes quite clearly.

> Just at this time, I left Caen where I was living, to go on a geological excursion under the auspices of the School of Mines. The incidents of the travel made me forget my mathematical work. Having reached Coutances, we entered an omnibus to go some place or other. At the moment when I put my foot on the step, the idea came to me, without anything in my former thoughts seeming to have paved the way for it, that the transformations I had used to define the Fuchsian functions were identical with those of non-Euclidean geometry. I did not verify the idea; I should not have had time, as, upon taking my seat in the omnibus, I went on with a conversation already commenced, but I felt a perfect certainty. On my return to Caen, for conscience sake, I verified the result at my leisure.
>
> Then I turned my attention to the study of some arithmetical questions apparently without much success and without a suspicion of any connection with my preceding researches. Disgusted with my failure, I went to spend a few days at the seaside and thought of something else. One morning, walking on the bluff, the idea came to me, with just the same characteristics of brevity, suddenness and immediate certainty, that the arithmetic transformations of indefinite ternary quadratic forms were identical with those of non-Euclidean geometry.[xxxiii]

Here again, we have a mathematician faced with a difficult problem and unable to solve it after much time and effort. So he takes a break, relaxes, thinks of something else, and goes for a walk. And quite suddenly, in a flash, the answer comes to him; he understands the solution. Later on, he can return to his work and iron out the details. This extract recounts two such experiences where insights occurred not in the midst of work but at a time of relaxation.

3. Let us look at the well-known story of **Helen Keller (1880-1968)**. She was afflicted with a disease at the age of eighteen months, which deprived her of sight and hearing. She grew up a very unruly child, cut off from the world, helpless and dependent. When she was six years old her parents hired Annie Sullivan to be her tutor. Annie herself had suffered from neglect and cruelty in her youth and also experienced partial blindness. She was trained in the methods of the Perkins school to communicate with the blind and deaf by tracing the alphabet on the hand and associating these movements with common objects. She started using this method with Helen but was not meeting with much success even though Helen did learn to [64] imitate the movements on the palm of the hand. On March 3rd, 1887, all this changed, as Helen describes in her autobiography:

> We walked down the path to the well-house, attracted by the fragrance of the honeysuckle with which it was covered. Someone was drawing water and my teacher placed my hand under the spout. As the cool stream gushed over one hand she spelled into the other the word w-a-t-e-r, first slowly, then rapidly. I stood still, my whole attention fixed upon the motions of her fingers. Suddenly I felt a thought; and somehow the mystery of language was revealed to me. I knew then that w-a-t-e-r meant the wonderful cool something that was flowing over my hand. That living word awakened my soul, gave it light, hope, joy, set it free! There were barriers still, it is true, but barriers that could in time be swept away.
>
> I left the well-house eager to learn. Everything had a name, and each name gave birth to a new thought. As we returned to the house every object which I touched seemed to quiver with life. That was because I saw everything with the strange, new sight that had come to me..... It would have been difficult to find a happier child than I was as I lay in my crib at the close of that eventful day and lived over the joys it had brought me, and for the first time longed for a new day to come.[xxxiv]

Helen was seven years old when this incident took place. She had learned almost nothing in those seven years, her mind blocked by her blindness and deafness. But this is a liberation, a breakthrough. She discovered naming: things have names, can be referred to, fall into classes, can be identified and recognized. So we have the paradox of a blind girl who can now see - 'that strange new sight' - which we are calling insight or the act of understanding.

4. A more contemporary example is taken from *Scientific American*:_

> In 1951 David A. Huffman and his classmates in an electrical engineering graduate course on information theory were given the choice of a term paper or a final exam. For the term paper, Huffman's professor, Robert M. Fano, had assigned what at first appeared to be a simple problem. Students were asked to find the most efficient method of representing numbers, letters or other symbols using a binary code. Besides being a nimble intellectual exercise, finding such a code would enable information to be compressed for transmission over a computer network or for storage in a computer's memory.
>
> Huffman worked on the problem for months, developing a number of approaches, but none that he could prove to be the most efficient. Finally, he despaired of ever reaching a solution and decided to start studying for the final. Just as he was throwing his notes in the garbage, the solution [65] came to him. "It was the most singular moment of my life," Huffman says, "There was the absolute lightening of sudden realization."[xxxv]

He had been working from the wrong end of the coding tree; reverse the process and it works. Huffman's code is now one of the basic ideas of computer science and data communication.

These examples are somewhat dramatic but they do give good detailed descriptions of the experience of insight. It is an extremely important moment of transition from not understanding to understanding, from not seeing to seeing. A psychologist, E. D. Hutchinson, who has studied many examples of insights, divides the occurrence of an insight into four stages.[xxxvi] There is a first stage of preparation when the question is posed but despite great effort nothing seems to happen. A second stage of incubation or retreat follows when we temporarily give up on finding a solution, relax, turn our mind to something else to forget our frustration. There is a third stage of

insight when it just happens; we suddenly see, a light comes on, we get the point, we have a sudden illumination. Finally, there is a stage where we quietly verify, clarify and apply the insight. These stages can be perceived in all of the above examples.

However, what is important is not to study the insights of others but to recognize the same experience in your own intellectual activity. You may not be able to remember an experience as vivid as that of Helen Keller. For most of us the experience of insight is routine, taken for granted, not adverted to. But we are understanding whenever we are reading, speaking, listening to a lecture, taking notes, driving a car. The exercises at the beginning of the chapter are designed to make us stop and think; to jolt us out of a routine; to provoke the experience of puzzlement, of trying different solutions, being frustrated, and finally finding the correct answer. Our interest is not in learning mathematics, but in identifying the experience of understanding. Do some puzzle and, having found the solution, reflect back on the mental processes involved in solving it. What images did you use? What figures did you write down? What led you astray? What blocked you from understanding? What was the clue that helped you to solve it? Where did the insight come from? Each one of us has privileged access to the working of our own minds. Shift the focus from the objects on the paper to the activities [66] of the mind. There we can examine the intimate details of the experience of insight. The examples we have given are intended as a kind of mirror in which we can see the workings of our own understanding. The protracted struggle is only present when we are confronted with difficult problems. But you will usually find that our insights conform to the pattern of preparation, incubation, illumination and verification suggested above.

The above historical examples are all acts of discovering something for the first time; hence it is very dramatic, joyful, memorable. An educational system cannot afford the time to allow students to discover everything for themselves. The accumulated discoveries of generations of scholars are put together systematically and the student has to understand, remember, digest it all in one semester and repeat it in the exam. In an educational system the solution is often presented before the problem; learning loses the joy of insight and discovery and becomes dull and tedious. It is no so easy to isolate individual acts of understanding in that process of learning. Perhaps, an educational system which allowed more time for personal research and discovery would motivate and encourage students in the search for understanding.[xxxvii]

3. Five Characteristics of Insight

To further our objectification of the act of understanding we will discuss five characteristics of insight.[xxxviii] Remember that we are not describing something that happens only in the minds of geniuses, but rather, what is going on in your own mind all the time when you are understanding.

3.1 Insight comes as a release of the tension of inquiry

Knowing begins in inquiry, in the asking of questions. The first sign of the emergence of intelligence is the tension of inquiry, the questioning of experience. We are all familiar with the incessant questioning of the child. But even as adults we understand in proportion to the strength of our desire to know. There is a great difference between the student who has a personal interest in a subject, and one who is there only because he or she has no choice. It [67] is that interest which motivates, directs attention, sharpens concentration, and dismisses distractions. An idle curiosity might move us to attempt a problem, but it may not be strong enough to keep us at it until it is solved.

Aristotle starts his *Metaphysics* with the cryptic statement, 'All men by nature desire understanding.' On that he built his metaphysics; on that we build our philosophy. We presuppose a deep, strong Eros of the mind, an inquiring spirit, and a thirst for knowledge. The stronger, deeper and more intense the desire, the better chance there is that we will persevere in the effort to understand. The questioning dominates the activities of our mind, our drawing of diagrams, our exploring of analogies, our search for relevant data, our testing of hypotheses. The many disparate activities are united by the one desire seeking the one solution. Our searching is purposive, determined.

Archimedes had a desire to know as a mathematician but he had a strong reinforcement of that desire with the request of the king, the possibility of a reward and the fear of failure. It became a deep drive in his psyche, such that, even when he was physically relaxing, somehow unconsciously he was still working on the problem. Tension is created by the elements that do not fit together, the clues that we cannot reconcile, the lines and dots that do not make sense. We cannot tolerate disorder, we do not like a mess, we want to put things in their place. Puzzles annoy and challenge us. This is the period of the struggle, the thrashing around, the frustration, as we explore possible solutions.

When we discover the correct solution we experience it as a physical, mental and emotional release of tension. The joy of insight is symbolized by the naked Archimedes rejoicing in the streets of Syracuse. Or perhaps we can think of Helen Keller, happy for

the first time in her life, eager to begin a new day of learning and insight. It is the joy of a desire that is satisfied, that has finally reached its goal. It has its emotional side as frustration, anger, despair give way to joy, contentment, peace in the finding of the solution. It has an intellectual aspect as the mind too is at peace, the contradictions have been reconciled, the clues have been put together, we have hit upon the solution; we cannot comprehend why the others cannot see [68] it. There is even a physical component to such release; the tension of inquiry can disturb our sleep, affect our appetite, and interfere with our digestion.

The stream of images, examples, analogies, similar cases, possibilities that come into our mind are crucial for the generation of insights. Once we have the right image, clue or example, the insight will follow very quickly. The stream of images and possibilities come from our imagination and memory but under the influence of questioning. It is not a random stream. We dismiss immediately images and examples that have no relevance. The relevant image, data, example, come readily to mind for the intelligent person. Concentration means bringing this stream of images under control; distraction means that the images have taken over and we are being led far from the problem at hand. Even before insight occurs, intelligent inquiry is active, sorting out the relevant from the irrelevant, picking out clues, hints, suggestions, disposing the image so that it can become intelligible. Classical Scholastic philosophy recognized this activity as disposing or throwing light on the phantasm preparatory to the act of understanding.

Questioning represents the active aspect of understanding; we are doing the asking, constructing images, searching for relevant examples. We can control our imagination and memory and harness them for the purpose of understanding. Although the particular operations of constructing images and drawing on examples from memory are activities at the level of sense, they have been already been harnessed for the work of understanding. Higher animals have imagination and memory as well as an ability to coordinate responses; but we see no evidence of an ability to control or construct images. What is missing is intelligent inquiry; what is distinctively human starts with this inquiry.

You usually profit from a book or course to the extent that it responds to your personal questions. You will profit from this text to the extent that you are ceaselessly asking pertinent, critical, personal questions. What is he at? Is that true? What is the value of that? Surely that is wrong? How does that fit in here? Philosophy is about asking questions. Sometimes we think of science and philosophy as providing answers and so they do, but there are always further [69] questions, different questions, broader

and deeper questions; the questions will always go beyond available answers.

3.2 Insight comes Suddenly and Unexpectedly.

It comes; you cannot force it; you have to wait and hope and keep trying. But when that moment comes, it is something like a gift, an intervention from outside, something that happens to us; we receive it, we are to some extent recipients; we are illuminated. When faced with a problem, we are active in the sense that we are looking for different images, putting different bits of information together, searching in the memory for similar examples, etc. But we are also passive in the sense of waiting, hoping and praying that the insight will come. Aristotle was on to something when he distinguished between an Active and Passive Intellect. We need to discriminate between these two aspects to the act of understanding, the active and the passive.

The act of understanding does not follow automatically after questioning. In this, we can contrast sensation and understanding. Sensation is automatic; if you open your eyes you see. If there is light and it is reflected off surfaces and your eyes are functioning normally, then automatically an image is cast on the retina and the reactions of the nerve endings send signals to the brain. If you are shortsighted or long-sighted, wear spectacles and automatically the image is corrected. If we are not seeing, then something is wrong with the functioning of the eyes, the nerves or the brain. But understanding is different. Presented with a puzzle, it does not follow automatically that you will solve it. Understanding is not like immediate automatic vision of objects. You cannot impose a timetable; you cannot force an insight to come; you can only create the conditions in which it is most likely to occur. Understanding is a highly complicated series of interrelated operations, in some of which we are active and in others passive.

There is a difference between working out a calculation and making a discovery. In working out a calculation, you have a problem but you have clear rules to be followed; if you follow them you will automatically get the correct result. The process of getting the square root of a number is a typical example of a calculation. No [70] matter how complicated the number, simply apply the rules and work out the steps and automatically you will get the result. But that is because somebody in the beginning figured out what were the correct rules and procedures to be followed to get the correct result. We learn the rules, practice how to apply them, and if we follow them we will get the correct result. Acts of understanding are involved; we understand the rules and how to apply them but we probably do not understand why these rules get this result; for that we trust the teacher. But the preliminary exercises we have suggested at the beginning of the chapter are different because you do not know what are the rules

to apply; they are not calculations but discoveries. You have to work out which rules to apply; you are on new ground; it is original; there are no automatic results. Discovery is a new beginning. If there were rules for discovery the Greeks would have developed the computer. There is intelligence involved in following rules; but more creative intelligence in discovering what the rules are in the first place.

To say that insight comes ‘suddenly and unexpectedly’ is not the same as saying that it comes ‘immediately and easily.’ Sometimes it can be very difficult and comes only after much research and effort. Whether you get it or not depends not only on intelligence but also on imagination; an intelligent person can be lead astray by expecting something more than is there. There is a certain amount of luck involved in finding the right image, construction, clue or hint. A certain amount of guesswork is involved in choosing what seem to be the most fruitful alternatives to follow up. But even if we stumble on the solution after hours of sleepless work, when it comes, it still comes suddenly and unexpectedly. Even if we do not notice it, there is always this aspect of receptivity, passivity, emergence of order from confusion.

It does not always come when we are studying but, as with Archimedes, it can come when we are relaxing, even when we are walking or playing or working at something else. If the desire to understand, the tension of inquiry, is strong enough, then the unconscious seems to continue to work on the problem and we can wake up in the middle of the night and shout, 'I've got it.' So it is recommended that when you reach a dead-end in some work, you [71] take a break, do something else, go for a walk, come back to it later and try again from a new angle.

3.3 Insights depend on Inner Conditions rather than outer Circumstances

Even though we cannot force insights to come, we can create the conditions in which they are more likely to occur. These are mostly inner conditions in the mind rather than in outer circumstances. Primarily, it means to be continually asking questions; to be manipulating the data in the direction we think the solution lies; to be looking at the problem from different angles, dragging up new images, testing examples, remembering similar situations, exploring possibilities, trying analogies, starting again when we reach a dead end.

Students hear the same lecture but receive it in many different ways. They are in the same classroom, have the same equipment, the same general educational background; they hear the same words but grasp different meanings. There is an old

Latin tag, *Quidquid recipitur, ad modum recipientis recipitur*; whatever is received is received according to the mode of the recipient. It is the inner conditions of interest, attention, questions, images, and habits, expectations, ability, which determine how a lecture is to be received.

The inquiring subject sets the context into which insights will be received. A person who is familiar with mathematics will easily solve mathematical problems but may not be so good at crosswords or trick questions. Someone with a good memory will be good at general knowledge questions but may have difficulty with math or logic. So much depends on previous education, state of development of the culture, age, etc. Many people frequented the baths at Syracuse and experienced the sensation of floating in the water but only one of them had an insight into the laws of displacement and specific weight. [72]

3.4 An Insight Pivots between the Abstract and the Concrete

On the one hand, an insight is dealing with data and images which are concrete and particular: Archimedes had one chalice, one King, and one particular problem to solve. On the other hand, what the insight grasps is an idea, a relation, a universal, a law; and that is abstract. The laws that Archimedes eventually formulated were universal, referring not only to this chalice but also to any other material body immersed in any other liquid at any time or any place. The insight is constituted precisely by 'seeing' the idea in the image, the intelligible in the sensible, the universal in the particular, the abstract in the concrete. We pivot back and forth between images and ideas as we search for the correct insight. First let us now clarify the difference between images, ideas and concepts.

3.4.1. Images

An image is a sensible presentation; the most typical kind of image is the visual image, an imaginary picture. If we imagine a tree, then, it is a mental picture of a particular tree, with a definite size and shape and color. Even if we try to neutralize distinguishing features, still, the image will have a minimum sensible shape and size so long as it is an image. It is the function of imagination to receive images and to produce images of things that do not necessarily exist. An image is a product of the imagination. All the senses give images so there are also tactile images: we can imagine what it feels like to touch a snake. There are images of hearing: when we write music we can imagine what it will sound like. We can study a cookery book and imagine what the different dishes will taste like. We can imagine the smell of freshly baked bread. All these images

are sensible, they are visible or tactile or audio, images of smell or taste, products of imagination.

We can construct images of things never seen or sensed. We can combine images such as in a golden mountain or a pink elephant. We can imagine things that do not exist. We can fantasize about the future. We can do thought experiments such as imagining what it would be like travelling at half the speed of light. It is imagination that is imagining, but it is under the influence or control of intelligence, questioning, searching. But imagination must first [73] receive the raw material from the senses; a person totally blind from birth can hardly imagine color.

Animals have imaginations and can store sensible images. Dogs can be taught to recognize and react to the smell of drugs or explosives or to follow a trail. Animals remember places and times. But their imaginations are limited; they do not seem to have free images, to be able to create new images out of the material received in the senses. The human imagination can do this; it can construct new combinations of images, extrapolate from images, visualize new possibilities, write endless fiction. The chess player can look at the board as it is at the moment but imagine it as it will be after three more moves. This flexibility is essential for facility in understanding. We can imagine not only the actual but also the possible, what does not or could not exist.

3.4.2. Ideas

As an image is the content of an act of imagining, so an idea is the content of an act of understanding. An image is concrete and particular; an idea is abstract and universal; they are as different as chalk from cheese. If you take the example of the sequences of numbers given in the exercises you can see that each number is particular; the next number required is particular. But the only way to get what generates that number is to grasp the intelligible relation between the numbers. That is grasped in the formula (e.g. 2x+4); that is an idea. It is abstract, universal. It can generate an infinity of particular numbers but by itself it is an abstract, empty formula. Once we have grasped the idea behind the sequence, we can go forward or backwards as far as we like, but we quickly find this boring and pointless because it is the same thing over and over again. An idea is called abstract or universal precisely because in itself it is not concrete or particular but can be applied to an infinity of concrete or particular instances. The definition of a circle can be realized in an infinity of circles of different sizes and colors. The definition of a human person is a universal but it can be applied to an infinity of particular cultures, ages, colors, sexes.

There are many different kinds of ideas. We have defined images as products of imagination and we will define ideas as products of [74] intelligence. Definitions, laws, relations, intelligibilities, unities, qualities, quantities, classifications, virtues, numbers, are all ideas. Helen Keller had an idea when she grasped the connection between the lines traced out on one hand and the experience of water on the other hand. She grasped a relation between a word and a reality; this relation is abstract. The lines are concrete, the water is particular, but she grasped a relation, by which that word represents that reality. Archimedes grasped a combination of laws operating on all concrete particular things, the laws of specific weight and flotation. Poincare grasped the similarity of one branch of mathematics to another. Huffman grasped the idea of going backwards instead of forwards. There is an almost infinite variety of different ideas. The crucial point for us at the moment is to grasp the difference between images, ideas and concepts.

3.4.3. Concepts

Concepts are ideas that are formulated explicitly and expressed in words or symbols or definitions. A concept is also a product of conceiving. A direct, simple insight into a particular problem usually comes first but then we think about it, put it clearly into words and formulate it as a definition or law. Archimedes had the correct idea of how to proceed when he was in the baths, but only later defined the concept of specific weight and the laws of displacement. Ideas come first but are quickly followed by concepts. Concepts are formulated ideas. Most people have an idea of what constitutes a circle and would be able to distinguish between a circle, an ellipse and an ovoid. But many would not be able to define a circle correctly; when you formulate a definition of a circle explicitly, then, you have the concept of the circle. Both idea and concept are products of intelligence, not of imagination. Both concepts and ideas are universal and abstract. It is intelligence that grasps intelligible relations, meanings, solutions, laws, and expresses them in a formula or definition. We will discuss this activity of formulating concepts and definitions in more detail in Chapter five on Developing Understanding and Formulation.

A concept is only a concept, that is, a creation of the mind in its purposive search for understanding. We can have strings of concepts [75] which cluster together to form a theory or explanation. We could invent concepts at will in the sense of science fiction. But normally concepts are a stage in the process towards knowledge of the real when we need to be quite clear about what we are talking about. Concepts are usually a means towards an end, rather than an end in themselves. Concepts in themselves are simply suppositions. But they can also be the means by which we understand correctly

the working of the material world. Any technical discipline requires concepts, but they are not the object of the science in question; they are the means the science uses in order to know the concrete. Idea and concept, being both products of understanding, belong very closely together and hence we sometimes use these terms interchangeably.

The terms 'perception' and 'percept' are used in various ways: meaning either pure sensation, or full understanding, or anything in-between. It can be very confusing when people are using the same word in totally different senses. We would tend to use the word perception to indicate not a pure sensation, but a sensation that is patterned by understanding. Psychologists are fond of certain diagrams which challenge our perceptions; a stairway, which can be perceived as from above or from below; a sketch that can be either an antelope or a bird - see question five of the preliminary exercises. For them, these furnish proof that our knowing is subjective; that the same sensible data can be 'understood' in two different ways depending on the subjective dispositions of the knower. For us, this is simply an example of understanding imposing upon or controlling, to some extent, how we see the diagrams; there is no correct way of seeing such diagrams.

3.4.4. Images and Ideas

The crucial distinction we are making is between images, on the one hand, and ideas and concepts, on the other. David Hume and many empiricists after him use the words image and idea in vague and confusing ways. He defines an idea as a 'less lively' image.[xxxix] Ideas seem to be vague replicas of vivid images; they have less force but are the same kind of thing. His intention was to reduce all the contents of the mind to the level of the sensible. He was trying to say [76] that even the most abstract ideas could be traced to some image and so could be explained in terms of the sensible.

We are using the terminology of image and idea in a strictly defined sense. Ideas are not just less vivid shadows of impressions but have quite different properties as noticed above. Our appeal for the justification of this distinction is our own experience of the activity of understanding. What happens in your mind when you grasp the formula that generates an infinite sequence? What happened to Archimedes when he grasped the concept of specific weight? What happened to Newton when he grasped that a line or motion was a continuum? It is more than imagination. It is intelligence at work. The imagination produces images. Intelligence produces ideas and concepts. Although image and idea are clearly distinct they are also closely interrelated in the process of knowing.

3.4.5. We cannot think without images.

Having distinguished clearly between images and ideas, let us not make the mistake of separating them. It is a matter of common experience that we cannot think with out using images. Spontaneously if we are trying to understand something we appeal to examples, we construct a diagram, we refer to a particular incident; if we are teaching we similarly use examples, tell stories, apply metaphors, draw illustrations. By image here we include the vast store of memories, imaginations and sense data given to us in experiencing. Insights emerge when we question certain aspects of that data. Ideas emerge from the images. They are quite distinct from one another. Yet the development of our understanding continues to depend on appropriate images. It is not as if once we got the idea we were set free from the senses and imagination. The process of pivoting between the concrete and the abstract, the image and the idea, continues.

Images may become more and more rarified but never completely disappear. The mathematician needs appropriate symbols to facilitate his procedures. The Romans used an extremely awkward system of mathematical symbols; it would be extremely difficult to perform operations of multiplication, division, roots, etc using such symbolism. They had to be replaced by symbols which [77] were more flexible, more suggestive, more functional. In the empirical sciences, as we shall see, it is necessary to construct images of atoms, diagrams of forces and vectors, tables and graphs of data. Even in theology it would seem very difficult to think of God without some vague image of light, size, power. In the end we are perhaps left with the image of the word as the peg on which to hang the idea.

The more appropriate the image the sooner the idea will come; we need the images to reach the ideas. We have to manipulate, adjust, add to the images in order to get the insight. Solving problems in Euclidean geometry usually involves a construction, bisecting an angle, drawing a parallel line, etc. This is manipulating the image; when we hit on the right construction, we can usually grasp the solution. There will be much drawing and pencil work in solving some of the problems at the beginning of this chapter, but the act of insight that comes at the end produces, not an image, but an idea. It is intelligence grasping intelligible relations; it is seeing the connection; it is reaching the definition. Newton's laws of motion are a statement about a series of interrelated concepts. They are products of insight. The insights would not have been possible without the experience of motion and the images associated with the experience, but the insight goes far beyond that experience to grasp intelligible relations that explains universal qualities of motion. The laws are universal and abstract. They apply to all motion, of all material bodies, wherever they may be, past, present and to

come, no matter how large or small.

Plato seems to have thought that human intellectual knowing was a purely spiritual activity not dependent on the senses or images in any way. To understand was to be able to 'see' the intelligible Forms directly and immediately. For him there was no need for this complicated business of manipulating images, asking questions, struggling with the data, testing possibilities, following up leads, and finally getting the point. For Plato ideas did not emerge; they were already there. It is much simpler to think of intellectual knowing as a kind of intellectual seeing, simple, single, immediate contact, but such does not seem to conform to the common experience of the struggle to understand and the complicated [78] interrelationship of activities which seem to be necessary for understanding.

David Hume seems to have held the position that human knowing was simply sensible experience; that ideas are the same sort of thing as images; that intelligence was the same as imagination. All these ideas and concepts we have talked about are merely faint images and they are related together because of certain laws of association. This simplifies matters considerably; we can eliminate the spiritual, the intellect, metaphysics, theology, and anything else we don't like. But the question is, does this square with your understanding and my understanding as actually experienced in solving a problem or formulating a universal law? It seems, on the contrary, that human understanding does involve images and ideas, imagination and intelligence, the concrete and the abstract, the particular and the universal. It is a complicated process involving interrelated activities; the attempt to oversimplify simply distorts rather than clarifies.

Aristotle held the middle position. There is an active intellect which operates on sensible data to throw light on phantasms to prepare for the act of understanding.[xl] Ideas emerge from images; the thinking part, then, thinks the forms in the images. There is a difference between images and ideas, phantasms and forms. But they continue to develop together; for this reason the soul never thinks without images. Aristotle's account of human understanding is quite complicated, expressed in difficult metaphysical language, but seems to square with the actual experience of understanding better than any other theory.

Human knowing combines elements of animal knowing with intellectual knowing in a new synthesis not just a mixture. It is animal knowing to the extent that it is tied to the sensible and particular by way of the external and internal senses. It is intellectual knowing in the sense that the human intellect can grasp the intelligible, the universal,

the necessary, the abstract, the forms. But human knowing is not just a mixture of these two forms of knowing; it is a synthesis in which both are involved in a new unity, a new interrelationship, or interdependence. It is unique; it is complicated. Any attempt to reduce human knowing to the level of the sensible [79] alone will fail, because it cannot account for the grasp of the universal. Any attempt to maintain that human knowing is purely intellectual will fail when we notice the dependence on the sensible and images. Human knowing involves both images and ideas, both the concrete and the abstract. It is, perhaps, because it is so peculiar and so complicated that so many theorists have been tempted to oversimplify and thus failed to give a comprehensive account of human knowing.

3.5 Insights pass into the habitual texture of the human mind

If you have solved one of the puzzles at the beginning of the chapter, it is not easy to forget the solution. Whenever you discover something for yourself, it is not easily forgotten. There is a great difference between understanding and memorizing. Something we do not understand is usually very difficult to memorize; nonsense sequences are the hardest to memorize. But something we have understood becomes part of our mind in such a way that it is difficult to forget.

This constitutes the basis for the possibility of learning. We take it for granted that we can read and do not remember the years of learning involved in acquiring that skill. Learning the meaning of each letter was an effort, and when we finally learned it was an act of understanding the relation between a shape and a sound. Then, we were faced with the further task of associating letters together to form words. This presupposed the identification of the individual letters but called for a further step in associating letters together to form meaningful words. Again, each slow step forward was an insight, which passed into the habitual texture of the mind. Finally, there was the challenge of sentences, long sequences of words linked together to form a meaningful whole. This presupposed the words but went beyond the words. A new insight was required and when it was attained, then we could say that we could read. After years it has become so easy that we take it for granted. But that is only because each of the individual insights have coalesced and become part of the very texture of our minds.

Much the same thing happens in any area of competence when the learning process builds up a context of principles, laws and [80] relations, that are taken for granted as a background when approaching any concrete problem. A professionally trained mechanic sees and hears the same as the lay person, but because of his habitual store of principles and theory can attach significance to data which for the layman is

insignificant. Similarly, a doctor, an astronomer, a physicist, an exegete, a historian, possess a store of theory, concepts, procedures which has become habitual.

4. Distinguish Experiencing and Understanding

4.1 Distinct

Our identification of the five characteristics of the activity of understanding has made us aware of the complexity and subtlety of this activity. We have started with direct acts of understanding of simple problems or puzzles. Much remains to be said about developing understanding and knowing but at least we have made a start on self-appropriation. Now we can distinguish clearly between two different sets of cognitional operations or activities, that of experiencing and that of understanding. We will use the image of levels hoping that it will not be taken too literally; experiencing we put on the first level and understanding on the second. By experiencing we mean any activity at the level of the external or internal senses; seeing, hearing, remembering, imagining, feeling, are all operations of sense. These activities of the senses we share with the higher animals. They can be explained and accounted for in terms of animal psychology. In contrast, understanding is a different kind of activity; it is grasping the intelligible in the sensible, the abstract in the concrete, the universal in the particular. It is both active and passive. It involves questioning, struggling, searching for relevant data. Finally it comes; we grasp the idea, the relation, the law. Experiencing and understanding are quite dissimilar; it is impossible to just lump them together; they are distinct activities.

The products of these activities are also distinct; images, sensations and memories are not the same as ideas and concepts. An image is a picture or sensible replica of touch or hearing or taste; it is concrete, sensible, and particular. Our image of a house involves certain dimensions, colors, and shapes. Without some of those [81] sensible qualities there is no image. An idea is abstract; the law of specific density states an abstract relation between weight and volume. To apply the law requires other further activities; the law itself is an idea, the content of an act of understanding. Images and ideas are distinct products of the distinct operations of experiencing and understanding.

Let us explore in what ways these activities are different. The senses operate *immediately* on sensible objects. The senses require direct physical contact between the

object seen and the seeing eye. It is immediate in the sense that there is no intermediary, no other actions involved; it is direct physical contact. Similarly for the other senses of smelling, touching, tasting and hearing. Understanding, on the other hand, is *mediated* through operations of imagination, memory and questioning. Questions operate on data to make what is potentially intelligible to become actually intelligible. Kasparov spent fifty-five minutes on one move; Huffman spent months working on his problem before he got the simple insight to work backwards instead of forwards. Why does it take so long to understand? What are we doing before it comes? Understanding is mediated by questioning, selecting relevant data, organizing suggestive images, constructing helpful diagrams.

Operations of sense are *simple, single* activities; understanding is a *complex series of interrelated activities* finally issuing in insight. In experiencing one sense operates on one object, in one act, and constitutes one seeing or hearing. In contrast, understanding requires many activities in a sequence to produce one act of understanding. Human intelligence is discursive, it is a conversation with oneself; it is a jumble of activities; we rarely go directly to the correct solution; more often we take many by-ways, make many mistakes, get distracted, come back to it again. We tried to reconstruct what was going on in Kasparov's mind for fifty-five minutes; review your work in writing a paper; the original vague idea, the research in the library, talking with friends, suggestions of the professor, preparing notes, writing the first draft, bring order out of chaos. Why does it take so long to get things clear, to understand? Because it is not one simple, single activity but a complex series of interrelated activities. [82]

Operations of the senses are passive whereas understanding is both *active and passive*. The senses are receptors. The eyes receive light waves; the ears are designed to receive vibrations; if there is no light there is no seeing; if there are no vibrations there is no hearing. They are purely passive; open your eyes and you automatically see what is there to be seen. Understanding is both active and passive. It is active in the sense of questioning, manipulating, organizing data, etc; but it is passive in the sense that when it comes, it comes; it is a reception. There is the aspect of work, concentration, research, and effort in understanding; but there is also the aspect of gift. It comes; it is received.

4.2 Not separate

Although these levels of activity are distinct, they are not separate; they do not normally operate independently of one another. Often if you claim two things are distinct, it is assumed that they can be physically separated from one another. We are claiming that experiencing is a distinct activity from understanding; but understanding

cannot occur without the senses. Let us illustrate some of the many ways by which they are related.

It is possible for a subject to operate at the level of experience alone at least for a time; there is a sense in which experiencing can be separate from understanding. We start at the level of sensation, of experiencing. The child is mostly a bundle of sensations, desires, needs. At first there is no flicker of intelligence. But the child is seeing, hearing, tasting and smelling. Activities of experiencing can occur apart from the operation of understanding.

Understanding presupposes the level of experience. We cannot ask questions, unless there is some content; there must be something about which we ask questions. We ask about what we have heard and seen, imagined and remembered. We do not just understand; we understand something. What is that something and where does it come from? All the preliminary exercises present sensible data; the data have to be seen before they are understood. First there are data that are seen and remembered; initially there is no meaning or sense or explanation for the phenomena. Later, there follows the moment of seeing the connection, the meaning, the solution. [83]

However, in a normal adult the sensitive side of us has been so penetrated and influenced by intelligence that it is quite difficult to identify a pure sensation, i.e. a sensation that is in no way influenced by understanding, naming, defining. Compare a cow and a man looking over a fence. Both have their eyes open, are conscious and seeing in the physical sense. Are they seeing the same things? The same images are being transferred to the brain along an optical nerve in much the same way. The cow sees in a physical sense within the context of its biological pattern of experience and, with its imagination and memory, can perceive and react to things related to its needs and instincts; the cow can recognize grass, smell an approaching fox, hear and fear rumbling thunder in the distance.

The man sees, but he adds identification and naming to his seeing. He sees five different species of trees; he sees the smoke of the village in the distance; he sees the lack of nitrogen in the pasture; he sees one of sheep limping and speculates on the cause. The experience of the adult is so patterned by organizing intelligence, so shot through with definitions, identities, relations, so transformed by the influence of insights that have become habitual, that it is difficult to separate out a sensation that is purely a biological sensation. It is this synthesis of animal experiencing and emerging intelligence that constitutes the uniqueness of human knowing.

5. Heuristic Structure

Plato was puzzled that a person, who genuinely asks a question not knowing the answer, can still recognize the correct answer when it comes to him. How can he recognize that the answer is correct, if, at first, he really did not know the answer? This seems to be a contradiction. Either he knew the answer all along, or he can never find the answer. In the *Meno* Plato presents the example of Socrates teaching a slave to solve a geometrical problem simply by asking questions.[xli] The problem was to construct a square that would be exactly twice the area of a given square. The slave had no previous training in geometry; at the beginning, he genuinely did not know the answer. Socrates asks a series of rather pointed questions, and by answering them the laborer was able to discover the solution for [84] himself. He could now recognize that the answer was correct. What is this mysterious process from not knowing, to knowing?

One of the major questions in epistemology is, where do our ideas come from? Roughly speaking, there are three answers. One group says that we always possessed them, we have innate ideas, we were born with them, they were always there; these are usually idealists or rationalists. Another group claims that there are no such thing as ideas, and that what we call ideas are really less vivid sense images; these would be called empiricists. Then, there is the Aristotelian tradition, which claims that the human mind produces new ideas out of images. Let us consider each of these positions in turn.

Plato had to resort to the theory of Reminiscence and Innate Ideas in order to solve this dilemma. He had to suppose that we already know all the answers, already have possession of the Forms, from a previous life; but now that we are embodied, this knowledge has been hindered, buried, has become unconscious. The learning process is simply the unconscious becoming conscious on the occasion that the right question is put, or the appropriate teaching is presented. He had such a high notion of the immutability and infallibility of intellectual knowing that he could not make it dependent on sense objects which are always changing.

For the empiricists the difficulty is that if you admit of truly universal and abstract ideas it is only a short step to admitting a reality which is beyond sensation. But their position is built on the premise that there is only sensation and the sensible; therefore, ideas must be the same as images and these come from sensation.

Our answer, the third position, is that we can generate ideas out of images. There is a structure in the mind which enables us to move from images to ideas, from the

sensible to the intelligible, from the unknown to the known. We call it a heuristic structure. 'Heuristic' comes from the same Greek verb which Archimedes used in his exclamation of joy at his insight, 'Eureka,' I have found it. A heuristic is a device that helps us to find something, to move from the unknown to the known; it gives direction to our search. It is an anticipation of the known while it is still unknown. What is this heuristic? [85]

At the most general level, we have already identified the activities of experiencing, questioning and understanding. We can do self-appropriation and recognize in ourselves the process from images to ideas, from not knowing to knowing. We can recognize a direction, a movement, a method in the unfolding of knowing. We have recognized many different mental activities going on in the mind, when we are understanding and particularly emphasized the three categories of activities, which we have called questioning, experiencing and understanding. These are not random activities. The first manifestation of intelligence is in the purposiveness of asking questions. But questions have to have a content, are directed at some data given in experience. The aim of the question is understanding; that is reached when we have the experience of insight. Is there a method to guide us from the question to the answer? In the most general sense we can answer yes; it is not a set of rules but general guidelines which orientate our search. We have identified many different mental activities going on in the mind when we are understanding. We can distinguish striving, remembering, writing, drawing, imagining, feeling, following clues, exploring, separating, rejecting, trying again, giving up, etc. But these are not random activities. There is a basic method in our madness, there is a direction in which we are moving.

The unknown is never completely unknown. We can ask questions about it so we must know something. A question represents a combination of the known and the unknown. The more clearly we can formulate our question the nearer we are to answering it ourselves. The first step would seem to be to give the unknown a name; naming seems to be the first and simplest kind of insight. We do not know what it is but at least we can refer to it and talk about it. This technique is particularly effective in algebra where the standard method is to let 'x' equal the unknown. But it also occurs in the empirical sciences; instead of 'x' we tend to use such a term as 'the nature of.' What is the nature of fire? What is the nature of a free fall? What is the nature of AIDS? We have a name but we do not yet know the intelligibility or law to which it refers.

The second step would seem to be to sort out and relate the knowns and the unknowns. What do we know about the unknown? [86] What do we want to know? What

are the terms of the question? Write down all that you know. Is there any way that information can be manipulated in order to reach the unknown? In algebra the technique consists of forming equations; once you have a sufficient number of equations, combine them and find the value of 'x'. In the physical sciences it will be more complicated but the same process is at work. Much is known about AIDS but there are also many unknowns; call conferences to share what is known, isolate and pin down what needs to be known and how to find out. Be clear about everything that is known. State as clearly as possible the unknown that is being sought. Combine that with what is known. Where is the significant new data to be found? There will be many different techniques for finding further information; many complicated calculations involved; many sophisticated instruments to be used. But the guiding heuristic is the same. This is the period of struggle, of manipulating the data, of waiting for the insight to come, of creating the conditions in which it is most likely to occur.

The third step is solving the equations, doing the necessary observations, working out the solution. The example of the addition sum in the preliminary exercises is a good example where you must write down all that you know about each letter. Be perfectly clear about what you know and what you don't know. You can infer certain conclusions from the laws of addition, i.e. an even number plus one gives an odd number; any number added to itself gives an even number.

There are many specific methods proper to each discipline; we are often taught the rules of how to proceed, for instance, to identify an unknown chemical substance. Some disciplines will favor deduction, some induction; some will favor analysis, some synthesis; some will favor observation, others experiment. The basic heuristic we are identifying underlies them all. A heuristic guides our questioning of data to a fruitful and correct understanding. We have seen that this process is not automatic and cannot be the subject of rules. But there is a direction, a guidance, an orientation that can promote the emergence of the idea from the image, the insight from the phantasm. [87]

Algebra is a particularly clear illustration of heuristic techniques. The basic technique in algebra is to give the unknown a name; let x equal the required answer. Now that it has a name it can be manipulated. Combine it with the data given in the question. Imagine you knew the answer, what could you conclude? Get equations containing x. Solve the equations. If Fred leaves the house at three o'clock traveling at fifty miles an hour; and Bob leaves the house at five o'clock traveling at eighty miles an hour in the same direction, at what time will he overtake Fred? Let x equal the number of hours after three o'clock that they will be traveling. Fred will be traveling at fifty miles an hour for x hours and therefore will cover a distance of 50x miles. Bob will be traveling

at eighty miles an hour for (x-2) hours and therefore will cover a distance of 80(x-2). But they both travel the same distance, therefore 50x = 80(x-2). Solve the equation and get the value of "x".

The great mathematician, G. Polya, specialized in heuristic techniques for solving mathematical problems.[xlii] He taught mathematics not in terms of rules, but in terms of general strategies to be implemented to work towards a solution. He formulated his broad strategy in four maxims. First, understand the problem; analyze what you given and what you are looking for; be clear, write it down. Secondly, use experience from related problems to devise an attack; techniques which worked elsewhere might work here; identify similar problems; remember previous successes and failures. Thirdly, carry out the attack. Apply the techniques, do the calculations, work out the equations, find the coefficients, differentiate, integrate, etc. Fourthly, ask yourself whether you really believe your answer. Check backwards, verify, look for mistakes, and search for loopholes. This is the bare bones of a heuristic which need not be confined to mathematics.

Empirical scientists use the same technique even though they may not be aware of it. Galileo was searching for the nature of the free fall. What were the mathematical relations that pinned down the nature of a free fall? Well, set up an experiment to find out. Chart the series of results of the experiments. Get the insight that satisfies all the relevant data. Check the insight back against the data; repeat the experiments. [88]

There is a general heuristic involved once we start asking questions; the question suggests the direction in which to look for images, data, further information; the question sets the criteria that decide whether it has been answered correctly. There is often a scissors-like movement in the unfolding of understanding. On the one hand, we may be helped by more and better data, so we look up encyclopaedias, perform experiments, observe more closely. On the other hand, we need hypotheses, ideas, possibilities; we have to think as well as look for more data. At some moment the hypothesis fits the data and we have it.

Let us note, then, that there is a method implicit in these activities of questioning, experiencing, and understanding. There is the questioning, the initial puzzlement, the grasping of the problem, the challenge to understanding, the unrest of an unanswered question. This sets off a striving, a determination, and a stream of activities aimed at a solution. Our external senses are involved in looking at the book or blackboard, hearing the challenge, writing it down on a piece of paper, and beginning to draw lines, fill in

spaces, doodle. Our memory is involved as we try to remember similar examples, similar problems, analogous puzzles, previous experience of dealing with this type of challenge. Our imagination is involved as we try to manipulate the data, construct better diagrams, write down all we know, dissect the question to sort out the knowns and the unknowns, imagine possibilities. Finally, hopefully, comes understanding, the breakthrough; things fall together, the excitement of seeing the point. But that is not the end, as there remains the task of formulating the insight and checking the solution against the data or against the criteria set by the question.

It seems then that our minds are dynamic, the source of new ideas, concepts and theories and that these are derived from the matter of sensation. The mind is a heuristic structure by which it can proceed from the unknown to the known, from images to ideas, from the vague to the precise. The dynamic aspect is represented by questioning which points us in a direction, sniffs out clues, suggests possibilities and finally hits on the solution. There is a general method implicit in the very structure of human understanding. We can work out solutions for ourselves; we do not have to wait to be [89] told; we do not need to appeal to the Authority of Aristotle or anybody else; we can recognize when we are right and we can learn from our mistakes.

We reject Plato's innate ideas and reminiscence because it does not seem to conform to what actually happens. Why should we be obliged to call upon such unlikely and complicated presuppositions to account for the activity of understanding? Intellect does work in tandem with sense and ideas do emerge from images. We disagree with the empiricist position that ideas are the same as images. A little self-appropriation seems to indicate that they are quite different. Our position, then, is that human knowing can be progressive and cumulative. We can start with primitive insights into data; we continue to differentiate and develop as our education makes possible; there is no end to the cyclical development of questioning, sensing, observing, understanding, reflecting and, finally, knowing.

How then do we recognize an answer as correct if at first we did not know the answer? The question sets the criteria which must be satisfied if the answer is to be correct. You recognize that it is correct precisely because it satisfies these criteria. You check the correctness of the solution by working backwards to the question to see if it is satisfied. There is a closing off between the question and the answer. This checking procedure and other aspects will be explored in detail later when we deal with reflective insight.

In conclusion, then, this is our description of the experience of having an

individual insight. We have started the work of intellectual self-appropriation. Already, I hope we have made important discoveries about the working of the human mind, of your mind. It is just a beginning and there is much more to be explored. It is enough for the moment that we recognize this activity as it occurs in our own consciousness; it is enough that we focus our awareness on this activity to see how it unfolds over time. It is an activity in which we are constantly engaged. It is the activity of grasping sense from nonsense; separating what is important from what is unimportant; distinguishing the essential from the non-essential; picking out the relevant and leaving behind the irrelevant; focusing on the significant and ignoring the insignificant. It is intelligence [90] that enables us to do these mental activities. The intelligent person does them easily, quickly, expeditiously. The unintelligent person does them with great difficulty, great effort and often with numerous errors.

Comments on Exercises.

(1) One straightaway assumes that the 'tail' of the fish will become the new 'head'. But it doesn't take long to see that that does not work. You have to force your imagination to consider other possibilities. Then it becomes easy.

(2) Looks deceptively simple but it doesn't seem to work. Understand the rules correctly: no going over lines once they are drawn; lines must be drawn continuously. It's impossible. We usually presume we must stay within the 'box' of points; but nobody said that the lines must remain within those parameters. Then it becomes reasonably easy.

(3) This necessitates a series of insights. Very clear diagrams are necessary to distinguish what you know for certain and what you are experimenting with. Write down everything you know clearly. The key insight is the peculiarity of the fifth vertical line: how can you add E to O and still get O? What number can you add to another number to leave it unchanged? (Don’t get confused between the letter O and the number zero.) At a certain point you may have to switch from deducing, to assuming something and trying it out

(4) (a) The answer is 35. The formula generating an infinity of numbers is (x + 10).

(b) The answer is -5. The formula is (x - 4).

(c) The answer is 16. The formula is (X x -2).

(d) This is more difficult as it combines both multiplication and addition. The answer is 79. Two formulas generate this sequence, (3x + 4) where x represents the value of the previous number in the sequence; or (3^n - 2) where n is the number of the term in the sequence.

(5) You might be able to shift from one perspective to another.

(6) Even though we are understanding all the time, it is quite difficult to isolate one act of insight and identify its characteristics and genesis. But it is important to find your own examples in your own experience. The more detail you can provide the better.

3

Description to Explanation

Now the principal technique in effecting the transition from description to explanation is measurement.[xliii]

Preliminary Exercises

(1) In the context of geometry, (a) Describe a point. (b) Describe a line. (c) Describe a circle.

(2) In the context of geometry, (a) Define a point. (b) Define a line. (c) Define a circle.

(3) John thinks that the tea is too hot; Mike thinks the same tea is too cold. Is the tea really hot or cold?

(4) To person of sound common sense the table is brown, solid, smooth and stable. As a scientist Eddington declared that the same table is composed mainly of empty space, with a few tiny particles, moving at great speed; that it has no color and is extremely uneven. Which is the real table?

(5) John says, "The sun rises in the East and sets in the West." Mike says, "The sun is

not moving." Is there a contradiction between these two statements? [94]

We identified three stages of meaning in our opening chapter, common sense, theory and interiority, without giving a precise analysis of common sense and theory. It is now time to focus on this distinction which hinges on two diverse kinds of insights, namely, those of description and those of explanation.[xliv] We continue our program of self-appropriation in searching for a precise meaning to these commonly used terms. We have already identified the basic act of understanding and its five characteristics; now we expand our familiarity with understanding in appropriating two different spheres of knowing, describing and explaining. We will start with a history of attempts to get this distinction right; most of them failed. Through examples drawn from our own experience we will establish that there are two kinds of insights: those that relate things to us and those that relate things to one another. We will need to define these clearly and precisely as they have a universal relevance. This proves to be very fruitful and many apparent contradictions, confusions and paradoxes disappear in the light of this distinction.

1. Historical Background

Plato was very perturbed by the fact that a wind, which is judged chilly by one person, can at the same time be judged warm by another (*Theaetetus* 152ff). The same problem arises with things, which are large to some and small to others, heavy to some and light to others, sour to some and sweet to others. Plato feared that this would prove that Protagoras was right in saying, 'Man is the measure of all things alike of the being of things that are and of the non-being of things that are not.' Is knowledge relative to the perceiver? To admit that would be to surrender to the Sophists.[xlv] Plato was deeply convinced that there is knowledge which is not relative to the observer. But how was he to cope with the above examples? Plato seems to have given his answer in the analogy of the divided line and of the cave in the *Republic*.

The divided line says that there are two kinds of knowledge: sense knowledge (*doxa*) subdivided into opinion and belief, and intellectual knowledge (*episteme*) subdivided into knowledge of the Forms and of the mathematicals. Intellectual knowledge is real knowledge of things that do not change, of what is, and is infallible. Sense knowledge is of the changing and so is not really knowledge. The same message is driven home in the metaphor of the cave. [95] Sense knowledge is the kind of knowledge that the prisoners have of the shadows on the wall and the statues casting the shadows. The prisoners have intellectual knowledge when they come to the

entrance to the cave and see individual real things and the sun as the source of light.

Plato cannot consider knowledge, which is relative to an observer and changes, to be true knowledge. Knowledge of warmth, sweetness, weight, size, as in the above examples, would be classified as sense knowledge and distrusted by him as knowledge of shadows of imitations. In contrast, by way of intellectual knowledge we know the Forms that are permanent and unchanging. He seems to have surrendered the field of sense knowledge to the Sophists in order to hold on to real knowledge of the permanent realities in intellectual knowledge.

Galileo, Descartes and Newton were confronted with much the same problem in their efforts to understand the world in the language of science and mathematics. There were some aspects of nature that could be measured and subsumed under laws but there were also aspects which seemed to depend on the perceiver and which could not be measured. It was thought that some aspects of reality resemble the ideas that we have of them, and that the qualities we perceive belong to the object in reality as well as to the perceiver. For other aspects of reality there was thought to be no resemblance between what is in reality and what is in the perceiver; the real thing only has the power to produce these sensations in us. John Locke formulated this distinction explicitly in terms of primary and secondary qualities.[xlvi]

Primary qualities are those qualities of a body which really belong to the body and cause our ideas of that body and our ideas really resemble that body. There are five primary qualities, extension (size), figure (shape), motion (or rest), number and solidity. These qualities are inseparable from the matter and are found in every part of it. If you subdivide a quantity of gold, the primary qualities will still belong to each and every one of the smallest parts. Significantly, the primary qualities can easily be [96] measured and so it was claimed that they were 'objective' and belonged to science. It can also be noted that primary qualities are usually perceived by more than one sense.

Secondary qualities are perceived qualities like color, taste, smell, sound, warmth or cold, etc. They are causes of our perception of them but the ideas in our mind do not resemble the qualities of the bodies in reality. Secondary qualities are not true qualities of matter but merely powers in the objects to produce sensory effects in us. Secondary qualities can be influenced by the conditions of the sense organs, health or sickness of the perceiver, conditions of lighting, etc. If you have three bowls of water, one hot, one medium, and one cold, and you put one hand in the hot and one in the cold; if after a few moments you plunge both hands into the medium, it will feel both hot and cold at the same time. Hence, heat cannot be an intrinsic quality of things because our

perception of it varies so much. It would be the same with different perceptions of the color of a pond, which depend on conditions of lighting and the angle of perception. It is difficult to measure secondary qualities, as they are often the object of one sense only. Hence, Locke concluded, these secondary qualities are not real and do not belong to bodies and are to be excluded from science. For a slightly different reason then Plato, Locke claimed that we cannot have reliable knowledge of such qualities as sweetness, warmth, feel, etc.

Locke's distinction does not seem to hit the mark. Primary qualities are also subject to great variations depending on the view of the perceiver; for example, bodies which are close will seem to be large and those far away seem to be small. Secondary qualities can often in fact be measured (e.g. heat by a thermometer) and do play a part in science. There are difficulties to this distinction that he did not face. But the main problem lies not so much in the definitions but in how he asked the question: can you compare what is in reality with what is in your mind? How can you say that they are the same or different?

This kind of thinking lasted in the scientific community up to the beginning of the 20th century, when Eddington presented his dilemma of the two tables.[xlvii] By that time science had shown that atoms were mostly empty space and that the particles were [97] constantly moving. The table of the scientist is mostly empty space, with a few particles whizzing around at enormous speeds and it has no color. But the table of common sense is very solid, is certainly not moving and is very clearly brown. Which is the real table? How do you resolve the apparent contradiction? Following the tradition inherited from Locke and others, Eddington had to hold that the scientific table was real and that the table of common sense was merely an illusion. We are not so sure.

This confusion throughout history continues to the present day. Our solution is to investigate the mental operations we perform when we are describing and then the mental operations we perform when we are explaining. If we keep closely in touch with real examples we will be able to grasp how our perspective shifts when we move from describing to explaining. We discover that both are valid forms of knowing with their own advantages and disadvantages.

2. Description

We do not seem to have much difficulty in describing things. When asked to describe a point, students will usually suggest words like, a dot, a mark, a spot, a small

stain, a little dot, etc. A line will usually be described in terms of a path, a long mark, a series of dots very close together, an infinite series of dots, etc. A circle can be described as a round ball or an even wheel or a regular curve. Even more easily we can describe trees, tables, landscapes, objects. Clearly, we have little difficulty describing, but what exactly are we doing when we are describing?

Our definition of the activity of describing is that we are 'relating things to ourselves.' We are assuming that we are the center and that things are to be related to us. We are saying how it seems to us, how it appears from our perspective. We do this via the senses and so descriptive knowledge is dominated by how we see things, hear them, feel, taste, and smell them. To describe a table is to say what it looks like to us, how it feels, smells, seems to us. To describe a point or a line will be to say what it looks like to us; what image can best be used to describe it. To describe the heavenly bodies is to say how [98] they seem to be moving from our point of view assuming that they are moving relative to us.

The most obvious thing about description is that it is relative to us. The point of reference is presumed to be ourselves. Terms like right/left, up/down, there/here, now/later, all presume ourselves as the term of reference. But they may be different for another observer because he is relating things to his own position. So, descriptions will relate to the point of reference of the observer. Consequently, ordinary descriptive knowledge will be ambiguous and approximate. 'I have a terrible fever,' approximately describes your problem but doctors will usually treat this with a little skepticism and check with a thermometer. 'There was a huge crowd at the demonstration;' well, that assessment may depend on whether you are for the cause or against it. It is rarely that a chemistry book tells you to add some concentrated acid, simmer for a while, mix a pinch of this with a little of that. When we use works like large, heavy, warm, many, bright, far, fast, soon, sweet, easy, we are usually using descriptive terminology. Even though we may have a fair idea of what we mean by those terms, there is no guarantee that another person will have exactly the same idea.

Descriptive knowledge forms the bulk of the common sense of mankind. Common sense is a specialization of intelligence relating to the practical, the particular, and the short-term. It is genuine knowledge but it is largely descriptive. It is very practical and eschews theoretical considerations. It is short-term and prefers immediate results to the long-term expectations of a better course of action. Common sense is related to the particular place and time and the fund of conventional wisdom that has been built up by the community as to how things are done, how one is to behave, dress, relax, play, etc. Because it is relative to time and place, there are many different brands of common

sense.

Description is where all our knowledge begins. The child is incurably egocentric and has to relate everything to itself. Even when intelligence has emerged, the sensible still predominates. Traditional cultures like the early Greeks were predominantly descriptive; all cultures must begin at that level. Hence confusion over meaning - magic and religion, art and science, poetry and [99] philosophy - was inevitable at that stage. Most of the empirical sciences begin by describing the materials that they study.

So far we have emphasized the limitations and relativity of descriptive knowing; now we must insist that describing does involve acts of understanding and that descriptions can be either correct or incorrect. Insights are involved because you are expressing yourself in words. Seeing red is an experience; animals can see red; but distinguishing and naming red, blue, purple, etc. is a work of intelligence and has to be learned. To describe the movements of the heavenly bodies involves recognizing the meaning of words, being able to distinguish different shapes and sizes and colors, being able to discern and to compare movements. To describe involves being able to classify things according to their sensible similarities and dissimilarities; discerning which qualities are significant and which are not. Data is given in experience; facts are judgments passed through correct understanding.

Descriptions, despite their limitations, can be labeled correct or incorrect. If you are observing the movements of the heavenly bodies and one person says the stars are not moving, another says they are moving at random, and another that they are moving from East to West, then, there is a problem. There comes a point when descriptions have to agree. If serious discrepancies occur then we have to look for the source of misunderstanding: are we looking at the same thing; what do we mean by movement; do we include movements which can only be detected after hours of observation, etc. Discrepancies are usually resolved when we look again, more carefully, more intelligently, more systematically. If two witnesses in court give quite different accounts of one event, there comes a point when we can correctly conclude that one of them must be lying.

But as well as ordinary description there is also scientific description, i.e. description as it prepares the way for explanation; description as it is controlled and guided by theoretical intelligence. Here description can become very sophisticated and refined. Looking at the heavenly bodies with the naked eye means that your observations are going to be very approximate and of little value. But as a person

advances in the science of astronomy, refines his [100] techniques of measuring, begins to use sophisticated telescopes, and directs his attention by way of theory to search for something specific, then he is using scientific description. It is still description because he is still reporting what he sees and how it appears to him, but it is no longer vague and approximate.

The sciences begin with descriptions, how things relate to us, in order to move on to explanation. Sciences begin with classifications based on sensible similarities in order to go on to defining things according to their intelligible relations. Botany will start with descriptions of plants, their color, size, shape, etc. in order to go on to define the species in terms of the functions of different systems in relation to the whole; the relation of this species to other species in an evolutionary model.

Turning back to Plato for a moment, we can sympathize with him in the problem of different perceptions of warmth, sweetness, size, distance, etc. At the level of ordinary descriptive knowledge there is no final resolution to this ambiguity and disagreement. Because descriptive knowledge is relative to the perceiver, the element of relativity cannot be overcome. Plato solved his problem by discarding this kind of knowledge as intrinsically flawed and not real knowledge. We would incline to the opinion that it is true knowledge even though it is only descriptive. To escape from the relativity of descriptive knowing we have to shift our perspective, prescind from the observer and jump to explanation. Plato asked the question, is the wind really cold? is the food really sweet? His answer was to escape into a noetic heaven where pure coldness, sweetness, oneness, being, etc. existed perfectly and permanently. We can ask the same question but find the answer in a slightly different direction. We accept the limitations of descriptive knowledge but seek a way to escape the relativity of this kind of knowing and get something which is more accurate, objective and permanent.

3. Explanation

To explain things is 'to relate things to one another,' to prescind from the observer's point of view to the extent that that is possible. [101] This usually involves a shift to a technical language, definition and often measurement. It is a shift to a theoretical point of view, which will eventually return to the concrete by way of verification. It enables tremendous precision to be reached in measurement and calculation, as well as in the use of technical terms and definition. There seem to be two principal ways to move into an explanatory framework, by way of measurement or by way of definition; we will consider them in turn. Our concern is still the identification of different kinds of insight as they actually occur in our own thinking and knowing.

3.1 Measurement

The technique of explanatory measurement was discovered by ancient civilizations when descriptive categories proved to be inadequate. You could hardly build the pyramids on the basis of 'big stones', 'long ropes', 'slanting', etc. Nor was it easy to divide out equal plots of land as a reward for the soldiers on the basis of 'large', 'small', 'pretty large', etc. Nor could you anticipate much progress in astronomy if you were confined to descriptive language such as ‘over there’, 'up there', 'far away', etc.

The basic breakthrough was to adopt a standard length then line up the object and see how many times the standard measure measures it off. This is one basic example of relating things to one another. Instead of relating things to individual perception of size, you have a standard measure on which everybody is agreed. If you wish to compare two distances, since lining them up might be difficult, measure each of them in terms of the standard and then compare the measurements. Simple arithmetic can, then, be used to divide a field into five equal sections, to determine how many blocks of what size would be needed for a pyramid of a determinate size, to discover how long it would take to complete various journeys. Geometry can also be utilized in the calculation of areas of fields of different shapes, and extended to capacities and volumes of containers.

Early standards were rather loosely defined and usually based on human dimensions; the cubit was a measure from the elbow to the tip of the index finger, about 18 inches; a span was the span of the [102] hand, about 8 inches; a foot was the length of a foot, approximately 12 inches; a hand was the width of the palm, about three inches. Small variations did not matter much in those days but in more modern times it became necessary to define standards more accurately. So we have the preservation of the standards of the yard and the meter, which are generally accepted, recognized and used as the basis for all calculations of length and distance.

The same technique can be used for weight. Adopting a standard of reference by which to measure quantities of vegetables, or corn, by weight was fundamental for the progress of trade and business; the difficulty was to ensure that everybody recognized the standard and adhered to it. In biblical and Greek times, people were aware of the danger of false weights which could favor the trader. The Greeks did not develop this technique of measurement, and were happier in the field of pure geometry and proportions. It was the Scientific Revolution that was to exploit the possibilities of

explanatory measurement to the full.

There is an arbitrary cultural element involved in the choice of the particular standard. Each early culture developed its own rudimentary weights and measures. As they came in contact with other civilizations they had to agree on standards if there was to be any trade and exchange between them. Then you can have agreement and communication across cultures and over time which will not be ambiguous or open to misinterpretation. In our day we are left with yards and meters, miles and kilometers, pounds and kilos, which are a result of historical struggles and choices. Either will do, as long as the same standard is preserved, recognized, used and respected by everybody.

One further advantage of explanatory measuring is to be seen in the precision that is possible in calculations. Once you have a standard it can be subdivided into as many smaller units as you wish. Similarly, it can be extended by multiplication to cover huge distances as far as the circumference of the earth. With fractions and decimals and eventually calculus you can deal with infinitely small areas and lengths. Now it is no longer a case of big, small, pretty large, but one and a half inches, three miles, a half kilo, a half gram. Distance and weight can be specified to any degree of accuracy that [103] you wish. Provided that everybody is following the same standard, there is no possibility of misinterpretation or ambiguity.

Once you have the basic standards of distance, weight, time and angles then you can extend the technique by the use of scales. How do you measure warmth? Is there a way of shifting to an explanatory framework? How can you relate things to one another here? You discover that metals expand in a regular manner with an increase in heat. You find a metal like mercury, which is easy to handle, and note the way it expands and contracts depending on heating or cooling. The trick now is to fix the scale at the top and the bottom. What can we take as a standard or fixed point? Let us just assume that the freezing point of water is zero and the boiling point of water is the other fixed point on the scale. Divide the intervening degrees of heat into a hundred equal parts. Now you have the centigrade thermometer; you are relating systematically the expansion of the volume of mercury, with the increase or decrease in heat, and the freezing point and boiling point of water are giving you your limits. You are setting up a system of relating things to one another. Now it is possible to specify in degrees the exact temperature of a patient; we have shifted from heat as felt to temperature. The more accurate the instrument the more accurate can the measurements of temperature become. We have shifted from describing how warm I feel, to an explanatory concept of temperature. We have managed to prescind from the observer and relate things to one another. Precision, accuracy and communication are now possible.

The same happens in so many other fields where instruments are constructed to relate different factors and to measure the differential by means of a scale. A barometer measures air pressure in inches. Noise can be measured in decibels. Water density, viscosity, torque, wavelength, intensity of light, electricity, etc. can be measured using similar kinds of techniques. Part of the development of modern science is the development of the sophistication of techniques of measurement. It is the advance of applied technology, which makes even more accurate systems of relating things to one another possible. We are not interested in the details of this progress but in the simple principle that these measurements are explanatory and [104] hinge on an insight that relates things to one another and prescinds from the point of view of the observer.

Measurement is a technique of marking off, but it is guided by concepts and definitions. The invariance of standards in scientific work resides not in the physical bars or weights but in the invariance of laws and concepts. All understanding involves some pivoting between the abstract and the concrete; this becomes explicit in the field of explanation. Standards of length, temperature, mass, specific gravity, the laws of motion, point, line and circle are abstract concepts. Ideas emerge from images; concepts are formulated ideas; in moving to an explanatory treatment of heat we move from feeling heat to a concept of temperature; you cannot feel temperature, nor do you have an image of temperature. We use the standards in measuring and understanding the concrete reality of particular cases.

It may be surprising to realize that a yard or a meter is a concept. But just as a circle is a concept to which concrete actual circles approximate, so a yard is a concept to which various measures approximate. There can be no perfect coincidence between the concrete and the abstract. The bar of metal preserved at the same temperature and pressure is the closest the concrete can come to the abstract concept of meter. But if you ask where is the precise end of the bar, you realize there is a problem because the end of the bar is uneven; even if it seems to be even to the naked eye, a microscope reveals that concrete is always uneven. We will explore this more deeply when we deal with classical method.

3.2 Definition

When one moves from physics and chemistry to the biological sciences and especially when one comes to the human sciences, measurement loses its primacy. But that does not mean that these higher sciences cannot be explanatory. The way to

explanation in the higher sciences is largely the way of explanatory definition, where the terms define the relations and the relations define the terms. Measurement, standards, counting are not entirely replaced but yield in importance to the power of explanatory definition. Let [105] us consider nominal definition, descriptive definition, explanatory definition and implicit definition.

Nominal definition tells us of the correct use of names. It is a genuine and important kind of insight as is illustrated clearly in the dramatic example of Helen Keller. Her insight was simply into the relation of the letters w a t e r with the sensible feeling of water flowing over her hand. But it was a breakthrough. Most of our early learning is of the correct use of words. Children are continually being corrected when they use the wrong word. Nominal definition gives us an insight into the correct use of words, but it does not give us an insight into the objects referred to. This can be a trap; because we have a word to refer to the object we often presume that we know what we are talking about. Nonetheless, nominal definition it is a first step in the learning process and prepares the way for future progress.

In descriptive definition we define things in terms of their relations to us. We classify things in terms of sensible similarities. They are genuine insights but somewhat limited. Descriptive definitions prepare the way for explanatory. Gradually classifications of things in terms of sensible similarity give way to classifications based on their relations to one another. A botany, which divided trees into those of the same size and color, would not be very satisfactory. The principle of sensible similarity has to give way to the principle of relating things together in an explanatory framework of definitions and concepts and principles.

Explanatory definition goes beyond nominal definition in that it includes knowledge of the object, as well as knowledge of the correct use of terms. Explanatory definition goes beyond descriptive definition, because it relates things to one another, rather than relating them to oneself. We have noted how the descriptions of the point, line and circle are usually given in terms of visual images, like dot, path, even round figure. How would we define the same things in an explanatory definition?

Usually students with a little help will reach a definition of a point as something like 'position without magnitude'. It does not have size, magnitude, physical dimensions; it does have position, it is a place, a point on a map or a diagram. Eventually, they will come [106] up with a definition of a line as a distance between two points, which has length but no breadth. But a difficulty arises when you ask, Can you see a point or a line? If a point has no magnitude then it cannot be seen; if a line has only length then

similarly you should not be able to see it. But you cannot do geometry without drawings of lines and points on the board in chalk. Lines and points as defined are concepts. There is an intelligibility, a meaning, that is grasped in insight and formulated in the definition yielding a concept. Images are products of imagination and concepts are products of intelligence.

The definition of the circle presupposed the definition of the point and the line, but grasps the necessary relation that all the radii be equal and that one point be fixed and the other rotates. So you eventually reach the definition as 'the locus of a point moving equidistant from a fixed point on the same plane'. But this is a definition not a description. It is relating things to one another in a necessary relation. It is an insight into the necessity of the equality of the radii, of the fixed and moving point and of the same plane. The problem recurs when you ask, Can you see a circle? A circle as defined is a concept, a product of insight and conception; if you cannot see a point or a line, then, similarly you cannot see a circle. Understanding grasps the forms in the images; we use the images to get the insights. But explanatory definitions go beyond the images to necessary relations between the terms. Images play a different role in explanation than they do in description, as we shall see.

There is a logical conundrum, which is often brought up at this point. To define one word you need a whole series of words to express the definition. But logically it would seem that for clarity you would then need to define individually each of these words. Then the words of those definitions would need to be defined, and so on. Our answer to this is that insight comes first, then expression and conception. A single insight can settle the meaning of a cluster or circle of terms and relations. In the example of the circle, there is a basic insight incorporating a cluster of terms and relations, such that the terms fix the relations and the relations fix the terms and the insight fixes both. The insight into the definition of the circle fixes the relation between points and distances and lines in a necessary [107] way; at the same time, that process also helps define the meaning of point, line and distance. All the concepts are needed for the insight.

Hence, we can get some idea of the importance of system for explanatory definition. It is often not possible to define one element explanatorily in isolation from everything else, as Socrates found to his cost. When you move into the context of explanatory definition, you usually move into a system of terms and relations such that the relations fix the terms and the terms fix the relations. The periodic table in chemistry is a typical process of setting up such a system of terms and relations; arrange

the known elements according to their atomic weight; notice that they seem to fall into a pattern; each element is defined in relation to the previous one, the next one and its place in the pattern; it becomes so systematic that you could predict unknown elements even though they had not yet been discovered.

Technical terminology is part of the process of moving from description to explanation. In description terms are usually vague non-technical and ex pressed in visual images or image language. 'Form' and 'matter' were words with a commonsense meaning in the time of Aristotle and he sometimes used them in that way. But he also assigned a technical meaning to those words and then they became part of his explanatory system. Sometimes new words have to be invented for the new system but more commonly ordinary words are used and assigned a technical meaning within a context of definitions and postulates. 'Person' and 'nature' were words, which were assigned a special meaning in the history of theology by way of the doctrinal definitions of the creeds. Explanation needs this shift to technical meaning because the definition does assign a precise explanatory meaning to that use of the word.

Implicit definition is a special kind of explanatory definition; it is explanatory definition without nominal definition. It is characterized by extreme generality. Nominal definition ties down the use of terms to certain images. But implicit definition concentrates on the purely relational character of the terms. D. Hilbert's geometry is characterized by the use of implicit definitions. For him the meaning of both point and straight line is fixed by the relation that two and only two points determine a straight line. This [108] definition fits Euclid's definitions but it also fits the coordinates and equations of coordinate geometry.

3.3 Verifiable and Non-verifiable Images

Let us examine more closely the role of images in description and in explanation. When you describe something you are relating how it looks to you, how you perceive it, hear it, touch, smell or taste it. You are relating things to yourself by way of sensible properties. If there is a disagreement with someone, then, you go back to the data and the images. You might have a disagreement as to whether a certain star is twinkling, whether smoke from the flame is black, gray, white, or a mixture; whether a flame makes a noise; whether the heavenly bodies are moving. How do you solve such disagreements? You look again more carefully, more attentively, more honestly. In description there is always a sensible image and our description must be in conformity with the image as sensed.

When you explain something you are relating things to one another; you are setting up a framework of concepts; you are prescinding from the observer and how it looks to you. Concepts are products of intelligence and not of the imagination. Insight abstracts the forms from the images. At the level of explanation there are no verifiable representative images. We can have an image of warmth, but we do not have an image of temperature; we have an image of weight but we have no image of mass. Theory, system, explanation, definition, measurement go beyond the field of representative images, because by definition they are relating things to one another.

On the other hand, we have already said that we cannot think or know without images. So what do we do? In the field of explanation we construct useful, heuristic, symbolic images to help us to think clearly and make progress. Niels Bohr suggested a very successful image of the atom. He gave us the picture of the atom with its nucleus of protons and neutrons at the center with layers of electrons spinning round in fixed orbits much like the planetary system. It was an image that embodied all that had been learned about the atom up to that time; it suggested fruitful questions as to the relations between the subatomic particles; it was helpful in studying the [109] relations between elements and suggested possible explanations of how elements bond together to form molecules. But it is not, and was not, what atoms look like in reality. It is a constructed, symbolic, heuristic image. It is not verifiable as an image. To verify an image you must have the corresponding sensation. To see what atoms look like in reality, you must be able to see them. At the moment it is not possible to see individual atoms; it may eventually be possible to construct a microscope to produce a visual image of the atom. Bohr would not be surprised if it did not look like his constructed image. Others might be disappointed. The unfortunate thing is that we often confuse the constructed symbolic images of explanation with representative verifiable images of description.

The same paradox recurs in the other sciences such as botany and biology. You can describe a tree but can also define a tree. Most of us can describe a tree but the botanist cannot be satisfied with description and must move on to explanatory definition. The definition of a tree is to be found in botany textbooks, where each species is classified in terms of their relation to one another; in terms of structural and functional similarities and dissimilarities with other plants; in terms of the chemical and physical processes needed for the functioning of the tree. It is only the botanist who can define the tree in terms of relations, systems, functions and correlations. The description of the tree leads up to the definition. The tree, as defined, cannot be imagined; there is no verifiable image of the tree as defined; relations, functions,

structures, systems, intelligibilities cannot be imagined.

We use various kinds of symbols to help us to think and the more apt the symbol the better. Letters are symbols but some alphabetical systems are more apt than others; the Egyptians had their hieroglyphics, the Babylonians had theirs, the Hebrews had theirs; somehow our alphabet emerged as the most flexible and appropriate. Numerals are symbols; the Egyptians had their lines by which they counted; the Romans had their notation but it was very cumbersome and was abandoned for our present system. Leibniz and Newton both invented the calculus, but the symbolism of Leibniz was more suggestive and helpful and was adopted. Letters [110] and numbers are constructed images and can aid or hinder conceptual thinking.

There is an important principle here, which applies not only to the atom but also to all of the explanatory sciences, including philosophy and theology. Once you start creating technical terminology, defining and explaining things as they relate to one another, then, you have left the field of verifiable images and entered the field of constructed symbolic images. Explanation prescinds from observers and therefore prescinds from observables and from verifiable images.

Every scientific discipline moves from description into explanation. The kind of thinking, imagining, verifying, is quite different in the two realms of knowing. Endless confusion arises when these two realms are not clearly distinguished. Scientists often confuse the verifiable images of description with the unverifiable, symbolic images of explanation. Instead of asking, What is it? They are often asking, What does it look like? Instead of telling us what has been verified, they give us a picture of what scientific reality looks like. We do need images to think but it should be intelligence that is in control. If imagination takes control it tends to become the criterion of what is real and we are back to picture thinking of description. We tend to be more at home in the world of description and images. To move into the world of theory, concepts, relating things to one another, verifiable relations, demands an intellectual asceticism, which is difficult to sustain. Yet it is clear that this distinction must be made and that it is of fundamental and universal relevance.

4. Description and Explanation

There is a continuity between description and explanation. It is the same object, which is first described and, then, defined and verified. If it were not so, then, description would not be preparing the way for explanation. Describing the chemical

elements prepares the way for their definition in terms of atomic weight and empirically verified relations with other elements. Biology starts with descriptions of the appearance of animals, their sensible [111] similarities with other animals, descriptions of their anatomy etc. to lead into explanation of where they fit in the evolutionary tree, whether they are mammals, vertebrates, crustaceans, etc. Description is the 'tweezers' which holds the sample until scientific explanation can be brought to bear.

Description and explanation are complementary procedures. They are both valid forms of human knowing. All you have to do to avoid confusion is to continually add the proviso, from the point of view of description, from the point of view of explanation. Does the sun rise in the East and set in the West? From the viewpoint of description it is certainly true. Any student who reports that he sees the sun rising in the West and setting in the East needs to have his coordinates straightened out. Does that mean that we disagree with Copernicus? No, because Copernicus is looking at the solar system from the point of view of explanation. If we prescind from the observer and relate the movements of the planets and the sun to one another, then, you can state that the earth is rotating on its axis and revolving around the sun. They are two different valid points of view. All we have to do to avoid confusion is to be clear whether we are adopting a descriptive or explanatory point of view. Nothing but confusion can and does ensue when these points of view are not distinguished.

The explanatory view will have an effect back on our description and our images. The common sense of the twentieth century is different from the common sense of the seventeenth. The technical language of the scientists has been popularized and become part of our culture. The big bang, black holes, curved space, fission, fusion, genes, chromosomes, etc. is part of the common language of the twentieth century. Within the context of science they have an explanatory definition. In popular culture they are interesting pictures, images, stories. In simple, traditional cultures it was easy to think in terms of occult forces and properties that had a life and power of their own; it was easy to think of the heavenly bodies as alive, as active, as perfect, as Gods; that was the common sense of those times.

Now we are in a position to respond to the attempts of John Locke, Immanuel Kant and others to formulate this distinction. [112] Locke used the terms primary and secondary qualities. Primary qualities were real and belonged to science; secondary qualities were not real but merely apparent and to be discarded. We drew our distinction between description and explanation on a different basis. We drew it on the basis of our experience of two different kinds of insight which we have identified in

many examples and which ground two different but related points of view. Both description and explanation can be verified and so are human knowing. Description usually prepares the way for explanation and explanation leads back to description. All the data is to be admitted and accounted for. We do not allow of an arbitrary brushing aside of data, as Locke did with secondary qualities, just because it is difficult to pin down. We appeal to our own experience of knowing to identify this pivoting between description and explanation and to show that both kinds of knowing are valid and have their own advantages and disadvantages.

4.1 Transition from Description to Explanation

To illustrate the transition from description to explanation, let us first consider the development in philosophy represented by the shift from Socrates to Aristotle and secondly we will consider the same transition in theology. Description and explanation involve two different kinds of thinking, imagining and knowing. The transition occurs in all sciences but I think it is useful to show it actually, historically occurred in philosophy and theology.

Socrates was deeply convinced that there was a permanence to truth, which the Sophists were undermining by their relativism and skepticism. But Socrates had great difficulty formulating his convictions and demonstrating their truth. He was searching for wisdom, but had to admit that he was not sure what wisdom was. He was sure of his own ignorance and easily demonstrated the ignorance of his foes. His method was to seek 'inductive arguments and universal definitions'.

He initiated his discussions by asking one of the group to propose a definition of 'virtue', 'courage', 'justice', etc. One of the group usually obliged, thinking he had the correct answer. Socrates took that definition as his starting point and invited the group to think of [113] particular examples, and then tested the definition against the examples. It usually did not take long before an example came up which did not fit the definition. Hence the definition had to be rejected because it was not universal. To be universal it would have to cover all the concrete cases of 'justice' or 'courage' or whatever was being defined. Discussion continued along these lines and usually did not result in finding a satisfactory definition. We are entitled to ask, why was Socrates such a consistent failure?

Our answer would be because he remained at the level of description and was not able to set up a theoretical framework of terms and relations, which would shift the discussion into an explanatory framework. Description will rarely give you universal

definitions. Description is concerned with the concrete and the particular; it has few theoretical aspirations; it is content with the short-term, the practical, what appeals to imagination and feeling. It is very difficult to set up one explanatory definition because the terms of the definition will remain at the descriptive level. What is needed is a jump to a system of terms and relations, where the terms define the relations and the relations define the terms and the insight fixes both. Such a major shift was not possible at the time of Socrates, the groundwork had not yet been laid.

We can consider Aristotle's Ethics as embodying that explanatory system, which was being sought. Aristotle's earlier work in logic had been indispensable as a preparation. In his logical works he had laid down the requirements for definition and division, the process of demonstration and induction, propositions with their contraries and contradictories and their various types. Next it was important to define ethics and separate out the subject matter and aim of ethics and politics in the framework of the productive, the theoretical and the practical sciences. His work in these areas was an indirect help in clearing the ground for the ethics.

He realized that terms cannot be defined individually, and so he set himself to build up a set of fundamental terms going to the very basis of ethics and then working out the details. In Book One of the *Nicomachean Ethics* he attempts to define 'the good', 'happiness', 'final end', 'self-sufficient', and other terms in their relations with one another. He appealed to the concrete for descriptions of examples of these but [114] his aim was explanation; theoretical universal definitions in a system.

In the context of these clarifications he was able to go on to habits and to define virtue as a mean and vice as one of the extremes (Book 2). Then he was able to clarify the notions of voluntary and involuntary, choice, deliberation and wish (Book 3). It was only then that he set out to define individual virtues (Book 4 and 5). Here he was setting up a system where each virtue was flanked by the vices, which erred, by defect and by excess. It was an explanatory system something analogous to the periodic table in chemistry. Each virtue and each vice was defined in terms of one another. Sometimes words already existed to cover these terms and he gave descriptive terms an explanatory meaning. Sometimes he had to stretch already existing words to give them a new explanatory meaning. Sometimes he had to invent new words to fit in his explanation.

After this he was able to distinguish moral and intellectual virtues, discuss friendship and to finish it all off with reflections on pleasure, happiness, the good life,

and his ideal of the contemplative life (Book 10). He ends with a return to the concrete, the kind of way of life which he values most as worthy of man, the kind of life that produces true happiness. His achievement can be judged by the fact that his text has survived two millennia of attempts to do better and some reputable scholars still think that nobody has surpassed him.

We are just looking at this as an example of explanation at its best. Socrates was swimming in confusion and not even realizing why, nor what might be the way out. Plato begins to sort out the issues, clarify the use of terms, distinguish true and false kinds of knowing, experiment with different methods and move towards theory and explanation. But it is only Aristotle who realizes that 'he shall be as king who can define and divide'. Aristotle starts from the concrete from the opinions of other philosophers, from common sense and from concrete examples. He moves into an explanatory framework because his desire to understand forces him to shift from description to explanation. He wants to be clear, to have universal definitions, he wants to cover every concrete case imaginable, and to do that he has to shift to theory. So he sets up his technical terminology, shifts the meaning of the words he is using and invents [115] new words in order to set up his cluster of terms and relations. But the end is to return to the concrete, to return to describe the way of life to be prized above all as worthy of man. Aristotle was not a conceptualist. He did not want to remain at the level of abstractions; concepts were not an end in themselves; they were to be used to illuminate the concrete and to guide concrete living.

We took the example of Aristotle because it is such a clear example of the successful shift from description to explanation in the field of philosophy. But any philosophy worthy of its salt will have to be explanatory. The questions that a philosopher asks reveal the inadequacy of the descriptive approach; it is too ambiguous and approximate; it does not have sufficient clarity and cannot support the burden of criticism too deeply. One can expect that the terms of philosophy will be defined in terms of explanatory relations with other terms. We can expect that it will abstract from the concrete by way of insight into the universal. It will need a network of concepts, not as an end in itself but as a way of illuminating and clarifying the concrete. We cannot expect a professional philosophy to be expressed in the language of the newspapers; we cannot expect it to appeal immediately to people of common sense; we cannot expect an appeal to imagination, to examples, symbols, and stories. Just as we do not expect to understand theoretical physics without a long and thorough preparation and study, so we cannot expect to take up a book of philosophy and grasp its message unless we have some training in philosophy.

4.2 Transition in Theology

The same transition can be identified in the development of theology. Let us just have a brief look at the transition from the scriptures to the systematic theology of Thomas Aquinas. Needless to say this can only be a sketch and our interest in this is simply as an example of shifting from insights of the descriptive type to those of explanation.

The Scriptures are almost entirely descriptive. They were written by men of common sense, for people of common sense in the Hebrew culture which had a practical wisdom but little by way of a theoretical differentiation of conscious ness. The gospels teach by [116] way of examples, stories, proverbs, rules of thumb, appeal to symbols. It is full of analogies, allegories, myths, admonitions, promises and threats. It is only very slowly that rudimentary creeds emerge expressing some grasp of the essentials of the story of Jesus of Nazareth. In understanding the gospel stories we have to be prepared for ambiguity, for confusion, for apparent contradiction; even though the faith of the apostles was deep, strong and clear on the core of Jesus message, yet it was expressed in descriptive terminology and we have to use careful exegesis to get at what is meant by the various titles given to Jesus, allusions to the Old Testament, etc.

Further questions arise in the early Church, especially through the missionary work of the Church and its contact with Hellenistic culture. Transferring a teaching from one culture to another is a hazardous occupation at the best of times. But here a teaching is being transferred from a largely descriptive culture to one in which the theory of philosophy, mathematics, music, astronomy, etc. was influential. Eventually the question about Jesus was expressed unequivocally, was He God? or man? or both? And if the latter how could this be? Similarly questions were raised about the Trinity, giving rise to a whole series of formulations most of which we judge by hindsight to be heretical. Questions were asked about Mary, about baptism and rebaptism, about ministry, moral teaching, authority in the church, etc.

Answers that were clear and unequivocal were required. The gospels had spoken in allegories and symbols; now these had to be shifted into an explanatory framework. It was literally a matter of life and death. Technical terms had to be invoked to answer these questions. Gradually these were invoked by the creeds and the definitions of the early Councils and the teachings of Augustine, Athanasius, etc. Elements of systematic meaning were invoked to preserve the authentic understanding of the tradition and to express it unambiguously in a systematic manner.

Perhaps it was only in the Middle Ages that theology became completely explanatory and systematic. Aristotle was invoked as providing some of the background as well as the terms and relations that made this possible. It was a question of seeking a coherent, [117] comprehensive, unambiguous, theoretical expression of the Christian faith. This was required by the level of the culture, the questions that were being asked and the challenges from secular culture, and the exigencies of mission.

In Aquinas we have one great example of such a system. The way had been prepared by the study of the teaching of the Fathers, by the distinction that had been drawn between the natural and the supernatural, by the creeds of the Patristic period, by the work of Augustine. The system of Aristotle presented a basic challenge; was the Christian understanding of man's relationship to God to be integrated with the greatest wisdom of the time or was it to be marginalized and isolated. Aquinas opted for integration and used the philosophy of Aristotle as a basis for setting up a comprehensive systematic theology. It involved distinguishing and relating the natural and the supernatural, reason and faith, the natural virtues and the infused virtues, defining person and nature, processions and relations, sacraments, different kinds of grace, freedom, truth, etc. etc.

Again we are talking of an explanatory system of terms and relations. Systematically he starts from God, his existence, his attributes, as known by reason and as known by faith; then creation as coming from God, nature and man as the crowning point of nature; then man's way back to God by way of the natural virtues and the infused supernatural virtues; Christ who has made this possible, the sacraments and the Church; finally the last things. This is presented by was of the Quaestio; the statement of the truth; apparent contrary arguments; an exposition of the truth and a reply to the objections. The questions unfolded systematically until a particular theme was exhausted and all possible objections answered. Terms were defined, divided and given a technical meaning. Apparent contradictions were resolved.

In catechism class children are taught what is a sacrament, that there are seven sacraments and each can be defined. It is surprising to think that Peter the apostle did not know what a sacrament was, nor how many there were. Theory goes beyond the immediate appeal of the stories and persons of the gospels. The difference is so great that some are tempted to abandon the achievement of [118] systematic meaning and to go back to the scriptures. Our understanding of the purpose of the shift from description to explanation shows us why that is not possible. We seek an understanding at the level of our times. Our culture sets the questions, problems and challenges that

have to be answered clearly and unequivocally whenever possible. Authenticity does not consist in returning to the beginning, in abandoning permanent achievement, in primitivism. Authenticity is to be faithful to the exigencies of questioning, which lead inexorably over time to more apt and clear expressions of our faith seeking understanding.

Explanation and system is not to be thought of as a flight from reality into the safe world of concepts and theories. It is the culture that sets the questions, problems and challenges that a systematic theology has to tackle. The purpose of the definitions and explanations is to facilitate the return to the concrete in a way that will be faithful to the original message. Aquinas was not a conceptualist but an intellectualist. The modern theologian similarly has to do theology at the level of his time and that requires an explanatory framework appropriate to the culture of today.

5. Balance between Description and Explanation

We have tried to show in the foregoing how natural and necessary is the transition from description to explanation. It is part of authentic development of understanding that we shift from relating things to ourselves to relating them to one another. We have illustrated the various shifts in terminology, definition and point of view involved. Common sense is inherently limited to the practical, concrete and imaginary; seeking to go beyond common sense, we are led to relate things to one another whether it is in the empirical sciences, the human sciences, philosophy or theology.

Our procedure in this text is, similarly, to start with description and move on to explanation. Our data is the data of consciousness, not the data of sense. Our questions are about the activities involved in thinking, in science and in common sense. We started with general descriptions; we described the activity of insight; we gave different historical examples for comparison and identification; we [119] distinguished insights of description and insights of explanation. We will continue to describe inverse insight, reflective insights, classical and statistical methods, etc. We are moving towards a definition of insight but we have not yet set up all the pieces that are necessary for the full explanatory definition. When we reach Cognitional Structure in Chapter 8, we should be in a position to put all of the pieces together in a fully explanatory fashion and define insight in relation to the other components that are central to the activity of human knowing.

When we have done that, we will be in a position to reconsider in greater depth and with greater clarity some of the implications of the act of understanding. We will be able to see the methodological implications of insight. We will be able to consider aberrant views on human knowing and grasp why they are wrong. We will be in a position to understand the foundations of knowing and to move to the structure of the known. We will be in a position to give an account of human misunderstanding; how is it that philosophers are always getting it wrong? What is the basic source of continual confusion on knowing and the real?

Let us conclude this chapter with a reminder of some of the imbalances which occur between descriptive and explanatory thinking.

There is a danger of clinging to the descriptive and thinking that the explanatory is needless, useless, theoretical nonsense. Much of modern theology seeks to be popular by remaining at the descriptive level; by appealing to what is relevant, what catches the imagination, what is easy to communicate, what is deemed immediately practical. The return to the sources is sometimes interpreted as a return to description and the abandonment of explanatory understanding. This brand of common sense decries the need for theory, mocks the systematic theologians, and appeals to the simplicity of the scriptures. But the price paid by these theologians is very high; in confusion, ambiguity, and stifling further questions. Because they are relevant and appealing to symbols that are popular today, they become irrelevant when the fashion and symbols change tomorrow. Because they appeal to this particular people, it will not appeal to people of a different culture [12] across the border. Staying at the descriptive level can only be an illusion.

One of the great advantages of explanation is that it, to some extent, rises above the culture of the time and place and can be transmitted across cultures. There is a permanence to genuine achievement. No one could have been more Greek than Euclid, yet few would claim that teaching Euclidean geometry today is cultural imperialism.

On the other hand, you can have theories that remain at the theoretical level, that never return to the concrete, that become conceptualist in being wrapped up in themselves. The conceptualist is content in dealing with the interrelationship of concepts with one another. He is not concerned with a return to the concrete. This is an abuse of the explanatory viewpoint. Although explanation aims at abstraction it is an enriching, not an impoverishing abstraction. It is an enriching abstraction because it confers intelligibility, meaning, definition and law on the concrete. There is a reference back to the concrete, a reorganization of description in the light of explanation and a

posing of further questions in a dynamic on-going process.

Finally, there is confusion when there is a mixture between description and explanation and an inability to distinguish two different points of view. Much of the popularization of modern sciences and the philosophy of science cannot discriminate between description and explanation. We still have people who are puzzled and confused by Eddington's dilemma. Theologians also are torn between the call to be relevant, popular, inspiring and the exigence of theory and system. In this text we are working towards the world of interiority. We can distinguish between description and explanation because we have identified two different kinds of insights in our own cognitional experience. We can distinguish concepts from images, explanation from description, not on the basis of the authority of some author but on the basis of our own experience of understanding.

We have spent much time and energy on this distinction because of its fundamental importance for any development of understanding. A grasp of this distinction would illuminate many modern debates in theology, philosophy and science, where the confusion of primary qualities and secondary qualities and other inadequate distinctions still reign.

Comments on the Exercises.

All of the preliminary exercises have been discussed and solved in the text of this chapter.

4

Inverse Insights

While direct insight grasps the point, or sees the solution, or comes to know the reason, inverse insight apprehends that in some fashion the point is that there is no point, or that the solution is to deny a solution, or that the reason is that the rationality of the real admits distinctions and qualifications.[xlviii]

Preliminary Exercises.

(1) Give the next number in these sequences:

(a) 5, 7, 4, 6, 5, 8, 6, 6, 5, ...

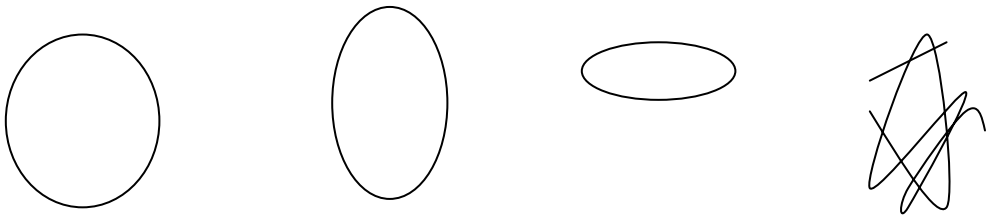
(b) 75, .82, .77, .80, .79, .74, .79, ...

(c) 98.1, 99, 98.7, 98.8, 98.3, 98.7, ...

(d) 5, 1/2, --198, 17, 1.1, ...

(2) Name the following geometrical figures.

(a) (b) (c) (d)



[124]

(3) What is the numerical relationship between the side of a square and its diagonal? Or work out the square root of 2.

(4) What keeps an arrow moving in the air even though there is nothing pushing it?

(5) Drop an elephant and a feather off a high building at the same time. Which hits the ground first? Why?

(6) Can you distinguish patterns in the distribution of the stars in the night sky?

(7) Do you believe the weather forecast for the following day? Does it give probabilities or

certainties? Can you have accurate predictions of the path a tornado will take? If you have complete information can you make that prediction?

1. The Experience of Inverse Insight

Have you ever had the experience of reading a rather difficult book, and despite your best efforts and concentration you are not getting the point? You presume that this author is very bright, and it is because of your lack of intelligence that you do not understand. You may give up there and then, and the author will always remain in your mind revered for his great intelligence and superior knowledge. You may also have the experience of persevering with great determination to get what he is saying and slowly and painfully discovering that the fellow is utterly confused, presents his material badly, and is trying to impress with big words and obscure ideas: he does not know what he is talking about. You have finally understood the author and the book; however, it is not an understanding of what is there rather, on the contrary, of what should be there, and is not. You are not grasping the message the author is trying to communicate but rather that he has no message, is quite confused, wrong, uttering nonsense. This is an insight; but it is a new, strange kind of insight.

Or perhaps you have had the experience of being asked to take the minutes at an important meeting. Unfortunately, the chairperson is not very competent and exercises no control over the proceedings. [125] So you listen to a stream of suggestions, pronouncements, interjections, retorts, declarations, digressions, appeals, defamation, arguments, winding their crooked way through the morning, until it is time for lunch and the meeting is mercifully called to a halt. What do you write in the minutes? There was no order or pattern, beginning or end, form or meaning to the whole procedure. Can you describe pure chaos? You can either give an exhaustive account of everything everybody said; or else report truthfully that it was a most chaotic meeting and that you cannot give an accurate account of chaos; or you can impose your own kind of order or pattern on the chaos to rescue what you think might be useful. An inexperienced secretary may blame him/herself for having difficulty following the discussion but the real difficulty lies not in being unable to follow what is going on, but in grasping that what is going on is pure confusion, chaos, a random stream of words with no meaning or pattern. Again, it is an insight; but of a different species from those we have met heretofore.

Or perhaps you are a bit of a gambler as well as a budding mathematician; so you try to construct a system of betting that will beat the roulette wheel, without cheating of course. How do you predict a random stream of numbers? How do you create a system that will beat the odds? You may notice that a certain number has not come up at all for a long time. Because you are a mathematician you know that occurrences tend to average out. If the number is falling behind its average, you might think that it has to catch up and so is now more likely to occur. But, do previous occurrences in a sequence like this change the probabilities of the next spin? When and if you grasp that they do not (hopefully before you become penniless), you are on the way to an inverse insight. The intelligibility of such a sequence of numbers is different from the direct intelligibilities which we have been considering up to now. It is with some shock and annoyance that we learn to accept certain limitations to direct understanding and how data are to be brought under law. There is no system that can be applied to a random stream of numbers which will enable you to beat the odds; whether you are trying to win or lose makes no difference; in the long run you lose. [126]

Sometimes it is assumed that the only real kind of knowledge is of certain, necessary, permanent truths. In these examples we begin to discover that most of our understanding of the material world yields not certainties but varying degrees of probability. The expectation of complete certainty is unrealistic in most areas of science; there is a convergence towards certainty but neither in classical method nor in statistical method do the conclusions of empirical science reach complete certainty. However, knowledge of probabilities is genuine human knowing - in most areas it is all that we can expect. That is the kind of universe we are living in; that is the kind of mind that we have.

In this chapter we explore these degrees or kinds of intelligibility in our universe. Not every area of data is susceptible to the kind of direct understanding that we have been considering up to now. We will identify *classical method* as the appropriate way of understanding data which are systematic and orderly. We will identify *statistical method* as appropriate for data which are a combination of systematic and nonsystematic. Finally, we will consider the *empirical residue* which lacks any immanent intelligibility

but can be grasped indirectly by way of an inverse insight.
Our focus continues to be self-appropriation. We present many examples in the preliminary exercises and in the text; the purpose is to help you to recognize this experience as it happens in your own mind. If you find that the examples are not appropriate, substitute others familiar to you in your own discipline or field of competence, at your own level.

2. Inverse Insight Defined

An inverse insight is an insight; therefore, there will be found the five characteristics that we have already identified in the direct insight. There is a problem posed to intelligence from the experience of certain data; a question arises creating tension towards a solution. This is followed by a sudden enlightenment, which depends on inner conditions rather than on outer circumstances. There is a pivoting between the abstract and the concrete, and the solution passes into the habitual texture of the mind. The experience of discovering that an author or a lecturer has got it all wrong is a very liberating experience. But it starts with an expectation of a different kind of intelligibility. The tension is towards that kind of positive intelligibility which you have a right to expect of an author or professor. But you reach a block; you try everything; look at the data from all sorts of different points of view; you try to make sense of the confusion; come back to it again and again. Then, slowly it dawns on you. The fellow does not know what he is talking about; there is a stream of impressive words but no sense; all sound and fury signifying nothing. You will never be the same again. Once you have realized the emptiness of one author or philosopher or professor, you are constantly aware that there may be more of them out there.

An inverse insight is different from a direct insight; instead of grasping what is there, we grasp what is not there. We can define an inverse insight as an insight into the absence of an expected intelligibility. There are three characteristics of an inverse insight.[xlix] One, there are *positive* data. Two, there is a spontaneous *expectation* of a direct intelligibility. Three, the insight is into the *absence* of the expected intelligibility.

Firstly, there are *positive* data: there is something to be understood. All the above examples presume some data presented by the senses, memory or imagination, which poses a problem for understanding. An inverse insight is not an insight into a simple absence of data. It is not simply a correction of a previous mistake. There are positive data, but they do not seem to respond to the usual procedures. The book, which is full of nonsense, presents a multitude of data on every page. The unfortunate secretary has pages of words to deal with. The gambler can collect sequences of actual numbers for as long as he wishes. The data are there, but are they intelligible?

Secondly, it runs in the face of the *spontaneous expectations* of intelligence. We can only have insights if we ask questions; if there are no questions there are no insights. We can only ask questions if we expect and anticipate an answer. We usually expect to find a law, a regularity, a system, an explanation as the answer. The answer we [128] expect to be directly intelligible, otherwise it would not be an answer to the question. But in the inverse insight we get, not a direct intelligibility, but precisely a lack of the expected intelligibility.

Thirdly, the insight is into a lack, an *absence*, a deficiency in the expected intelligibility. We expect to find the rational, the systematic, the significant, the regular; but discover that we also must cope with the irrational, the nonsystematic, the insignificant, the irregular. The Greeks were puzzled by the relationship between the side of a square and the diagonal. Surely, such a basic relationship in the most regular of all geometrical figures could be expressed in rational whole numbers. But they found that it could not. They called it incommensurable; modern mathematicians call it irrational. If the side of a square has the numerical value of one, you expect the diagonal to be some rational number. But if you apply the theorem of Pythagoras you find that it is the square root of two. If you follow the rules for finding the square root of two, you find that it goes on and on; you keep expecting the further decimal places to reveal a pattern; but even the most powerful of modern computers has not found a pattern in this sequence of numbers. How strange! And so we begin to grasp that there are varying types, degrees and levels of intelligibility.

Often, the inverse insight is the realization that we have been asking the wrong question. Misguided questions point us in the wrong direction, we are barking up the wrong tree, seeking for something that is not to be found. The insight is into the mistaken anticipations of the question; we have to back up and start again. Aristotle, for example, was asking the wrong question about local motion. He saw that everything in his experience of everyday life comes to rest; when you stop pushing, it stops moving. Consequently, he assumed that rest was the natural state. Thus, he concluded that it is motion which needs to be explained: if something is moving there must be something or someone pushing. But what is pushing the heavenly bodies? What is pushing the arrow which is already in flight? This way of formulating the question inclined thinkers to invent theories of impetus, heavenly Movers, and other occult forces. This was an enormous block to progress in astronomy. Copernicus could obviously not be right; the earth could [129] not be moving because of the enormous force that would be needed to push it. It was only in the time of Galileo that the question was turned on its head. What needs to be explained is not motion, or rest, but changes in motion or rest. Galileo understood this and it was later formulated in the first of Newton's laws of motion, the law of inertia.

Expectations are conditioned by our education, culture, specialization, and degree of differentiation of consciousness. Expectations can be refined by the process of education but one normally approaches an area with an expectation of a positive, direct intelligibility. Inverse insights confer a limited grasp of the irregular, and the nonsystematic. The frustration of accepting an inverse insight as the limit of what can be reached often leads to a denial that this is a genuine insight. Until this century it was assumed that knowledge of probabilities is not real knowledge. Classical science had no place for such a deficient insight and presumed that everything could be understood by a totality of direct insights.

Intelligibility is the content of a direct insight. Therefore a direct insight will always grasp what is intelligible, significant, regular, systematic, relevant, meaningful. The inverse insight confronts us with the data that are not fully intelligible, are lacking significance, regularity, or relevance. But you cannot by definition grasp what is unintelligible or nonsystematic by way of a direct insight. The inverse insight confronts us with this reality of lack of intelligibility. We can only deal with the nonsystematic and unintelligible by the roundabout route of the inverse insight. Inverse insights are important because they reveal the degrees and kinds of intelligibility attainable in our universe. They reveal that there are degrees of intelligibility and that our universe is only to be understood correctly by a combination of direct and inverse insights. We will

explore this in detail in our consideration of classical method, of statistical method, and of the empirical residue.

3. Classical Method

We consider classical method here because we wish to contrast it with statistical method, which follows immediately. The kinds of [130] direct insights we considered in chapters two and three were for the most part belonging to classical method. We use the word 'classical' to associate this type of insight with the scientists from Copernicus to Einstein: the historical period called the Scientific Revolution. Generally speaking, these scientists were all looking for the kind of direct insight which we have previously defined, and they in no way recognized the existence of inverse insights or statistical methods. We are appropriating their grasp of classical scientific method, but we disassociate ourselves from the philosophical assumptions which often accompanied their science.

3.1 Classical method described

Let us first of all describe a typical case of classical method at work and pick out the characteristic stages in the unfolding of this kind of direct insight. Let us dwell on the example of Galileo, as he set out to discover the nature of a free fall.

1. Heuristic anticipation. There was something to be understood; there is a wealth of data on falling bodies; it is a common experience of mankind; it is part of our everyday living; there is a something there which needs to be explained and so Galileo asked himself, 'What is the nature of a free fall?' He gave the unknown a name; he presumed there was an immanent intelligibility to be found.

2. Ordinary description. It is easy to give a description of the matter: heavy bodies fall, very light bodies seem to rise. Heavy bodies seem to fall faster and faster. The problem is set by commonsense observations and questions. You do not have to be a scientist to observe and describe instances of falling bodies and to ask why do they fall in such a way.

3. Similars are similarly understood. You start with instances which are similar from the point of view of common sense or of description. But you are moving towards a similarity which will be based on explanation. Galileo expected that similar instances of falling bodies would be explained in the same way. He did not expect to have one theory for Italy and another theory for Spain; one theory for gold and another theory for iron. There is something [131] behind all the instances of falling that is to be

understood as common to them all.

4. Functional Relations. The Scientific revolution had discovered the importance of mathematics and how the regularities of nature could often be expressed in mathematical language. What were the variables which could be systematically related in order to formulate the regularity of a falling body? Galileo might have considered weight as significant; for Aristotle this was a determining factor. Distance is a factor because the farther an object falls, the faster it moves. Time is a factor because the longer the time, the faster it falls. Changes of velocity are a factor because you are talking of faster and faster. Acceleration is a key because that is the precise mathematical term for faster and faster. But what is the precise mathematical formula? How can the individual variables be related in a single function?

5. Scientific Description. This is the time for measurement, observation and experimentation; for rolling steel balls down an inclined plane and measuring time and distance as accurately as possible. Description becomes more and more precise depending on the materials, the instruments used, the care taken. Galileo's first discovery - actually from using a pendulum - was that weight made no difference. No matter what weight the balls or what material they were made of, the time and the distance did not change. This in itself was a major discovery and proved that Aristotle was wrong: the commonsense assumption that weight determines how fast bodies will fall was simply wrong. But, leaving aside weight, what was the relation between time and distance? He fixed the distance and measured the time taken; he repeated this a number of times for accuracy. He increased the distance and got another set of results. He decreased the distance and recorded further sets of figures.

6. Range of Possibilities. Now he put down his results on paper in the form of a table, with distances at the top and corresponding times at the bottom. How could these be related? Sequences of numbers can be generated by a variety of mathematical formulae. So Galileo looked at these series of tables struggling to find the formula that would unlock the secret. His familiarity with mathematics made a wide range of possibilities open to him. We might only think of [132] addition and subtraction; but there are also multiplication and division, roots and cubes, direct and inverse relations, etc.

7. Practical Techniques. Perhaps, he tried to represent the tables on a graph. It was easy to see that the more the time increased the more the speed increased. Just as in algebra you manipulate equations to find the value of the unknown, so Galileo

explored possible relationships to find one that fitted.

8. Upper and Lower Blade. There was a process from below upwards, by which the data are gathered, selected, measured and begin to suggest possibilities; there was a movement from above downwards, by which he constructed various hypotheses, different formulae or functions, and found them wanting. There is a scissors-like movement from data to hypothesis, from hypothesis back to the data.

9. Insight. Suddenly and unexpectedly the insight came. It was a leap of constructive intelligence. He found a formula for the relationship between distance and time. 'Spaces traversed by freely falling bodies are proportional to the square of the times.' He had found a universal, abstract, functional relationship, which underlies all instances of all falling bodies. Any discrepancies could be explained by the deficiencies of his material or the inaccuracy of the measurements. Of course, he had to make the proviso of other things being equal; the figures did not match exactly. The law is true in a vacuum, but may not be true if friction was allowed to interfere; so he had to postulate a vacuum. Now that he understood acceleration, he could go on to work on measuring friction, projectiles, etc.

10. Verification. Undoubtedly he went back to check, perhaps constructing further experiments and tables, perhaps working further on the mathematics to verify again the correctness of the formula. Once he had this he could predict how falling bodies should behave in varying circumstances. Now, he could start studying projectiles because he had pinned down mathematically one of the major forces determining a trajectory.

Galileo succeeded in specifying the nature of a free fall in terms of simple mathematics, a simple rule, an abstract mathematical correlation of time, distance and velocity: distance is proportionate [133] to time squared. The abstract formula could be applied to any instance of a falling body and, provided that there were no outside interference, could be verified. It was a most satisfying kind of direct insight because it was so simple and explained so much. It applied to all instances of all falling bodies in all places. No wonder the scientists considered that mathematics was the key to understanding nature. They had uncovered a very basic regularity in the workings of nature.

3.2 Classical method defined

We could define classical method as, "the intelligent anticipation of the systematic-and-abstract on which the concrete converges."[1] When we were discussing the characteristics of direct insight we noted the constant pivoting between the abstract and the concrete, the intelligible and the sensible. The abstract is usually universal,

functional, explanatory; expressed in concepts. The concrete is the data, the sensible presentations, the images, what is given in sensation. But these are not two separate things; it is precisely the intelligible in the sensible that we are trying to understand. Classical method seeks the systematic laws and functions immanent and verified in the data.

The key word of the definition is convergence: the concrete converges on, comes closer to, the abstract. There can never be a perfect coincidence between the concrete and the abstract. There are always inaccuracies because of impurity of samples, limited power of instruments, limitations on measurement, and the impossibility of excluding all extraneous influences. But the point that Galileo probably noted was that the more accurate his measurements the closer his figures converged on the abstract law. The more he excluded friction, the finer the materials he used, the closer his figures converged on the abstract mathematical formula.

Classical laws have to postulate 'other things being equal.' They have to presume that extraneous influences have been excluded. Chemists go to great lengths to procure pure samples, to have clean implements, to control all factors of pressure, temperature, etc. But this can never be complete or perfect; it is just sufficient for practical purposes. You have to make the assumption that the imperfections [134] of the sample or instruments are insignificant. It is impossible to exclude all extraneous influences in principle. There is always room for experimental error.

As a matter of principle there can never be a complete coincidence between the abstract law and the concrete data. The abstract will always be abstract; the concrete, concrete. The intelligible will be intelligible, the sensible sensible. The definition of a circle will always be abstract; any concrete circle will always be imperfect. If it were perfect you would not be able to see it and it wouldn't be a concrete; it is imperfect because it is a concrete realization of the definition of a circle, an image that converges on the concept. But the image can never coincide with the idea because they are different kinds of things; the image is a picture; the concept is an intelligible relation.

3.3 Misunderstanding

The kind of classical insight exemplified by Galileo is extremely satisfying: a single neat formula reveals the regularity underlying a vast multitude of data. When related laws are also expressed with similar simplicity, a system of laws can be set predicting and controlling a vast range of data as in the planetary system. The protagonists of the

Scientific Revolution built up these systems of laws along the classical lines. Newton was, perhaps, the most successful of all these thinkers, putting together a synthesis of physical laws concerning motion in a highly systematic way.

Further, the application of these laws to the concrete proved to be very successful. In the technology of war, ballistics, projectiles, battering rams, gunpowder, firearms, began to change the balance of power. Applications in navigation, manufacture, machines, the steam engine, electricity, etc. began to transform the way we lived. The ideal of complete control over the workings of nature seemed to be within their grasp. No wonder the nineteenth century was the age of optimism.

However, a basic misunderstanding of the scope of classical laws lay at the root of all this as would become very evident in the twentieth century. It was the assumption that classical laws are the [135] only kind of scientific laws. Coupled with that was the assumption that once all these laws were known, that knowledge would confer complete control over nature, and the possibility of predicting and controlling anything that could happen.

Laplace is said to have maintained this position in its purest and most explicit form.[li] He claimed that when all the laws were understood, and we knew one situation in world process, we could work forward to predict accurately any subsequent situation. This was a position of complete determinism; it did not leave room for freedom or chance or probability. The universe was a vast mechanical machine obeying the fixed classical laws of physics. This position assumed that all the data of world process were systematic and so could be understood by laws of the classical type. Just as it is relatively easy to predict an eclipse because our solar system is systematic, so Laplace held that all data are systematic and that it was only a matter of time before finding the other laws that would make total prediction and control possible. He contended that the totality of classical laws would completely explain all the data of experience and enable exact predictions and control to be exercised on everything. There are many things one could say in answer to this, but let us concentrate on the implied misunderstanding of the scope of classical laws.

Classical laws express what would happen if certain conditions were fulfilled. But how do we determine whether the conditions are fulfilled? Galileo's law of falling bodies will only work perfectly in a vacuum. But there is no perfect vacuum, so does that mean that it cannot be verified? No! The nearer the situation comes to a perfect vacuum, the more accurate the results become. It is statistical laws which will determine when, where, and how the conditions will be fulfilled. Classical laws can only be verified given

certain conditions. But classical laws do not determine those conditions.

Classical laws assume 'everything else being equal.' But how do we determine that? Is everything equal when you throw a feather and an elephant off a high building? Classical laws work if no extraneous influences interfere. But classical laws cannot guarantee the exclusion of such interference. A chemistry professor always faces the disquieting possibility that his experiment may not work. [136]

The idea of having full information on any situation is an illusion. Laplace argued that if you have full information on one situation, you could predict any situation. But full information would be all the relevant facts. What are the relevant facts by which you could predict the trajectory of a falling leaf? Immediate conditions of height, wind, warmth, pressure, humidity, etc. are obviously relevant. But each of these variables is conditioned by a whole series of diverging variables. There is no end to the quest for full information. To have all the relevant information you would have to know everything about everything and that is beyond the human mind.

Classical laws are abstract and when applied to the concrete they explain certain aspects of the data but they do not explain all the data. Some data are amenable to explanations of the classical type and so are systematic or regular; other data cannot be brought under such laws and so are relatively nonsystematic or irregular. As well as the regularity of the solar system, there is also the relative irregularity of the weather. As well as what can be subsumed under laws, there is always the residue of data pertaining to particular places and times which can never be fully explained - as we shall see. Between the abstract law and the concrete instance, there is always needed an insight into which laws apply in what order of precedence; there is always this 'gap' to be filled by a further insight.

History provided its own answer to Laplace. These optimistic assumptions of automatic progress in science, technology, economics, medicine, etc. were brought down to earth by the first world war, the great depression and the discovery by scientists themselves of the need for a statistical method. It seems to have been in the field of nuclear physics that the principle of indeterminacy was most clearly identified and it was realized that statistical techniques were needed to deal with questions about the occurrence of particular states and events. Use of statistical methods spread to all other sciences through the century and was found to be successful. Einstein was apparently the last of the pure classical scientists, insisting to the end that ‘God does not play dice with the world.’ [137]

4. Statistical Method

4.1 Statistical Method Described

Statistical method is analogous to classical method, that is, it shares some common characteristics. However, it anticipates a different kind of intelligibility. To begin we will describe a typical case and illustrate the unfolding of statistical method in ten steps, which parallel those of classical method. Let us assume that we are investigating whether there is a connection between smoking and lung cancer. Is there a significant correlation between cases of smokers and those with lung cancer?

1. Heuristic Anticipation. As classical method anticipates an understanding of 'the nature of' something, so statistical method anticipates understanding 'the state of.' The state that is to be defined is the distribution of incidents of lung cancer compared to incidents of smoking. We are wondering whether the correlation will be significant or random.

2. Ordinary Description. At first it is only a suspicion; someone makes a connection and begins to wonder; the public are alerted. An interest group is formed. They point to this and that example, but it is rather hit and miss. Figures that are limited, unreliable, approximate and ambiguous are produced. They may be slanted if they are produced by an interest group.

3. Similars are similarly understood. We start from sensible similarities, from description. A neutral group is set up to start a pilot project. Describe the kinds of smoking and the possible connection with lung cancer. Description is too vague and ambiguous; the similarities of description have to shift to the similarities of explanation.

4. Functional relations. Terms need to be defined. Compare sets of classes of events with sets of probabilities as an ideal. What would be the normal distribution of incidents of lung cancer if it were random? There has to be some basis of comparison to judge whether the results are significant. [138]

5. Scientific Description. The data have to be collected. Everything has to be done accurately, precisely, objectively. Normally the whole population will not be investigated; a random sample will be chosen, but it must be sufficiently large to be representative of the whole population. Perhaps, certain controls can be included for comparison. This will involve training personnel, making questionnaires, collecting

names and addresses, doing interviews, coding information, etc.

6. Range of Possibilities. Meanwhile someone has to work out what deviation from the norm would be significant. If a sample has been used, then the smaller the sample the less convincing the results will be. What random deviation from the norm can be expected? What is the norm?

7. Practical Techniques. There are various ways of coding information so that correlations can be easily made for age, sex, smoking, race, religion, anything that might be significant. There are statistical techniques for establishing probabilities, an average, and significant deviation.

8. Upper and Lower Blade. There is both a movement from the data to hypothesis, and from hypothesis to the data, as in the scissors movement of a heuristic. The figures represented on a diagram will begin to suggest patterns. But the mathematics of statistics, size of sample in relation to population, etc. will suggest which correlations might be significant.

9. Insight. Just as in classical method, so also in statistical method there is a moment of insight, when all the work is summarized on tables and diagrams and the relationship is seen to be significant or simply random. The conclusion can be stated in a proposition that is universal and abstract, a statement of a probability function or a statistical law.

10. Verification. There should be a process of verification, a checking of the mathematics, a review of the procedures used in collecting data, a crosscheck on extraneous factors which might have interfered, a comparison with control groups or factors which were included for this purpose. [139]

This is an outline of the use of statistical procedures in one particular area. In fact, these procedures are becoming more and more common and accepted in most areas of scientific work. Statistical method does parallel classical method but is anticipating only a statement of a statistical probability rather than a universal law applicable to all cases. It is this aspect of probability which made it difficult for scientists to accept it as scientific knowing. But it has been quite successful in its own way, and barriers to its acceptance have broken down. More and more we are accepting the idea of probability, of averages, means, frequencies, rates, and using these in our understanding of our universe. Let us examine more closely the notion of probability and the definition of

statistical method.

4.2 Statistical Method Defined

Let us be clear about a few preliminary definitions:

An *event* is the occurrence of a defined variable such as an incidence of leukemia, a death, a birth, an accident, etc. An event is the answer to the question, did this occur? A *frequency* is the number of events so defined in terms of how much, for so many: how many deaths, for how many of the population, over a certain period of time? A frequency can be either *ideal* or *actual*. It is ideal if it is a theoretical statement of an abstract statistical correlation. It is easy to see that the probability of a toss of a coin producing a certain result is fifty-fifty; that is the ideal. But if you toss a coin for a certain number of times, keeping an account of the results, you get an actual or real frequency.

We can define statistical method as, "intelligent anticipation of the systematic-and-abstract setting a boundary or norm from which the concrete cannot systematically diverge."[lii] Statistical method yields laws that are systematic and abstract. The laws of probability of occurrence of events in states are abstract and systematic. Death rates, average life expectancy, mean temperature, incidents of diseases, frequency of accidents, can all be stated in laws that apply to a given population at a certain time and place.

In classical law we saw that the key word was convergence; the concrete converges on the abstract. In statistical method the key [140] term is ‘nonsystematic divergence.’ You do not expect actual frequencies to coincide with ideal frequencies; you do not expect the tossing of a coin to conform always to the average of fifty-fifty. You expect a divergence. Just because the life expectancy is fifty years, it does not mean that everyone dies at fifty years of age. There will be fluctuations, ups and downs, divergences.

But the crucial point is that these divergences cannot be systematic. If they were systematic, they could be explained by the use of classical method, which specializes in dealing with the systematic. If there were a systematic divergence it would indicate that the averages were wrong: some other factor is operating. If you find that a certain number is

recurring on a roulette wheel, then you begin to suspect cheating. If the actual figures for deaths are always above expectations, then suspect some new disease interfering. The actual frequencies fluctuate around the ideal but they do so in a way that is nonsystematic, cannot be explained, is not subject to law.

Chance can be defined as the random divergence of the actual from the ideal. In the tossing of a coin the ideal frequency will be fifty-fifty. But if you actually toss a coin you find strings of heads and tails. There is a divergence of the actual from the ideal. It is that divergence which constitutes chance. The ideal remains the same; but there is a divergence which is nonsystematic; the divergence cannot be controlled or predicted. The actual fluctuates around the ideal nonsystematically. That is where luck comes in; that is the aspect of coincidence.

Statistics is true knowledge. It does give a limited intelligibility; it is not a mere cloak for ignorance. The scientists of the classical mold had an ungrounded expectation of a much more complete intelligibility than that provided by statistics. They hoped that the time would come where everything could be explained by classical laws. Then statistics would not be needed. But the importance and success of statistical method in so many areas of science today belies this claim.

The insight of statistical method can be called a devaluated inverse insight. It is an inverse insight because it is into a lack of expected intelligibility. But it is not a pure inverse insight because there is an intelligibility that is grasped in the probabilities and [141] averages and frequencies that are expressed in statistical laws. It is a sort of in-between case. It reflects the fact that there are degrees of intelligibility and at least two complementary ways of understanding data.

It is much easier and more satisfying to understand systematic processes, because a cluster of insights grasps an interrelated set of intelligibilities. One cluster of insights orders all the data about the movements of the planets for decades to come; accurate predictions can be made for centuries ahead. But to understand the weather pattern, here, tomorrow, you need comprehensive data and numerous insights, yet in the end can do no more than state a probability. The same process of data collection and understanding have to be repeated each day to give a probable forecast for the

following day. In statistical method long-term prediction is extremely difficult; situations cannot be deduced from one another; each situation is open to extraneous forces; statistical laws change over time and place.

There are four characteristics of statistical method that set it off from classical method and they are worth considering:

(1) Statistical method clings to concrete situations in a way that classical method does not. Averages, probabilities, means always refer to certain populations, particular areas, specific times and places. If you establish the average rainfall in one place, it does not follow that it will be the same in adjacent areas. If you determine average life expectancy in one country, it does not follow that it will be the same in another country. Statistical laws apply to specific states, at specific times, in specific places. The conclusions of statistical method go out of date very quickly. One expects classical laws to be invariant over time; but with statistical laws things may be changing so fast that in a few weeks the probabilities are completely different.

(2) Statistical method attends not to theoretical process but to palpable results; it involves counting and its conclusions are verified in counting. There are theoretical elements involved in the mathematics, but the crucial moment is gathering the data. In certain situations as in throwing dice, or the roulette wheel, or certain games of cards, the probabilities can be calculated as an ideal from the very nature of the number of possibilities available. But in normal cases of fixing average rainfall, incidence of child mortality, rate of divorce, etc. there has to be a research, a counting, a measuring.

(3) Statistical method attends not to individual events but to frequencies, rates, averages, sequences, etc. The intelligibility of statistical laws resides in the sequences or averages and not in the individual event itself; there will be a reference back to individual events but one event is not usually significant. Let us

consider the figures for average rainfall in a specific place. Each individual occurrence of rainfall can be explained correctly in terms of moisture, temperature, pressure, winds, etc. Each individual event can be understood in terms of classical laws. But statistics concerns the intelligibility of the sequence of occurrences of rain. That intelligibility is expressed in a figure which is an average. That does not mean that each year the quota must be fulfilled; it allows for large fluctuations from the average. An individual event such as a catastrophic downpour has little significance from the point of view of statistics; one event can never disprove a statistic. If Galileo found that one of the balls was falling twice as fast as the others he would have had to revise his thinking; if you get twice the average rainfall in a day or in a month, it is no reason to revise the average.

(4) There is a fundamental difference in mentality between statistical and classical method. There is a difference in the expectation of intelligibility. Galileo was looking for the mathematical formula which would express the intelligibility of a free fall and would be valid for all time and in all instances of falling. But looking for the connection between the distribution of cancer cases and cigarette smoking can only establish whether that connection is significant in the long run. It does not mean that everyone who smokes gets lung cancer; nor that everyone who gets lung cancer is a smoker. [143]

5. Complementarity of Classical and Statistical Investigations

We have considered classical and statistical methods separately to show that they are distinct empirical methods which are an accepted part of contemporary science. In conclusion, we wish to show how these methods are not mutually exclusive, but complementary to one another in many ways. It is not that physics is a classical science to the exclusion of statistical method; or that the human sciences are statistical to the exclusion of classical. There is an overlapping and a complementarity that has to be explored.

1. Complementarity in Heuristic Anticipations. Classical method anticipates an understanding of the systematic. Statistical method anticipates an understanding of the nonsystematic. Data will be either systematic or nonsystematic or any combination of the two. The same data are considered from the point of view of the systematic and are understood in classical laws; under a different aspect they are nonsystematic and are studied by statistical method. All data will be either systematic or nonsystematic; hence all data will be covered by a combination of classical and statistical methods. (In chapter nine we will consider dialectical method and in chapter eleven a brief mention of genetic method.)To understand a single traffic accident you must invoke both classical laws and statistical laws. Classical laws state that if a car is driven at a certain speed around a corner of a given camber, it will roll; that without oil the engine will seize; that braking can reduce speed at a given rate for each vehicle without skidding. But why is a particular driver going around a corner too fast? Why was there no oil in the engine? Why did the driver fail to stop in time? Was the driver drunk, tired, inattentive, or incompetent? The coincidence of these factors is governed by statistical method.

2. Complementarity in procedures. We have already shown the parallel procedures of classical and statistical methods in the examples of Galileo and the statistical relation between smoking and lung cancer. These procedures are complementary in that the isolation of the systematic prepares the way for the determination of the nonsystematic. Similarly, the isolation of the nonsystematic prepares the way for a determination of [144] the systematic.

Galileo used mathematics as the heuristic tool in his search for the law of falling. To do so he had to try to exclude extraneous influences. He made his equipment as perfect as possible, and his measurements of time and distance as accurate as possible. Given the limits of his instruments he could not produce a vacuum or perfect conditions so he had to try to eliminate possible experimental error by repeating his measurements and experiments to average out the discrepancies. When he had formulated his classical explanation for the law of falling bodies, he was in a position to study friction. He had determined how bodies should behave in a vacuum; by measuring the discrepancy in the figures he would be able to study the different interferences, especially friction. He would be able to measure the degrees of friction on an elephant and a feather dropped from a height and thus to explain why the elephant would fall faster.

We used the example of the distribution of incidents of lung cancer in relation to cigarette smoking to illustrate statistical method. But if this study were to indicate that there is a significant positive correlation between the two variables, then that would be

a hint to the classical investigator that there was a is the causal relation between lung cancer and smoking. What element of smoking could be the causative factor; what is the precise element of smoke that causes cancer; is it a causative element or merely a catalyst, etc.

Mendel studied genetics using a statistical method.[liii] He noted the recurrence of traits in a series of experiments with peas and was able to formulate statistical laws as to the probability of certain traits repeating themselves after a certain number of generations. That was the hint the biologists needed to go in search for the reason for this recurrence, and led to the discovery of genes, chromosomes and D.N.A.

3. Complementarity in Formulation. Classical formulations regard correlations, which are verified only in events. Statistical formulations regard events, which are defined only by correlations. [145]

Classical laws presume that no extraneous influences interfere. They make the proviso of 'other things being equal'. The law of the lever states what would happen, if you apply a lever with a given force and a fixed fulcrum to a certain body. But that does not tell you how it might actually be used to move the earth. What material could it be made of? What happens in theory in a diagram may not be possible in reality because of the material that would be needed. Classical laws need statistical laws in order to be applied in the concrete. A physics professor might set up an experiment to demonstrate some classical law, but much to his embarrassment the experiment does not work; he cannot completely exclude all extraneous factors.

On the other hand, statistical correlations only possess scientific significance if the events are defined by the correlations of classical laws. An event is 'what' it is that occurs; it is the definition of this 'what' which makes statistical method possible. In doing the survey on smoking and lung cancer, it was vital to define the terms clearly; what kind of cancer; what kind of cigarette smoke; etc. If doctors were confusing lung cancer with tuberculosis or bronchitis, the results would be useless. If the smokers included those who did not inhale, then, similarly, the results would not be accurate. The value of the survey depends on accurate definitions of the factors being correlated. But these definitions are provided by classical method. Therefore, it is classical method that suggests which correlations might be significant. Many possible statistical relations could be investigated. Throw in traits like ‘marital status’ or ‘knowledge of foreign languages’ as a control factor in the survey of incidence of lung cancer, and the distribution should be random: it is hard to conceive of a possible positive correlation between these factors and lung cancer. It is classical method

investigating cancer which suggests that certain chemicals in cigarette smoke could be causative factors and are worth investigating.

4. Complementarity in modes of abstraction. Both classical and statistical methods lead to abstract laws. Classical method leads to abstract correlations between variables; statistical method leads to ideal probabilities. Both methods abstract from the concrete in the enriching leap of insight. Both need further insights to be applied in [146] any particular concrete situation. Classical laws are applied to the systematic; statistical laws determine ideal frequencies from which actual frequencies diverge nonsystematically. Both are legitimate scientific procedures; both yield abstract ideal laws or frequencies. But they are applied to the concrete in different ways. Classical laws are applied on the proviso of other things being equal. Statistical laws are applied on the assumption that actual frequencies will diverge nonsystematically from the ideal. The complete view demands the use of both methods in complementarity.

5. Complementary in verification. Both classical and statistical laws can be verified and so both are valid scientific methods. Classical laws determine what would happen if conditions were fulfilled. Statistical laws determine how often one may expect the conditions to be fulfilled.

Classical laws cannot explain everything; they are verified only with the proviso that 'other things being equal'. But it is impossible to exclude all extraneous influences. They have to be reduced to a minimum; and even then allowance has to be made. Classical laws are verified in that the concrete converges on the abstract; but there can be no total coincidence between the concrete and the abstract.

Statistical laws determine how often the conditions will be fulfilled; they indicate which data are due to randomness and which seems to have a significance of its own. What in one age is dismissed as due to inaccuracies of measurement can later be the ground for important discoveries. If a divergence of data from the expected is found to be systematic, then it is an indication that classical law is at work; it is statistics which determines which divergences are random and which are of significance.

6. Complementarity in data explained. There are not two distinct and separate sets of data, one for classical investigation and one for statistical investigation. There is one set of data and certain aspects of the data receive the classical type of explanation while other aspects of the same data are explained along statistical lines.

Data which are systematic at the moment can become nonsystematic, and vice

versa. The solar system is systematic for the present, but the planets are slowly coming nearer to the sun and will [147] eventually collapse back and the solar system with all its regularity and system will become a chaos.

What is coincidental can suddenly become systematic. The stray elements of pressure, wind, moisture, and temperature, which are independent and nonrelated, can suddenly become systematically related in the system of a typhoon. Then the different elements do form part of a system of interrelated factors.

In a particular study either classical or statistical method may predominate for a time. But when the aspects of the data dealt with in classical method have been fixed there will be a need for statistical method and vice versa. There are no data which can be entirely explained by one method to the exclusion of the other.

6. The Empirical Residue

Finally, we deal with a notion which some deem to be difficult. The term 'empirical residue' refers to what is left over when classical and statistical methods have run their course. Is there something left over? What is it? Can it be explained? There is something left over and we are calling it the empirical residue and by definition it cannot be explained either in terms of classical or statistical method. The empirical residue, then, has three characteristics, (1) it is positive empirical data, (2) it does not possess any immanent intelligibility, but (3) it is connected with a compensating higher intelligibility.[liv]

The empirical residue is positive data. It is not simply a vacuum or an absence of data. The positive data are given in experience, by way of the external and internal senses. We do experience a vast multiplicity of data, but experience alone is not understanding; human understanding is insight into data. Experience is preintellectual and preconceptual. An animal can experience but cannot understand. Similarly we experience a vast panorama of data; some of it we understand by classical laws and some of it we understand by statistical laws, but then there remain aspects of the data which can only be experienced. [148]

The data that belongs to the empirical residue possess no immanent intelligibility. They cannot be brought under law. They can be named, pointed to, but they are not the content of a direct insight. The most obvious case of the empirical residue is particular places and particular times. Particular places and particular times are precisely what are

abstracted from in the procedures of classical and statistical investigation; they are left out, left behind as not relevant.

Scientific generalization consists in abstracting from individuality. When Galileo discovered his law of falling bodies, he did not have to formulate different laws for different materials, different laws for different places and times. It was an abstract intelligibility which, given certain conditions, could be applied to any material at any time and any place. Particular time, particular place and particular material used were irrelevant, to be excluded, of no significance. This is the power of scientific generalization. The particular as particular, the concrete as concrete, merely numerical differences cannot be brought under law. To bring under law is to abstract the universal from the particular. If you are trying to understand the particular as particular, then, there is no way you can abstract from the particularity.

The Scholastics of the Middle Ages had great difficulty formulating a principle of individuality. They felt that there had to be a reason for the numerical differences of individuals within a species. Aquinas appealed to *materia signata quantitate* (quantified matter); Scotus appealed to *haeccaetas* (thisness). But there is no principle that explains merely numerical differences; they are different simply as a matter of fact. The Scholastics were not familiar with the experience of inverse insight into the lack of an expected intelligibility. They were looking for something which was not to be found.

The process of abstraction abstracts the relevant from the irrelevant, the important from the unimportant, the rational from the irrational, the meaningful from the nonsense, the significant from the insignificant. What do we do with the unimportant, the irrational, the nonsense, and the insignificant? Can we bring them under law? Can we explain them? Can we formulate a theory about [149] nonsense? But to formulate a theory means to abstract the intelligible from the unintelligible; there comes a point when the unintelligible is simply unintelligible; when nonsense can be pointed to but cannot be explained. These are precisely the elements that are left behind in the process of human understanding.

The empirical residue is connected with a compensating higher intelligibility. Although the empirical residue possesses no immanent intelligibility of its own, it provides the materials for the procedures of abstraction and generalization that are of enormous significance.

The empirical residue is not a direct correlative of inverse insight. We defined inverse insight as the absence of an *expected* intelligibility. The difficulty with the

empirical residue is that nobody expects it to be intelligible. Few people expect scientific theories to be different depending on where they were invented or by whom or when. Few people look for an ultimate explanation of why x was born at a particular place at a particular time. But one characteristic of the empirical residue is that it is connected with a compensating higher intelligibility. The empirical residue is 'significant' because it allows the process of scientific generalization and abstraction to take place and is itself simply left aside.

The empirical residue is roughly equivalent to what Aristotle referred to as matter. However, he used that term in many different senses such as prime matter and secondary matter, general matter and specific matter; he used it in a technical sense and in a loose sense. The common element was that matter was not knowable; it was the matter in which the form was realized; we know the form in the matter but the matter in itself is strictly, in principle, unknowable. So for us the empirical residue is a technical term with a very specific meaning as what is left over when all intelligibility has been abstracted; data which can be experienced but cannot be explained. The empirical residue can only be known in that strange indirect way of an inverse insight; it can only be known when the processes of generalization and abstraction leave behind the individuality of particular times and places. [150]

In conclusion, lest we get distracted from our main purpose, let us remember that we are slowly becoming aware of how our minds work, how we understand. This chapter compels us to face the fact that there are types of intelligibility, degrees to which data can be brought under law. The scientists of the nineteenth century looked forward to a time when science would understand and therefore control and predict everything. In the twentieth century science is more realistic. We have accepted the need for statistical method as a necessary complement to classical method. There are degrees of intelligibility. Some questions we can answer and some not, not just from lack of information but in principle. Inverse insights bring us up short. They remind us of the limits of our human understanding and the degrees of intelligibility of our universe. We are forced to use at least two different methods in the understanding of any set of data. The exercises give you some opportunity to identify these procedures in your own consciousness.

The principle of sufficient reason seems to imply that there is a reason for everything. The foregoing has revealed that there are degrees of intelligibility ranging from the satisfying intelligibilities of classical laws to the shock of the empirical residue which lacks immanent intelligibility. We have a reluctance to accept the unintelligibility

of some data; we spontaneously ask for the reason for something and expect a direct insight. But this is not always possible. For there is chance; there are random occurrences; there is no explanation for the particular as particular, for particular times and places; there are accidents, coincidences, the merely empirical residue. Why did the locusts land on my farm and not on my neighbors? Why did I get malaria and my friend in the same room did not? Why did the tree fall just when I was passing? Why did it rain here and there is drought over there? This is the kind of world we live in; one which is a complicated combination of the systematic and nonsystematic; one which can only be correctly understood by a combination of direct, devaluated, or pure inverse insights.

We got into some rather technical 'stuff' in this chapter. The more down-to-earth examples of the bewildered reader, the unfortunate secretary and the inveterate gambler at the beginning [151] remind us that the problem exists not only for scientists and experts but for everyone of common sense. The type and degree of understanding attainable in any discipline will vary enormously. Aristotle warns the readers of his *Ethics* not to expect the same degree of precision in moral inquiry as is possible in mathematics. We noted that measurement and hence precision and accuracy is primary in the physical sciences; but in the human sciences it is explanatory definition which is primary. In all areas we must differentiate what we can know with certainty, with high probability, or simply as probable. In all cases we distinguish what we can understand clearly and distinctly and what we can only expect to understand in a confused and ambiguous manner. Our universe is rich in the diversity of the phenomena it presented to us. Our minds are rich in strategies for coping with this diversity. The third stage of meaning is not some monochrome reduction to one type of meaning; rather a nuanced and sophisticated grasp of the complications, variety and levels of intelligibility of human persons operating in the real world.

Comments on Exercises

(1) The peculiarity of probabilities is that the intelligibility applies to the sequence not to individual numbers. These sequences might represent results of exams, range of temperature, degrees of humidity, etc. There is no single number that is exclusively correct. For (a) it would normally be anywhere between 5 and 8. For (b) one would expect something between .74 and .82. For (c) one expects between 98.3 and 99. But even these limits are not sacred in a statistical sequence. The numbers in (d) are lacking in intelligibility and are close to purely random. It is an inverse insight to grasp this lack of expected intelligibility.

(2) We can easily name and describe the intelligible. But can we recognize and name

the random, the unintelligible, the nonsense, as in (d)?

(3) This puzzled the Greek mathematicians who expected to find an even numerical ratio. But they found it was irrational, incommensurable. In our terms it turns out to be a decimal which goes on forever. Get the square root of two on a calculator. It goes on forever and ever. [152]

(4) Aristotle presumed that the natural state of a body is to be rest in its natural place and if nothing is pushing, then, a material body will come naturally to rest in its natural place which is down. The heavenly bodies had Movers to explain how they kept moving. The earth was not moving because of the enormous force that would be needed to keep it moving. The arrow was a problem and he thought in terms of air coming from the front and pushing it from behind. Late medieval physicians developed complicated theories of impetus on the same lines. The whole line of thinking is based on a false presupposition, a wrong question. Newton's first law of motion states the correct assumption. It is changes of rest or motion that need to be explained.

(5) Obviously the elephant, but why? Aristotle would have said because the elephant is heavier and the heavier a body is, the faster it will fall. Galileo disagreed and proved that weight has nothing to do with acceleration under gravity and in a vacuum all bodies will fall uniformly. We accept Galileo's principle. But when you actually drop an

elephant and a feather from a tower the friction from the air will have a disproportionate effect on the feather as opposed to the elephant; it is friction or air resistance which causes the elephant to fall faster than the feather.

(6) The only significant pattern of stars visible to the naked eye is the Milky Way. That is a band of many millions of stars that constitutes a sideways view of our galaxy. Otherwise the distribution of stars is random. Other clusters such as Pegasus, Orion, the Great Bear, etc. are names given to groups of stars which happen to look like things on earth.

(7) Weather forecasts give a range of probabilities rather than certainties. Rain may be possible, probable or highly probable or anything in-between. The probable path of a tornado can be predicted but with little precision or certainty. It is an illusion to think you can have all the relevant information: for that you would need to know everything about everything. [153]

5

Developing Understanding: Formulation

Properly, to abstract is to grasp the essential and disregard the incidental, to see what is significant and set aside the irrelevant, to recognize the important as important and the negligible as negligible.[lv]

Preliminary Exercises

(1) John can cultivate one acre in two hours. Michael can cultivate one acre in three hours. Working together how long does it take them to cultivate one acre?

(2) 1. How many swans must you see to justify saying, ‘All swans are white'?

2. How many humans must you see to justify saying, 'All men are mortal'?

3. How many corrupt politicians do you have to meet to conclude, ‘All politicians are corrupt’?

(3) Form one word from each of the following jumbles: [156]

V I P T O
D R N R B E A
H T I G I N S
R G O E A N N L

(4) Zeno, the Greek dialectician, wanted to prove that there was no such thing as space. He did this by reducing the opposing view to absurdity. This is how he argued. 'If there is space, then it is either something or nothing. But if it is nothing, then things cannot be in it. If however it is something, it will itself have to be in space, and that space will have to be in space, and so on indefinitely. But that is an absurdity. Therefore there is no such thing as space.

(a) Is the logic of the argument valid?

(b) What does he mean by space?

(c) What does he mean by 'something'?

(5) Do you know the meaning of just and unjust? Can you define justice?

We have begun our appropriation of the activity of insight by identifying individual acts of understanding; we should now be familiar with the characteristics of an insight, the cooperation and coordination of activities of questioning, sensing, remembering, and imagining in reaching understanding. The purpose of this chapter is to reinforce our familiarity with all of these aspects as well as to extend our ability to deal with understanding as an ongoing process. Understanding is a dynamic process; individual insights tend to coalesce, to form a context, a system, a science. The initial act of discovering is one thing but the mode of demonstrating, presentation, formulation of the discovery is another; in between there is needed a stream of insights into the correct words to use, the extent of the discovery, correct expression in a formula or definition or theory or concept. We will now focus on the process from an insight to a

correct formulation of that insight in a definition, or explanation. This requires many further acts of understanding both [157] into correct use of language and into the real extension of the intelligibility grasped in the insight.

We focus first on *generalization*, to show how the act of understanding pivots from the particular to the general: this is the very nature of understanding and hence of induction. Then we deal with the closely related topic of *abstraction*, to show how the act of understanding of its nature abstracts from the concrete; there is an enriching way of doing this as well as an impoverishing way. We then consider the contrast between *conceptualism and intellectualism*; we consider the role of the concept in understanding; is the concept that which we know, or that by which we know? We consider the relation between *things and properties*, discovering that there is a further pivoting involved in the development of understanding. Finally, we consider the dynamics of reaching a *higher viewpoint* and the *infinite flexibility* of human intelligence.

Our aim continues to be self-appropriation. It is a start to be able to isolate, identify and describe individual acts of understanding. Now we are appropriating, becoming aware, making explicit, the forward development of understanding as a process. We distinguish clearly between the initial act of understanding and the later formulation of that understanding in a theory. This chapter is important because certain philosophies and systems of logic attend to the formulation and not to the insights which made it possible. It is quite difficult to become aware of the subtle processes of the activity of understanding; it is easier and more tempting to take it that they do not exist and to consider the rules of grammar or logic or method as the rules of thought. The focus of this chapter is in showing that the act of understanding is the source of all philosophy, all empirical science, all human knowing, every human culture, and all systems of logic, methods and technologies. [158]

1. Generalization

1.1 Generalizing

We have found it to be an essential characteristic of individual acts of understanding that they pivot between the abstract and the concrete. One aspect or application of this characteristic is a pivoting between the general and the particular, the universal and the individual. We are continuing to describe simply and honestly what happens when we understand. We do not begin by saying what intelligence must do; we are looking at the activity of intelligence to discover what it is from what it does. The aspect we are now concentrating on is that it generalizes.

Animals do know particulars by way of their senses. They recognize individual persons, places, and objects. They can learn a limited amount by way of imagination and memory. They see the particular, individual, concrete sense objects. They know them at the level of sense knowing. There is a minimal generalizing based on sensible similarity evident in this activity of sensing.

In contrast, consider the insight of naming described by Helen Keller; she had an experience of something running over her left hand while at the same time her tutor was tracing the word w-a-t-e-r on the palm of her right hand. The insight was to see how they were connected; she realized that the shapes formed on one hand referred to the experience she was having on the other hand; the substance was water. It was an insight of naming, an insight into the correct use of words, grasping a relation between an arbitrary sign or sound and an experience. Naming is the beginning of the expression of understanding in words.

Crucially, the word did not only refer to this one particular experience of running water; it referred to past experiences dimly remembered and forward to future experiences. It referred to typical aspects of this experience, to the essentials not to the non-essentials, to the general and not to the particular. When she went to the house she was able to recognize that the liquid coming from the tap was the same as that in the garden; the liquid offered for drinking at table had the same name; the substance she washed with was also in the same [159] category. The insight was to see the sameness behind all these experiences. The same data are to be understood in the same way; once you have understood one set of data, then, any similar set of data will be understood in the same way. On the first occasion the insight is difficult, but to repeat it is a matter of habit; it becomes easier and easier until it becomes so habitual that it is hard to recognize as an act of understanding.

Helen did not have to be taught how to generalize; it is one essential aspect of the insight of naming that it does generalize; it does not refer exclusively to this particular, it puts this particular in a general category; it pivots between the particular and the general. If the name 'water' referred only to what was experienced in the garden, then, what was later experienced in the water for drinking would have another name. Insight automatically begins to classify, to divide into categories, to understand the particular in the light of the general. Further learning and later insights refine the first clumsy attempts at classification. Helen had still much to learn about liquids: alcohol, kerosene, ice, steam, etc. The limits of the categories had yet to be set; the basis for the insight to be made more explicit; the experience of water could be very varied as in steam or ice or snow, but yet it was the same substance. Naming is only the beginning of understanding but it is an essentially valid activity of generalizing.

1.2 Commonsense generalization

Commonsense generalizations tend to be made very easily, quickly and loosely. Listen carefully to any discussion and you will note the frequency with which we jump from the particular to the general. This politician is corrupt; therefore all politicians are corrupt. These Irishmen are drunk; therefore all Irishmen are drunks. These workers are lazy; therefore all the workers are lazy. The basic procedure is essentially valid, the work of intelligence, a sign of understanding at work. But that does not mean that every generalization is justified or correct; counter examples will often be invoked and so the argument proceeds. The activity of generalizing is ubiquitous: learning consists in understanding better the correct extension and application of words, i.e. to what particulars can these [160] terms be generalized. This is done in a loose way at the level of common sense but more precisely in the explanations of science.

There is a movement from the particular to the general, but there is also a reverse move from the general to the particular. Classifications are refined by reference back to concrete applications. A doctor can learn about malaria from a textbook in his training, but it may be twenty years before he is confronted by a particular patient with certain range of symptoms; it may take him a while to make the connection but then he gets it; the patient is suffering from malaria; so this is malaria. The general is applied to the particular. Diagnosis consists in recognizing the general category described in the textbook in this concrete particular.

We may see something coming down the road from a distance. It is something but we do not yet know what, so we put it in the most general category available: it is a

'something'. But as it comes nearer we can refine the category and assert, 'oh! It is a lorry.' This is a narrower classification but still very general; there are many lorries in the world. As it comes nearer we are able to recognize our neighbor coming with his lorry to collect sand, 'oh! It is John.' Finally we have reached the particular. But we can only talk about the particular lorry in terms of general categories, a something, a vehicle, a lorry, a Leyland, a tipper, etc. We can know particulars but only with a reference to the general category or classification of intelligence by which we name and categorize it.

A child visits a zoo with her father. 'What's that, daddy?' She asks. 'Oh! That's a giraffe, honey.' After a short silence the girl asks, 'What's a giraffe, daddy?' 'That is,' replies the patient father, pointing. The story of the child at the zoo illustrates how the process of understanding proceeds sometimes from the general to the particular and sometimes in the reverse. From the point of view of logic it seems to be a vicious circle, but it is an accurate depiction of the process of learning. The more we learn about the concrete, the more we need our names and categories; the more refined the categories the more we need to return to the data; it is a continual pivoting from the particular to the general and vice versa. As the child's understanding of animals develops she will learn to discriminate more precisely between giraffes, camels, zebras, and [161] horses. The process of generalizing correctly involves continual refinement of names and categories.

1.3 Scientific generalization

At a more refined level, the scientist is engaged in the same process of generalization. The first chemist to discover that combining hydrogen and oxygen through burning produces water, was very excited. He had made a monumental discovery; water was a combination of hydrogen and oxygen. Perhaps he repeated the experiment a few times to check; perhaps he sought to reverse the process to confirm his conclusions. What he did not do was to attempt to demonstrate that *all* water was a combination of hydrogen and oxygen. That was taken for granted. It was not necessary to prove that English water was the same as French water; that hot water was the same as cold; tap water the same as river water, etc. It was not necessary to repeat the experiment a month later to see if water was still made of hydrogen and oxygen. It was recognized that particular times and places were irrelevant to the correctness of the insight. The insight was precisely into an essential property of all water; to be water it must be a combination of hydrogen and oxygen. It was the establishment of a basic relation between the elements hydrogen and oxygen and the compound water. It was an insight involving generalization. The experiment was only performed on a limited

number of samples. But the nature of the insight was such that the conclusions could be applied to all water, all hydrogen and all oxygen, regardless of time, place or circumstances.

1.4 Justification

The principle at work here is that similars are similarly understood. If one set of data is grasped by an insight, then another set of data similar to the first will be grasped by the same kind of insight. You do not need a different kind of insight for each particular instance of water. You do not need to compose or decompose every instance of water to prove that water is a combination of hydrogen and oxygen. It is the very nature of insights to generalize. [162]

Which data are similar to other data? Who decides that these data are similar to those? There is no simple set of rules that can be applied mechanically to give automatic, correct results. There is only the driving force of questions, understanding and the search for better and more perfect understanding. Mistakes will be made, but they can be corrected. What is similar and what is different? What are the significant similarities and what are the significant differences? What are descriptive similarities and what explanatory? It is matter of intelligence and insight to recognize significant similarities and differences. A real zebra in a zoo is different from a stuffed zebra, even though they do look alike. Ice, snow and steam seem to be very different and yet they are the same. A real man is different from a picture of the man, yet they do show resemblances. We are dealing with an immanent law of intelligence, which picks out the significant from the insignificant, the similar from the dissimilar, the real from the imitation; which grasps the general in the particular; which recognizes the particular in the light of the general.

1.5 Induction

Induction is a term used by logicians for a procedure that goes from a number of individual cases to a general conclusion. Question two of the preliminary exercises presents some examples of induction. The opposite procedure by which we start with a general statement and apply it to particular cases is called deduction. Logic concerns itself with the logical procedures and arguments involved in doing this correctly and identifying fallacies when incorrect procedures are used. Undoubtedly logic is of great value when it clarifies these procedures, reveals unstated premises, uncovers fallacious arguments or shows that conclusions do not follow from premises.

However, much contemporary logic is done in the context of an empiricist philosophy which holds, like Locke or Hume, that our ideas are simply 'less vivid images' and that the association of ideas in our minds is governed by the laws of imagination. They would not accept the possibility of insight grasping universals in particulars or pivoting between the abstract and the concrete: that inquiry operates [163] on what is given in the senses to grasp intelligible relations, laws, natures, solutions. Hence an empiricist philosophy would not recognize the ability of the human mind to generalize, to grasp a formula operating in a sequence and to apply that formula to produce and infinity of further individual cases. For us similars are similarly understood and it is human intelligence which works out significant similarities and differences.

For an empiricist philosopher then the human mind in itself cannot in principle grasp universals in particulars and so cannot generalize. Yet the hard fact is that people - including logicians - continue to generalize regardless and seem to do so successfully. Logic is then given the task of justifying this procedure and showing how generalization is possible. The laws of logic are being substituted for the laws of the mind; rules of correct procedures are put in the place of intelligence. It is in this context that the logic of induction has become an enormous, contentious, complicated issue today.[lvi]

If you ignore the generalizing nature of intelligence, as the empiricist logician does, you are impaled on the horns of a dilemma: you must justify induction either by way of a complete enumeration or by way of formulating rules for jumping from some particulars to the general. However, complete enumeration is neither an induction nor a generalization. Complete enumeration means counting each and every individual case: there is no going beyond the particular to the general; there is no going beyond the counting as the counting covers all the cases.

The alternative of formulating rules to negotiate the transition from a limited number of cases to all cases also breaks down. First, cases differ so much in common sense, science, philosophy, history, etc., that it is impossible to formulate rules to cover all cases. Are all politicians corrupt? Are all swans white? Are all men mortal? They are quite different cases and no one set of rules applies. Second, even if there were a set of rules there would be a need for intelligence to select the rules which apply to this particular case, to be able to recognize exceptions, to be able to decide what is similar and what is significantly different. But that is to invoke intelligence and once you invoke intelligence you are beyond an empiricist philosophy. [164] John Stuart Mill formulated five rules for an empirical scientific method: the method of agreement, of difference, of agreement and difference, of residues and of concomitant variation.[lvii] These are a

useful guide towards correct inductions in the field of empirical science; but they require intelligence in applying the laws to particular cases. They do not take the place of intelligence. They are not rules that if followed blindly automatically produce correct conclusions.

For us the fundamental principle for generalizing is the law immanent and operative in our activity of understanding: similars are similarly understood. To understand means to be able to classify, categorize, define and divide; to be able to assign the particular a place in the schema of things; to have a set of general categories in the light of which you can identify new particulars which are encountered for the first time. The advance of any science proceeds in this way. There was a time when only five sub-atomic particles were recognized and now there are over a hundred; research has revealed all sorts of new phenomena; the old categories are not sufficient; the new phenomena must be given a name; the name enables researchers to determine its properties. But that might well lead to still further subdivisions. Advancing understanding involves finding more refined, sophisticated, and accurate classifications and generalizations.

There is a legitimate and important function that the logic of induction has to perform. The generalizer tends to get out of control. The most common fallacy in ordinary conversation is jumping to generalizations from an insufficient number of cases. We do need Mill's rules as well as the fallacies and syllogisms of logic to keep things under control. We use the logic of induction to introduce formalization, consistency and coherence to our generalizations. But the crucial point is that induction helps us to generalize correctly; it cannot justify the process itself which is really intelligence at work.

1.6 Deduction

There is also a logic of deduction; in fact, most logic tends to be deductive i.e. arguing from given premises to specific conclusions. [165] We simply make the same point that we made as regards induction: the human mind works spontaneously by way of moving from the general to the particular and vice versa. That is how we understand; that is how scientists proceed; they do not need a course in logic to be able to do science. No one taught them logic; they did not need logic to work from mathematical principles to a particular conclusion.

The logic of deduction is after the fact of deduction and not before. The logic of deduction must presuppose the activity of intelligence proceeding from the general to

the particular in order to develop its rules. As one geometrician put it, 'Now that we know this is true, how do we prove it?' The function of logic is to make explicit the formal structure of deductive arguments, but it does not justify deduction in itself. We can make mistakes in deduction, and so deductive logic identifies the procedures which are legitimate and those which are illegitimate. A formalist interpretation of Aristotle's logic seems to imply that we need the rules of logic to do any deductive thinking at all; that in order to do philosophy you must first learn logic. There is an implication there that the rules of logic determine the rules of thought, that deduction is then a matter of the application of rules to terms and propositions in syllogisms. Such an interpretation does not do justice to Aristotle nor does it do justice to the spontaneous procedures of the human mind.

2. Abstraction

Abstraction is a further process in the forward movement of the activity of understanding. We have already noted that the individual insight pivots between the concrete and the abstract. What are the implications of this pivoting in the long-term activity of insight? How does the concrete relate to the abstract and vice versa? What exactly happens in this pivoting? Many philosophical traditions have disputed about the meaning and mode of abstraction.[lviii] It will further the process of intellectual self-appropriation if we can recognize this activity in our own thinking. At the same time we may find some guidelines as to correct and incorrect procedures of abstraction. [166]

As indicated in the caption of this chapter, abstraction is nothing more complicated that grasping the essential and putting aside the incidental; it is separating the important from the unimportant, the significant from the insignificant, the sense from the nonsense. We do this at the level of common sense; we do it in the sciences; we do it in mathematics and we do it in philosophy. It is a spontaneous activity of understanding; it is nothing more abstruse than pivoting between the abstract and the concrete, the idea and the image, the concept and sensible data.

There are degrees of abstraction. Traditional scholasticism distinguished three degrees of abstraction, grounding the distinction between science, mathematics and metaphysics. The sciences abstract from material individuality; science is not interested in this water, but in properties of water in general; it is not interested in this amoeba but in categories of amoeba. Science deals with sensible characteristics as the grounds for scientific generalization. Mathematics abstracts from all sensible qualities except

number and quantity. The operations of numbering, dividing, multiplying, fractions, etc., can be applied to any material objects. Metaphysics abstracts even from quantity to focus on being as being.

Unfortunately, abstraction is often conceived in a negative sense as simply leaving out, not attending to, ignoring, prescinding from, certain aspects of the data. We are thought to be moving away from the concrete into the more rarified air of the world of abstractions. Sometimes the connection with the normal processes of understanding is not grasped and abstraction becomes a very strange magical activity indeed. In that sense abstraction becomes impoverishing rather than enriching.

2.1 Enriching Abstraction

The basic moments in the activity of abstraction are positive rather than negative. Abstraction is the addition of intelligibility to the data rather than some kind of subtraction. Understanding is enriching rather than impoverishing; the enriching involves the pivoting between the abstract and the concrete, the addition of the intelligible laws and relations to the concrete data. We distinguish [167] three moments in the unfolding of understanding and hence three moments in the activity of abstracting.

The first moment is the anticipation of the intelligibility to be grasped. We have data and we have questioning; we are looking for something further, a law, a correlation, an explanation, a cause, a solution. If we do not grasp that further something, we will not be able to solve the problem. Archimedes as he set out for the baths was in this state of mind. He was anticipating a method, a theory, a technique, an understanding by which he could answer the king. But what was it? He had the data, the question, the clues, the hints; but the laws, the theories, would not come. This stage can be called *objective abstraction*: there is already a preliminary sifting of the relevant from the irrelevant, a focussing on data which seem promising.

The second moment is the successful realization of these heuristic structures or anticipations in the liberating flash of insight. Archimedes grasped a technique for solving the problem and returning from the baths did the calculations and reported to the king. The data remained the same; the chalice was the same but he now approached it with a new understanding. He implicitly understood the idea of specific weight and flotation. These added to his understanding of the data; they emerge from the data by the action of questioning. They are not imposed arbitrarily from above; the ideas can be put into practice and verified; they do indeed apply to these data. The abstract adds

intelligibility to the concrete. This can be called *apprehensive abstraction*; it is a grasp of the intelligible in the sensible.

A third moment is the formulation and expression of the idea in a concept. It may have taken Archimedes a few days to work out the implications of his insight and to define correctly the concepts of specific weight and flotation. To do this he had to reflect on his insight, work out the theory, define the scope of his concepts and their application. It is only here that there is a negative element to abstraction; it is here that we prescind from the concrete, leave behind the data that are not relevant and concentrate on the correct expression of abstract relations. Furthermore, it is only a temporary separation from the data; for verification, for further checking, and [168] for further refinements of concepts there will again be a return to the concrete so that the process of enriching understanding can continue. This stage can be called *formative abstraction.*

Enriching abstraction is a process by which the potentially intelligible becomes actually intelligible by the action of intellect on the data of sense. This is a classical formulation but seems to hit the mark. The concrete is not known as actually intelligible by just looking. If you want to understand the movement of the heavenly bodies you have to do more than look. When you look at the heavenly bodies for the first time it is just a chaos; you do not know what is moving or in which direction; you cannot distinguish a planet from a star; you do not know which movements are random and which are regular. But if you persevere in questioning, in further systematic and intelligent observation, it gradually begins to make sense. You do pick out the regularities; you distinguish fixed stars, falling stars, satellites, planets, comets, and galaxies. Insight is adding intelligibility; it is not an arbitrary addition but a grasping of an intelligibility immanent in the data. The amateur looking at the night sky sees chaos; the professional astronomer sees an extraordinary rich panorama of interrelated bodies moving according to well-defined laws.

An enriching abstraction does involve a moment of jumping to a theory, but always with a view to returning to the concrete. Any professional discipline like medicine, mechanics, economics involves theoretical definitions, concepts, formulations; these provide the explanatory framework that allows a return to the concrete with an enriched understanding. The person of common sense listens to his car and says it is working fine, but the professional mechanic can tell him one of his tappets is loose; they both hear the same sounds but the professional's interpretative framework is so much more enriching. A farmer looks at his field with self-satisfied

complacency; the agricultural extension officer will ask him what he is doing about the fungal infection of the grass. A person of common sense looks at a Picasso and sees some strange shapes and colors; an art expert sees the history, the allusions, the styles, the phases of development, similarities and differences all brought to bear on this picture. [169]

Similarly, philosophy should bring to bear an enriching abstraction. It does involve moving from description to explanation, from lower to higher viewpoints, from individual sciences to the unity of all human science, from knowledge of objects to knowledge of knowledge. It should bring an enriching framework to bear on individual ideas, controversies, books, or concepts. The withdrawal of the philosopher into the world of theory, explanation, interiority is only with a view to a return to the concrete, with the added enriched perspective of comprehensive theory.

1.3 Impoverishing Abstraction

More often in the history of philosophy abstraction has been taken in its negative meaning as leaving behind what is not considered relevant. This involves concentrating on what is common to many different instances. Impoverishing abstraction does not move in the direction of deeper understanding of our universe; it moves in the direction of emptiness, sterility and poverty of thought. It is the abstract separated from the concrete; the abstract becomes an end in itself; it neither arises from nor returns to the concrete.

In the opening of Book Gamma of the *Metaphysics*, Aristotle distinguished between first philosophy and the special sciences. In doing so he coined the phrase ‘being qua being.’ He was trying to establish the existence of a science of everything from the widest point of view possible, an enriching metaphysics. But in many instances the phrase 'being qua being' is taken from the point of view of an impoverishing abstraction: what does everything have in common? Eliminate all specific points of view. Leave behind all distinguishing features. Being then becomes what is neither substance or accident, what is neither material nor spiritual, what is neither finite nor infinite, neither changing nor unchanging. This becomes an abstract ontology of the transcendental properties of being which does little to help us to understand the real world in which we live.

This procedure is sometimes applied to the distinction between substance and accidents. What is the substance? Well, it is what is not accidental, so we leave out what is accidental and what is left [170] will be the substance. The procedure, then, is to abstract from the color, the shape, the weight, the chemical properties, the position,

etc. But what is left when this procedure reaches its limit? It is like peeling an onion; you keep peeling off skin after skin, hoping to find a core or kernel. You are supposed to find the substance; what you find, in fact, is suspiciously close to nothingness.

Perhaps the logical notions of extension and intension will help us to understand this distinction between enriching and impoverishing abstraction. The extension of a term is the number of individuals to which it refers; the intension of a term is the minimum content which a thing must have to be covered by the term, its definition. Enriching abstraction moves in the direction of applying the definition to the diversity of concrete instances, somehow including them all; the abstract applied to the concrete. Impoverishing abstraction moves away from the data in the direction of the intension of the term, the minimum content necessary to fulfil the definition.

The activity of understanding is creative, positive, enriching; so also the process of abstraction should be adding to the intelligibility of the concrete. The speculations of a Newton or an Einstein are highly abstract; but when applied back to the concrete and verified in concrete instances of movements in space and time, they are enormously enriching. We have seen how this works when we considered the activity of classical and statistical laws and how the pivoting between the abstract and the concrete works in both cases.

3. Intellectualism versus Conceptualism

In Lonergan's formative years, the Scholastic philosophy and theology he was taught was largely conceptualist. Either in principle or in practice, the emphasis was on the concepts: how they were defined and divided, interrelated and subdivided. Much of his achievement was to retrieve and make respectable the intellectualism of Aquinas in philosophy and theology. Intellectualism and conceptualism are partly philosophical positions but mainly basic orientations or approaches to the whole business of doing philosophy. It is important for our work in self-appropriation to be able to recognize these orientations. Conceptualism heads in the direction of impoverishing abstraction, static concepts and propositional, permanent truths; intellectualism heads in the direction of creative search for understanding with the role of concepts as a means rather than an end. We will put together some of the principal characteristics of both trends.

3.1 Intellectualism

Firstly, intellectualism recognizes that intelligence is somehow ultimate; that it is the source of logic, of propositional truth, of culture, of language, of method, of technology, of social organization. The rules and the criteria formulated in logic are very useful and important, but they are not ultimate; you can have different systems of logic formulated by intelligence to objectify certain processes of arguing or reasoning. If you can have different kinds of logic, how are you to choose between them? There must be something more basic or ultimate.

Some philosophies regard language as the ultimate; beyond that you cannot go; philosophy is confined to elucidating the semantics of language. But where does language come from? How do meanings change? How do we communicate across language barriers? Why are there so many languages? The intellectualist would claim that languages are the creation of human intelligence and can only be understood as vehicles for human intelligent communication. We can, in fact, translate from one language to another, albeit imperfectly. We can understand the writings of civilizations and mentalities quite different from our own.

Others hold that cultures are somehow ultimate and absolute; that they should be preserved untouched and unchanged; that we cannot communicate across cultures because they are so different. This usually entails relativism where each culture has its own truth, its own values, its own customs and ways of doing things. In this view there is no truth across cultures, no possibility of one culture criticizing another; everyone must follow what his culture prescribes. The intellectualist would again point out that cultures are the creation of intelligence; that the one thing all human beings have in common is intelligence; the reason that we can in fact [172] communicate across cultures and learn to understand the customs of others is that we are intelligent. Human intelligence and creativity is the source of cultural diversity; we can study cultures, their development and decline; how they interrelate; the different kinds of cultures; the effect on culture of media of communication, etc. Cultures are products of human intelligence and can be studied in their development and decline.

Intelligence is the source and basis of truth; as we shall see, it has its own reflective criterion of truth; it is the only ultimate guarantee of reaching the truth. But there are some who want to substitute something more tangible,a verification principle: it is true if you can see the sensible meaning and consequences of a statement. But where did this come from? If it is true, does it itself satisfy the criterion?

A second characteristic of intellectualism is that it recognizes that we learn about intelligence by studying its activity. We know what intelligence is by becoming aware of

the activities performed by intelligence in act. An old Latin tag had it that *agitur sequitur esse*, the being of a thing follows on how it acts. In other words we learn about the nature of something by studying how it moves or acts. Just as you cannot present a theory about the movement of the heavenly bodies without looking at them and collecting the relevant data, so you cannot propose a theory of knowledge without adverting to the activity of understanding in its various moments. The data about knowing are an experience; we can shift our awareness from external objects to the activities of sensing and understanding. Aristotle used this way implicitly; it is hard to see how he could have been so accurate about images and forms, active and passive aspects of understanding, and the intellectual virtues unless he attended to the data of consciousness. Aquinas explicitly states that intelligence reveals its nature by way of its activity; from objects to acts, to potencies, to faculties, was his procedure. Lonergan has elevated intellectual self-appropriation into an explicit, systematic and basic method for the first time. Some philosophers start out by laying down the necessary a priori conditions for the possibility of human knowing; this presumes that human knowing is necessarily how it is. Lonergan begins from the [173] position that human knowing could have been different; contingently, this is how it is; you only know that by experience of the activity of knowing. Fact proves possibility: instead of torturing ourselves trying to work out the a priori conditions for the possibility of human knowing, why not look at the facts of what human knowing can do and then you know that it is possible.

A third characteristic of intellectualism is that it pivots between the concrete and the abstract. We study the concrete in order to grasp the abstract; the verification of abstract formulations can only be done by reference back to the concrete. But in many systems the abstract becomes a domain all on its own; the abstract loses contact with the concrete; it becomes static and sterile. It is the concrete which changes; the abstract is static. Cut off from the source of change the abstract can remain in the illusion that it has attained permanent perennial truth. But it is an illusion: the onward march of understanding demands a constant reference back to the concrete from the abstract and vice versa.

Finally, we can say that intellectualism recognizes that concepts are a means rather than an end. The end of intellectualism is a better understanding of our universe, its source and purpose, human life and destiny. To that end we will formulate concepts; the concepts will be applied, sometimes verified, sometimes found to be wanting. We understand the concrete by means of ideas and concepts. But sometimes the concepts become an end in themselves; instead of being a means by which we know reality they become the object of knowing; what we know are the concepts. Philosophy is then a

matter of the interrelation of concepts, their division and definition; it becomes removed from reality; it becomes more and more abstract, more and more unreal, and more and more useless.

3.2 Conceptualism

In contrast to intellectualism let us consider conceptualism. This can be an explicitly formulated doctrine or it can be simply a tendency as a matter of practice to emphasize the concept.

Conceptualism regards the concept as ultimate; it has no account of the origin of concepts in intelligence; the concept is the term or object of knowing. Scotus is an explicit conceptualist; he held that [174] the first act of the intellect is in knowing concepts and the second act of the mind, the judgment, is in knowing the nexus between concepts.[lix] But if judgment is affirming the relationship between concepts, then there is no need to refer back to the data to verify the judgments. This philosophy is explicitly concerned with the formulation of concepts and judging how concepts relate to one another. Here you have the basis for a philosophy of definitions and divisions, syllogisms and theses, propositions, premises and conclusions; a philosophy of words and how they are defined, in happy isolation from the real world.

In a conceptualist system, the concept is *that which* we know and not *that by which* we know. Explicitly we are cut off from the world of data, experience, the senses and change. If the concept is that which we know, how do we know the real world of concrete material things? There is no basis here for any empirical science or any inductive knowing. Usually conceptualists posit an intuition of the concrete to justify our knowledge of existence. There is no way of applying concepts; if they are what we know, how can we compare them to the real world to check if they are true?

In this kind of system concepts are derived by way of impoverishing abstraction. The concrete has been left behind, prescinded from, is unworthy of consideration. Because concepts are abstract they are immobile and permanent. Understanding formulates concepts in its purposive search for truth; concepts in themselves are mere suppositions of the mind; whether they are more than that is settled by way of judgment and verification. But in conceptualism there is no account of how concepts emerge from intelligence; it is an unconscious process like magic, not a rational process; concepts are the ultimate; there is no account of where they come from. The result is a static, sterile, system of the interrelation of concepts which enjoys the illusion of permanent truth because it is removed from any concrete data which would disprove its

premises and propositions.

This approach dominated the Scholasticism of the nineteenth and early twentieth century, explicitly and in principle, in the schools which followed the Scotist tradition; implicitly and in practice even in the Thomist tradition where the emphasis and [175] presentation of philosophy was in terms of definitions and divisions, theses and corollaries, logic and deduction.

But the deficiencies of conceptualism are by no means confined to Scholasticism. Any philosophy which has been turned into a kind of dogma, which is not open, which does not criticize its own presuppositions, tends in that direction. Reading some of the discussions of linguistic analysts one gets the impression of a group of people living in a world of their own. Certain dogmas have been presumed about the limits of knowing, about the importance of language and the uselessness of talking about truth, God, the meaning of human life, or anything of real importance. Philosophy then consists of playing games with words; it is very clever, very sophisticated, invokes complicated procedures of symbolic logic. But it is not in the real world. It is extrinsic to anything of importance. It does not learn about understanding by observing the activity of intelligence; it has already predetermined the limits and activity of understanding. It has nothing to say to or to learn from the empirical sciences. It is cut off from the concrete.

Any tradition can become conceptualist if it becomes a kind of dogma. Dogma formalizes the basic tenets of a philosophy. Certain principles are beyond questioning; to belong to this group is to accept these dogmas, presuppositions and principles. Philosophy becomes a matter of repeating the words and forgetting the meaning. Even a Lonergan philosophy could become a formalist, conceptualist system; if it were to be reduced to a list of basic propositions, if you have to accept these basic propositions in order to belong to the school. If a philosophy is simplified in such a way as to dogmatize the essential principles to be adhered to, then, it is on the way to conceptualism. Once a great and original thinker has passed away, lesser minds take over; what was open becomes closed. They simplify and formalize the system; it can be reduced to its essentials and these can be learned off and repeated; it can become a set of propositions rather than a guide to the activity of understanding.

In teaching any discipline, it is usually easier to present conclusions, systems and rules rather than the problems and concerns that gave rise historically to the discovery embodied in the [176] system or the rules. Calculus can be taught in terms of learning off by rote the rules of integration and differentiation rather than understanding

problem these are designed to solve. This encourages repetition and implementation, but it is unlikely that it will foster any originality or encourage new discoveries. An alternative approach is to learn about the process of discovery rather than the final results, to trace the discovery for oneself, to learn from history not particular answers to specific questions but general strategies for finding solutions to whole ranges of problems. Education can be, not in terms of learning off formulae and rules, but in terms of general heuristics, strategies for long-term discoveries and solutions; in other words, of understanding understanding. Conceptualism is a tendency to formalize, systematize, dogmatize; to substitute rules, systems, logic, techniques for the activity of understanding. Intellectualism focuses on the creativity of intelligence, the ultimate criterion of truth, the experience of the activity of understanding, the willingness to accept any valid technique or procedure if it promotes understanding.

4. Things and Properties

We have seen how developing understanding pivots between particular and universal, between concrete and abstract, between data and concept. Now we consider how developing insight pivots between things and properties, substances and accidents, terms and relations. The insight you get depends on the kind of question you ask. You can ask, What is the unity or identity of that thing? In which case you are seeking the name of the thing, its substance, what it is as a whole. But you can also ask, What are its properties? How does it relate to other things? We can focus on one aspect of the data and compare it with other data. The pivoting between these questions and answers illustrates again developing intelligence at work. It also throws some light on a problem at the heart of philosophy from the time of Aristotle to the present day.

4.1 Historical Background

In the *Categories*, Aristotle distinguished between substance and the nine other

categories. He knew that a substance was unique but [177] he had great difficulty defining it. He noticed that the other categories cannot exist without that of substance; the other nine categories are all accidents and can only exist by inhering in a substance. A substance does not have contraries; the contrary of white is black, the contrary of healthy is unhealthy but what is the contrary of horse? Substance does not allow of degrees; one horse may be bigger or faster than another but is not more of a horse than another. A substance can sustain contraries; the same person can be healthy today and unhealthy tomorrow, sitting at one moment and standing at another. Contraries exist in a substance as in a subject.

In the *Metaphysics*, he returns to the attempt to define substance and explores the possibility that substance is the matter, the universal, and finally the essence. He clearly rejects matter and the universal and seems to settle for essence (Book 7 chapter 17). He uses the example of the syllable. If you juxtapose two letters, then you have two letters side by side; you have two things which happen to be side by side. What do you have to add to these letters to make them into a single syllable? It cannot be another material element, because then you would have a third element alongside the others. It cannot be nothing because a syllable is clearly different from two juxtaposed letters. What is added is the essence, the unity, the intelligibility, the identity of the new whole. For Aristotle the substance is the answer to the question, What is it? It is the whatness, the unity that integrates the accidents together, the essence. The substance was not something apart from, or under, or over and above the accidents. The substance is grasped by understanding the unity that exists between the accidents.

In the Middle Ages, the Scholastics formalized the teaching of Aristotle on substances and accidents, but began to lay the emphasis on the substance as that which 'lies under' the accidents, as the Latin term suggests, *sub-stare*, to stand under. This began to be taken in a rather literal sense and the original meaning and insight was slowly lost. The problem began to arise, how do we know the substance if it lies under the accidents?

In this context the English empiricists began to question the reality of substance. If you cannot see it, how can it be real? You can see the accidents, but you cannot see what lies behind them. John [178] Locke defined substance as "the supposed but unknown support of those qualities we find existing, which we imagine cannot exist *sine re substante*, without something to support them".[lx] He dubbed the substance the occult substratum standing under or upholding the accidents. David Hume abandoned, not just this fanciful notion of substance, but all notion of a nature or unity underlying

sensible qualities. Descartes and the rationalists made their own contribution to the misunderstanding of substance. It is difficult to use the terminology of substance and accidents today without invoking one or other of these misunderstandings so Lonergan abandoned the terminology altogether substituting, thing and relation or central and conjugate form. Furthermore he used his unique strategy in approaching the definition of these terms.

4.2 Abstractive/Inclusive insights

Our approach is to identify the two different questions that are asked and the corresponding kinds of insights that arise. Most of our examples have been concerned with insights into properties. These have been what we might call abstractive insights; from the whole of the data we abstract a certain limited datum in which we are interested and ask about that; we prescind from the rest of the data and deliberately focus only on one aspect. We may focus on the movement, the color, the size, the chemical properties, its density, etc. If we are given an unknown substance in a chemistry lab and asked to identify it, then we enumerate its properties, how it reacts with other known substances; we test whether it is acid or alkaline, metal or non metal, crystalline or powder, soluble or insoluble, its taste, its color, etc. These are the properties; they will eventually lead to an identification of the whole but you have to start with the properties. Galileo was not interested in what the rolling balls were made of; he was only interested in time and distance; they could have been steel, or glass, or wood, or stone, it would have made no difference to him. He focused attention on what was important for his purposes and prescinded from the rest; time, velocity and distance were relevant to his purpose; what the balls were, or were made of, was irrelevant. [179]

The identity of a substance is grasped by a different kind of insight. It is an insight into the unity, identity, wholeness of the entirety of the data. Here all the data are relevant. You are asking a different kind of question, What is it? It is no use telling the chemistry professor that it is soluble, or that it is alkaline; he wants the identity of the substance not its individual properties. These properties belong to other substances also. The professor is looking for the identity of the whole. When you have a sufficient accumulation of properties you begin to suspect what it is, perform the decisive experiment and then conclude this is hydrochloric acid, or this is sulfur, or whatever. You have grasped an identity that grounds all the properties. All the properties are relevant; but the insight is not into the properties taken individually but taken as belonging to the one substance. Aristotle's example of the syllable was fairly accurate. This might be called an inclusive insight as it includes all the data as relevant to the

identity of the substance or thing. This is in contrast to an abstractive insight which deliberately prescinds from much of the data to focus only on that which is relevant to some particular property.

Insights into the unity, identity, whole, are verifiable. The Greeks were happy enough with the four elements as it satisfied the data available to them. But this was found to be totally inadequate at the time of the Scientific Revolution and the periodic table of the hundred or so elements was constructed. Sub-atomic elements were first identified as four but have now been expanded to over a hundred. Substances are not hidden occult entities. They are the verified elements, different from one another, permanent over time, the basic unities, identities, things of scientific thought.

Properties can be attributed to a substance. A substance is the unity of the attributes. Attribution is not just a logical trick but is fundamental to the way we learn, the way we ask questions and the structure of our thinking. The more we learn about the properties the nearer we become to identifying the whole; the more we understand the whole, the more we grasp the properties. This is the way science proceeds; this is the way the human mind operates. In the developing of our understanding of any area, there is this constant oscillation from properties to things, from things to properties. [180]

The idea of thing and property go very much together. Without both of these together, we could not understand change. Change happens when something remains the same and something changes. If everything is changing, then you do not have change, you have chaos or complete flux. Heraclitus was involved in a deep contradiction when he said, everything is in flux. If that is so, then not only can you not step into the same river twice, but you can't step into it even once, because it is not a thing but a flux. If there is not something permanent then science cannot pin down what is changing. In accidental change, the substance remains the same while the accidents change, as a man is young or old, sick or healthy, awake or asleep, but still the same man. In substantial change, such as wood to ashes, you have to appeal to the original elements out of which wood is made as the basis for continuity. Understanding change involves grasping permanence and variation, things and properties.

The process of knowing, whether it is in building the periodic table, or studying sub-atomic particles, or exploring distant space, pivots from identifying properties to attributing them to things; things are given a name, their properties are explored. The more the properties are verified, the more we know the thing. The more we know the

thing, the better we can predict further properties. This is a very fundamental aspect of how we think and learn and know. We can best deal with the old problem of substance and accidents by adverting to how the astronomer, the biologist, the atomic physicist, proceed. We can do the crucial experiment by adverting to the structure of our own thinking.

5. Higher Viewpoints

The process of human knowing is dynamic; the operating force behind this dynamism is questioning. We have outlined the heuristic structure from questions to correct answers. By this means we get an answer to one particular, limited, specific question, but automatically further questions arise. They might be questions seeking deeper understanding or they might be seeking more information about other topics. If they are aiming at a deeper understanding they are usually aimed at a higher viewpoint. Our [181] knowing is progressive and cumulative. Insights pass into the habitual texture of the mind but lay the basis for further insights at a higher level of generality.

A higher viewpoint presupposes a set of insights at a lower level of generality. We question, study and eventually correctly understand some particular matter or data; we move on to related matters; ideas accumulate, similarities are noted. Each individual insight unfolds according to the characteristics already identified. In its own way it is valid, answers the questions raised, passes into the habitual texture of the mind.

But at a certain point the further question will arise as to how this aggregate of insights relate together. Is there an organizing act of intelligence that can see how they fit together? At this stage the data for the further insight are precisely the set of earlier insights which have already occurred. What is sought is a principle of unification, which will establish what these insights have in common, and how they differ; what is sought is an insight into insight, or more precisely a higher viewpoint.

Finally, there is the emergence of the higher viewpoint. There is discovered a law, a principle, a new set of postulates, definitions and conclusions. The validity of the original individual insights remains intact; but they are swept up into a new unity, framework, or schema. The higher viewpoint is characterized by its generality, its simplicity, its greater exactitude and precision.

Let us look at a series of examples to see how this works. The transition from elementary arithmetic to algebra provides us with one example. The first painful steps in learning arithmetic are usually taken in counting. Each number has to be identified by its

symbol and the symbol has to be associated with a sensible experience of quantity. So children learn to count from one to ten, write down the numbers from one to ten and are able to count out ten oranges or ten pencils. Each number and each operation successfully mastered is an individual insight, a breakthrough, a little flash of light. As familiarity increases with repetition, the operations of addition and subtraction are added. Mostly this is done in the context of sensible objects like oranges, cookies or pencils. But the operations can be generalized by learning the addition tables [182] and learning the rules for subtraction. Multiplication and division are another breakthrough, another intellectual triumph, not totally unrelated to the previous operations but going beyond them by generalizing. Multiplication is simply the addition of a certain number to itself so many times.

A crisis point might occur about this point when numbers appear in the operations that cannot be verified in a sensible experience. If you subtract a larger number from a smaller one you get a negative number. How can you represent a negative number sensibly? If you divide certain numbers you get fractions; they do not go in evenly. How do you add, multiply and divide fractions? How do you cope with square roots of minus quantities? Etc. Are these operations valid if you cannot provide a corresponding sensible experience with oranges or cookies?

The trick is to break free from the constraints of sensible experience. Let numbers be defined as the results of operations that are performed according to rules. Then mathematics is free to develop in all sorts of operations with strange kinds of numbers. These operations are generalized in algebra whose symbols allow further operations to be conceived and executed. Algebra is a higher viewpoint from arithmetic because it generalized the operations that are performed on sensible quantities; it goes beyond the limits imposed by immediate sensible quantities. It is a set of insights that presupposes the validity of all the different insights of arithmetic but systematizes, relates and generalizes these operations in a particularly expeditious way.

Perhaps learning to read can be taken as another example. The first stage in this process is to learn the alphabet. Each letter is a challenge; grasping correctly the corresponding sound is an insight. Each letter is understood and learned individually; the letters are 'what' is understood. But letters by themselves are not much use. Now they have to be put together into simple words, cat, man, mouse, mat. The individual insights into the letters must now be presupposed; we are going beyond the letters to a new reality, the unity or form of the word. You cannot understand the word without the letters; but understanding the letters is not enough to understand the word. The

understanding of the unity of the word is a higher [183] viewpoint to the understanding of the letters. Similarly, sentences are wholes made out of individual words; the words are the individual insights which must be presupposed and transcended in order to grasp the meaning of the sentence. The sentence is another higher viewpoint. Helen Keller reports how a few months after her insight into 'water' she grasped her first sentence.

Physicists now talk about finding a 'theory of everything.' As I understand it, the physics of the microcosm, subatomic particles and forces, has developed in quite a different way from the physics of the macrocosm, the solar system, galaxies, black holes, etc. The theories, equations, principles of quantum physics works when applied to the microcosm but not to the macrocosm where quite different theories and equations are needed. Is there a unified theory - a simple set or principles, equations and techniques - which will apply equally validly to both? This is a search for a higher viewpoint: a unifying synthesis leaving previous partial theories intact but unifying them at a higher level of generality.

Perhaps another example can be seen in the relation between the empirical sciences and philosophy. Each of the individual sciences develops its own methods, theories, concepts and definitions. It progresses in understanding its own particular area of matter assigned to it. Each science has its domain, its territory, its limitations. But questions arise that go beyond the domain of the individual sciences; who laid down these domains? how are the sciences are related to one another? is there anything that they leave out? who criticizes and evaluates scientific method itself? is matter the ultimate reality of the universe?. There is a felt need for some higher principle of unification; an organization of the sciences, their methods, their conclusions; a total worldview which incorporates but goes beyond the individual sciences. Philosophy emerges as the needed higher viewpoint. It does not invalidate the conclusions of the sciences; but sweeps the multitude of conclusions into a higher unity and synthesis.

Finally, there are a multitude of philosophies. In history there have been a succession of philosophies which have contradicted one another, criticized one another, supplemented and complemented one another. These are all individual attempts to understand the [184] world, man, knowledge and truth. A question arises as to how all these attempts are to be related together? Is philosophy just going nowhere? Is it a waste of time? Or can all these efforts be used as the data for a new understanding of understanding, a philosophy of philosophies? Our effort to shift from the objects understood to the act of understanding itself is the basis for a new higher viewpoint in philosophy. If we can pin down an invariant structure of the knowing subject, then we

will have pinned down indirectly all that is to be known by the knowing subject. If we can understand what it is to understand, then we will indirectly be able to understand any philosophy, any science and any branch of human knowing. If we can also understand the process of misunderstanding, then we can also grasp the secret of decline, of error, of falsehood. If we can grasp the dynamics of understanding and misunderstanding we will have the key, the fixed base, the invariant pattern opening on all further acts of understanding.

Higher viewpoints are not just new theories, or paradigm shifts, or revolutions in thinking. They are a special kind of insight which presuppose an aggregate of individual insights but sweeps them up into a new unity conferring a new significance. They represent a new unity, a deeper synthesis, a higher integration. The advantage of the higher viewpoint is its generality, its simplicity, the speed with which it gets to the point. It is part of the normal process of developing intelligence.

6. Infinite Flexibility of Intelligence

Aristotle defined human intellect as '*potens omnia fieri et facere*;' the capacity to become and to make all things. This sounds strange to us but for him it meant the ability to make any form or definition and possess it in the mind; in that sense we become the things we know, we possess them, we are them. The crucial term is 'all things;' nothing is excluded; if it is intelligible it can be known. We would agree with this definition but express it in a different way: we can ask questions about anything and everything. There is nothing excluded in principle from the range of our questioning; we can question about quarks, about God, about other possible universes, about history, before the Big Bang, after the Final [185] Crunch; there is no end to our questions. Our desire to understand is unrestricted.

Our attainment reflects the limited capacity of our individual minds, the limited time we devote to study, the limits of data available, the horizon of our teachers or tradition. But we can name and intend to know everything. We can question beyond the tradition in which we were reared. We can go beyond the limits of our present language, to create new terminologies or learn foreign languages.

Contemporary philosophers often invoke the claim of incommensurability; that certain mentalities are totally incompatible and therefore mutually exclude one another, e.g. the mentality of the mythic culture is totally incommensurable with that of the theoretic or scientific culture. If this were so the two groups would not be able to

communicate with one another and would be living not only in two universes of discourse but in two totally different universes altogether. The claim is that there are no rational criteria by which we can compare myth and science; no rational criteria which they share in common and by which they can communicate with one another. Sometimes this is extended to cultures and language groups, each culture representing one legitimate lifestyle and there is no cross-cultural communication or judgments.

What we have said about developing intelligence belies such claims. It is possible to understand, compare, contrast and evaluate the supposedly incommensurable mentalities of myth, science, theory and interiority. How do we know it is possible? Because we do it; this text is identifying the similarities and dissimilarities between these mentalities. It is possible because the principles of human intelligence are the common factor underlying all cultures, all mentalities, all description and explanation, all theory and concepts, all languages. There is the one desire to know, the one desire to be intelligent, to understand, to move from images to ideas, from data to facts, from the concrete to the abstract. Myth is descriptive knowing; it is limited by the symbols, the predominance of imagination and feeling, the confusion preceding clear distinction and definition. As the Greeks have shown, it is possible to move [186] from myth to theory by way of critical questioning. It is also possible to move from the world of theory to the world of interiority, the task which we are addressing in this text.

Not only can we intend knowledge of the universe, but we can also intend knowledge of the self, knowledge of the spark of the divine in us, knowledge of our own intelligence. This does require the special technique of self-appropriation by which we become aware of the activities of intelligence and thereby the infinite flexibility of our desire to know.

In conclusion, we have been appropriating aspects of developing intelligence in its movement towards fuller understanding and formal expression. We have seen how it generalizes, abstracts, oscillates from things to properties, reaches higher viewpoints, is always creative and open to further developments. One could go on and on examining the development of understanding but never exhaust its flexibility, inventiveness, and originality. It is understanding which devises the concepts, the methods, the logics, the strategies appropriate in each field. It is practical intelligence that devises the instruments, the measurements, the technologies, the research programs that reveal further relevant data. It is impossible to impose rules on creative intelligence or think that it can be controlled by a static logic or a specific methodology. We have only considered a few examples to illustrate certain basic properties of intelligence. Aristotle used the four causes as the basis for his method. Descartes used synthesis and analysis,

the putting together and taking apart. Social scientists use structure and function, status and role, diacronic and syncronic. There is no end to the strategies of creative intelligence. The point here as elsewhere is to identify this source of creativity and discovery in yourself and let it be your guide and principle in whatever discipline you choose to specialize.

The process from insight to formulation is a step which tends to be overlooked. Yet its importance is stressed by the fact that it is this procession which is the precise analogy in the human mind of the divine procession of the Son from the Father. In the human mind this procession is not a single act, but a multitude of acts of understanding words, implications, applications, relations, things, a [187] process from confusion to clarity, from implicit to explicit. The processes we have examined in this chapter in abstraction, generalization, conceptualization seem to be types of the process from insight to formulation.

As we conclude the first part of our study on thinking, we have a better idea of what Kasparov was doing for those fifty-five minutes of physical immobility. The body was immobile but the mind was furiously active. Even though it was only a game we see how questioning, imagination, intelligence, hypotheses, relations, combinations, possibilities, whizzed through his mind. Without learning much about chess, we have learned much about your mind, its infinite potential and its actual limitations. We have seen and appropriated for ourselves how intellectual activities constitute a specific pattern of experience distinct from playing or art or getting things done. That underlying the infinite varieties of expression this pattern has a basic structure: questions applied to sensible experience result in the emergence of insights which are later formulated in a theory or concept. This process from individual insights to formulation includes a stream of further insights into the proper use of language, becoming explicit about what has been understood, clarifying the intension and extension of terms. We have concentrated on the activities of thinking; but thinking must eventually come to an end - even for Kasparov. We have been dealing with understanding leading to formulation; now we must move on to reasoning as it leads on to knowing.

Comments on Preliminary Exercises.

(1) This problem looks simple but can be deceptive. There are many ways of doing it. The danger is to add the two together and answer three hours. But a little reflection shows that the answer should be between an hour, and an hour and a half. But to get the exact time? In this case algebra does not help. What you need

is some equation (relation) with both of them working together. We have them separately, how do you add them together? In two hours John will cultivate one acre. In [188] two hours Michael will cultivate two thirds of an acre. Add them together and the rest is technique.

(2) Generalizing and induction is not a matter of counting, it is a matter of understanding. If it were a matter of counting, then, you would either have a complete or an incomplete enumeration. But if there is a complete enumeration, induction would not be necessary; if there were an incomplete enumeration, you would not be entitled to go beyond that. But generalizing is grasping the essential and leaving aside the non-essential. It is the biologist who is competent to decide whether 'whiteness' belongs to the definition of a swan. He will not be counting all swans but noting that the basic species with which we are familiar are normally white. But there are species of black swan. Each case will give you a different degree of certitude. Each case will demand a different amount of evidence to establish the degrees of probability of the generalization. It is enough to understand one human being correctly to grasp that all human beings are mortal; because it is an essential characteristic of man that he be mortal. It is insight not counting that justifies generalization.

(3) This is partly a matter of luck but also method is involved. Compose syllables, do they fit together? Experiment with likely beginnings and endings. Imagination and memory are involved in throwing up possible solutions.

(4) The logic of Zeno's argument is correct but it all hangs on the ambiguity of the meaning of 'space' and of 'something'.

Does space mean emptiness, a void, a receptacle as something existing apart from and independent of material things in it? Or does it mean the verified relations of distance and time between material bodies?

Does 'something' refer only to horses, stones, men, etc. or can quantities, qualities, relations, positions, be a 'something'?. Is a relation real? Is it a something or pertaining to a something? [189]

Aristotle answered Zeno by saying that space was not a substance but a relation between substances. Even Newton did not get the correct answer, so do not be discouraged.

(5) Most of us claim to know the difference between just and unjust. However, it is very difficult to define it. This is the process of formulation; from individual cases we formulate a rule or definition to cover all cases.

6

The Notion of Judgment

> **For the desire to understand, once understanding is reached, becomes the desire to understand correctly; in other words, the intention of intelligibility, once an intelligibility is reached, becomes the intention of the right intelligibility, of the true and, through truth, of reality.**[lxi]

Preliminary Exercises*.*

(1) Is it true that men are more intelligent than women? What information would you need to answer this question? What definitions would you need to be clear about to answer precisely? Does it matter for the answer whether you are a man or a woman?

(2) Is it true that bodies will continue at rest or in motion unless interfered with by other bodies? Can you prove it?

(3) Is it true that the ozone layer is being destroyed by hydrofluorocarbons? Do you know this or do you believe it?

(4) Which of the following lines is the longest?

[193]

(5) A relativist would say that we can pick our own truths; that there are no absolutes; that everything is relative, a matter of choice. Is this a coherent position?

1. Introduction

1. Outline. In part I we have been examining the activity of direct and inverse insights of various kinds. We have appealed to dramatic instances from history and hope that you were able to identify similar experiences in your own intellectual development. It is not too difficult to become aware of instances of direct understanding as insights can be quite exciting, inspiring, illuminating, even brilliant.

However, direct and inverse insights in themselves give only possibilities; the most brilliant of insights, of explanations, of hypotheses in itself may or may not be correct, may or may not be true. Direct insight grasps possibility; it is merely a bright idea. Whether it is anything more has to be settled by a further question and a further insight, a reflective insight leading to judgment. We passed over the question of verification and judgment in our earlier chapters not because it was not important but in the interest of doing one thing at a time. But direct insights can be so seductively attractive that we fail to consider the further insight needed for verification.

We will begin this second part of the text by establishing what we mean by judgment and reflective insight; this is an invitation to discover how we actually reach conclusions which we hold to be true. We will then summarize all that we have discovered about human knowing under the title of cognitional structure, and put our position systematically and succinctly. This is followed by a discussion of intellectual conversion where we consider the dialectic involved in the unfolding of the process of knowing. We will then tackle the critical problem, the so-called bridge between the subject and the real world. If you are involved in the exercises and doing the personal self-appropriation called for by this text you may have already some intimation of the startling strangeness of the [194] world of understanding and knowing; it is very different from what we expect and presume.

It would be difficult to over-emphasize the importance of judgment. It is pivotal in the transition from thinking to knowing, from fiction to fact, from bright ideas to verified ideas from the world of fantasy to the real world. It is also crucial for the transition from subjectivity to objectivity. It is not just important for a philosophy but for our life and

our culture. Just as modern philosophies are on the whole skeptical or neglectful of truth, so also our culture in the public sphere is skeptical and negative regarding the claims of truth. What is useful, what is successful, what gives pleasure, what will sell, are readily valued, all too often displacing what is true. One of our expectations of this text was that it would provide foundations. It is in this chapter that we begin to lay the foundations for knowing the difference between true and false, image and reality.

2. Thinking and Knowing. Direct and inverse insights are, loosely speaking, about thinking; but now we are moving on to a consideration of knowing. Knowing goes one step further than thinking. The additional step is the reflective understanding leading to the judgment. In this chapter we will consider the characteristics of a judgment and try to clear up the many misunderstandings and misconceptions that there are about judgments. The following chapter will consider the structure of reflective understanding which is the insight that leads in to the judgment. The grounds for the judgment or verification will be given in that chapter. Here we simply intend to get a clear grasp of the difference between direct insight leading to definition and reflective understanding leading to judgment. We find that the fundamental difference between definition and judgment parallels the difference between thinking and knowing. In judgment we are systematically introducing the idea of correct or incorrect, true or false, fact or fiction. Our approach is still self-appropriation. We now ask how do we make a true judgment; why do we make false ones? One could appeal to all sorts of theories about truth, but for the moment we want to see how the mind grasps the sufficiency of the evidence for a true judgment. [195]

We can distinguish different modes in the operation of our intelligence: an understanding mode and a reflective mode. In the first mode we are doing a kind of brainstorming: what we are looking for are possibilities, expanding the scope of our thinking and imagination, pushing back horizons, expanding our vision. We open ourselves to new ideas, deliberately relaxing our critical faculty, simply envisaging possibilities. This is a mode you might be in as you begin a paper, or a sermon or an article.

But sooner or later this mode has to give way to the critical reflective mode. This rich mass of new ideas, images and facts which you have collected needs to be evaluated. Some of these are not true, some are not relevant, some are offensive, others unsuitable. This is the reflective mode, a sorting out, bringing criticism into play. For the most part in Part I we have considered only the mode of direct understanding. Now we intend to appropriate the more critical mode of judgment and reflective understanding.

3. Appropriation. For a variety of reasons appropriating our judgments is quite difficult, much more difficult than becoming aware of our direct insights. Very often the reflective insight is compacted into the direct insight, coming so soon after the direct insight that it is very difficult to separate the two. We ourselves have been guilty of this compacting as we have up to now been pretending, for the sake of simplicity, that all insights are direct insights.

The reflective insight is not as exciting as a direct insight. It comes more quietly, peacefully, gradually. It is relatively easy to get into the brainstorming mode and to recognize what we are doing; it is more difficult to get into the critical mode and to become aware of what precisely is meant by reflection. Reflective understanding can be a long drawn out process and often it is difficult to pin down that crucial step from thinking into knowing.

Sometimes judgment is confused with logic. There are many systems of logic but most of them seem to be deductive, working from premises to conclusions; lists of rules have to be learned to distinguish techniques which are legitimate from those that are illegitimate. But the rules of logic are not the rules of thought. We [196] are concerned with the rules of thought; how do we, in fact, in everyday life, reach a conclusion which we hold to be true and are prepared to defend strenuously. We are not concerned for the moment with logic but with the processes by which people actually reach conclusions that they know to be true: what is rational process?

There are many senses to the little word "is". 'A unicorn is an animal with one horn' and 'the horse is in the garden' both use the copula. But one is expressing a definition, the other a judgment of fact. Sometimes the many uses of the one copula hide the fact that we are moving from possibility to actuality, from thinking to knowing; there may be no grammatical difference whatever between a proposition entertained as a possibility and the same proposition firmly maintained as true.

It is easy enough to make judgments. We are making them every day. They can be simple judgments, that the bus is late, it is raining, the computer is down, Fred is not in the office; or they can be more complicated like there is a mistake in this calculation, this witness is lying, the economy is getting out of recession, etc. What is difficult is not making judgments but objectifying the process of making judgments. There are very few epistemologies which differentiate between the understanding mode and the critical mode, between formulation and judgment. Few of them have adverted to the actual experience of making judgments. So often they have been uncritical theories about

what knowing should be, rather than an appropriation of what knowing actually is. Surely if we want to know about judgments we should start with the experience of making a judgment, start with the data and move on to the explanation. The key to our procedure is this appeal to your own experience, to identify and verify everything we say about judgment.

4. Historical Note. Aristotle spoke of judgment as a synthesis of terms. His approach in the Categories was very grammatical: a predicate is affirmed or denied of a subject. This was ambiguous as the judgment could still be on the level of definition or supposition. Most of his examples in the *Analytics* were simply suppositions: Socrates is sick, etc. This is a proposition; it can be assumed to be true, but it only becomes a judgment if it is affirmed to be true.

Aquinas spoke of judgment as *compositio* or *divisio*, namely, composing or dividing. He inherited the Aristotelian terminology. But it is quite clear that he has a good grasp of the difference between a proposition as a synthesis of terms and a judgment as positing or affirming of the truth of that synthesis. Just as Aquinas had identified the act of direct understanding in active intellect enlightening the phantasm so that the form is received immaterially in the possible intellect; so he grasped that reflective understanding evaluates the grounds for the judgment going back to the senses, the definition and first principles and so affirms or denies in the judgment. A judgment is not only a synthesis of terms but a personal affirmation of that synthesis as true. His analogy for the processions in the Trinity was based on a grasp of this rational procession from evidence to affirmation in a judgment.[lxii]

None of the three founders of modern philosophy were able to distinguish between statements considered as possibilities and judgments affirmed to be true. Descartes states explicitly, "..I judged that I could take it to be a general rule that the things we conceive very clearly and very distinctly are all true,.."[lxiii] He takes 'clear and distinct' as his criterion of what is true: whatever is clear and distinct is true, if it is confused and ambiguous it is not true. But this totally conflates two distinct activities of understanding and makes them one. In trying to solve mathematical puzzles you may get clear and distinct ideas but they are often totally wrong. The confused relative insights of description may or may not be correct. There is a further question after the direct insight. Descartes was so fascinated with the brilliance of clear and distinct ideas that he did not realize that a further question arises. No matter how fascinating an idea, to be affirmed as true requires another act of the mind.

Kant examines the logical structure of a judgment very closely. He distinguishes a priori and a posteriori judgments, analytic and synthetic judgments; in this he was examining the relation between the predicate and the subject. His epistemology was an attempt to justify the possibility of synthetic a priori judgments. But he misses the point that a proposition is one thing but a personal affirmation of the truth of the proposition is something further. He missed the distinction between the proposition as a synthesis of terms and [198] positing that synthesis as true. His work, *Critique of Judgment* was about aesthetic judgments of beauty.

Locke and Hume were also incapable of distinguishing between propositions as logical constructs and propositions as affirmed to be true. Their successors, the linguistic analysts systematically rule out of court any consideration of mental acts and so distinguishing possibilities from truths is eliminated. Truth is consigned to logic.

The three great traditions of modern philosophy totally missed the basis for any consideration of truth in the judgment and that is at least one reason for the failure of contemporary philosophies to deal adequately with the topic. Not having a sound foundation it is then difficult to defend against the relativists, skeptics and deconstructionists. The topic is almost an embarrassment. One of the great achievements of Lonergan is the retrieval and articulation of this distinction.

5. What judgment is NOT. The word 'judgment' is used in many contexts with various meanings. To prevent misunderstanding let us briefly indicate what we do not mean by judgment. 'Judgment' is not being used in the sense of a moral judgment. The word often has the sense of the Last Judgment, a moral judgment of guilty or not guilty, the judgment of history, etc. There are indeed value judgments but these are best dealt with in ethics and religious studies. We are using the word judgment in a morally neutral sense as an affirmation or denial, of what is simply true or false.

Nor are we using 'judgment' in the sense as a quality of a person. Sometimes we say that a person is a good judge of character; that he has good judgment in business matters; that a man of skill has good judgment born of long experience at his trade. We praise the judgment of a general who knows when to attack and when to retreat; of a football player who knows when to pass and when to go on his own; of a sculptor who is a good judge of perspective.

Judgments are not choices or decisions. We do make choices and decisions; usually we do so in terms of a scheme of values, what we consider to be important or desirable; that process is best studied and objectified in ethics or religious studies.

However, it is very common for people to think that we can decide what to hold to be [199] true at the level of judgments of fact, science and philosophy. Freedom of choice is a legitimate value but does it extend to choosing what we will consider to be true or false? Do we have that awesome power to make something to be true by our free choice? A philosophy department might offer a variety of philosophical positions to study; a supermarket offers a variety of brands of toothpaste; do we have the same kind of choice in the two cases?

By 'judgment' we do not mean aesthetic judgment. There is a field of aesthetics where judgments can be passed on paintings, poetry, literature, sculpture, etc. But we are dealing with the intellectual pattern of experience. There is an analogous truth in the field of aesthetics where you can refer to an authentic poem, a true picture, etc. To say that a poem is true, and a proposition is true, is to shift from the aesthetic pattern of experience to the intellectual. In philosophy we are in the intellectual pattern of experience where the criterion for truth is different from that of aesthetics.

2. Different Kind of Question

To identify the experience of making a judgment of truth, the first thing to note is that the question which leads to the judgment is different from the one that leads to a direct insight.[lxiv] When we were dealing with direct insights we considered all sorts of questions like what? why? where? who? how often? etc. All of these questions are seeking further information relevant to a direct understanding. But there is also a series of questions that arise which are different in intention and tone. These are questions like, Is it so? Is it correct? Is it true? Is it real? Does it exist? Is he really sick? Does he really have cancer? Did he really do that? etc.

What is to be noted about these questions is that they anticipate a different type of answer: a Yes or No answer. They are not looking for further information, or further understanding; they are looking for affirmation or denial. A question already specifies the kind of answer that will satisfy it; if I ask, 'what time is it?' and you answer 'Yes', you have not been of much help. If I ask, 'Is it really true?' and you answer, 'five o'clock,' then again something is wrong. So the first characteristic of a reflective understanding is that it is asking a [200] fundamentally different kind of question and sending the mind off on a different kind of search than the question for direct insight. It is extremely important to note this difference because it is the question that specifies what the relevant insight is going to be.

We distinguish, then, *questions for intelligence* and *questions for reflection*. Questions for intelligence are questions asking for further information, questions seeking a clearer understanding or distinction, questions that are looking for further content. The usual questions of where? when? why? how many? how often? what is the weight? what is the distance? what is the answer? what is the required correlation? what is the required word? what is the formula? what is the definition? are all questions for intelligence. They cannot be answered with a yes or no; they are looking for more data, more content, clarifications, further relevant information, further direct understanding.

Questions for reflection are questions that are not looking for further content but are seeking a simple yes or no answer, is it so? Questions for reflection are oriented towards an act of reflective understanding that will normally lead to the judgment, an affirmation or denial.

Every direct insight will normally be followed by a reflective insight leading to a judgment. A direct insight gives us a possibility, a correlation, a bright idea, a hypothesis or a possible explanation, but normally we are only interested in possibilities as a halfway house to verifications and truths. So if we give it a chance the question will arise, is the hypothesis true? Can the bright idea be also the correct idea? Can the correlation be verified in the data and in all the data? Can the hypothesis be confirmed and raised to the status of a verified explanation?

Concomitant with every direct insight there is a question that arises for reflection: is this correct? is it true? is it so? Our critical thinking in solving mathematical or word puzzles involves a constant shifting from insights into possibilities, to judgments as to whether they are correct or not. Most of the possibilities we reject as they do not solve the puzzle; until eventually we hit on the final possibility and find that this is correct. There is something very fundamental about this constant shifting from possibilities to [201] reflection; it is a kind of hypothetical-deductive method in the sense of constantly throwing up hypotheses only to sort them out and reject many of them because they do not satisfy the criteria set in the question. Plato likened thinking to a person having a conversation with himself. Thinking is a constant stream of ideas, images, examples, direct insights and inverse insights; the mind does engage in this forward movement towards a conclusion. There is a constant oscillation from the mode of seeking new possibilities to the critical mode of asking is this possibility the right one.

Direct insight must precede reflective insight. To ask is it so? presupposes that we have understood what 'it' stands for. If we are not clear, then we have to ask what do

you mean by so and so. If you are in an argument about whether men are more intelligent than women, at some point you will have to ask, what do you mean by intelligent. Psychologists define intelligence differently; some allow for culturally determined differences some don't; some define intelligence as purely theoretical, some as practical, some as intuitive; does intelligence increase with education? etc. Direct understanding presents content for the reflective insight. If the direct understanding is vague, confused or ambiguous, then the judgment will be similarly ambiguous. Many a philosophy discussion hinges on the phrase, 'Well, it depends on what you mean.' Further clarifications and definitions or divisions bring us back to the level of direct understanding, but again the question will arise, 'is it true?' and we are back to the critical level of judgment.

The answer to the question for reflection can be Yes or No or anything in between, such as, probably, possibly, very likely, etc. Or it can be of the kind, I do not know, I am not sure, I have not sufficient evidence for that, etc. There are very few judgments of which we can be absolutely, unequivocally and eternally certain. There is a wide range of probabilities from the highest probability, which we can consider as virtually certain, to the lowest range of bordering on the merely possible. But all of these are legitimate and coherent answers to the question for reflection.

Note that the question for reflection arises spontaneously, automatically, instinctively; it is hard to avoid it, difficult to stifle or ignore it. It is only in certain limited contexts that we can ignore [202] questions for reflection, such as when we are writing novels, composing poetry, creating a work of art, brainstorming, or playing games. But in scholarship, science, philosophy or any of the areas of knowing, it arises spontaneously and we normally are not satisfied until we reach what we consider to be true. Our questioning is purposive; we are seeking knowledge; there is a question of true and false, correct or incorrect; we want to find the true and correct solution. If we jump to conclusions on the basis of insufficient evidence, we realize that our colleagues will reveal the shortcomings of our research and show that we are wrong.

We can teach children the contents of correct judgments but we do not need to teach them the art of asking questions for reflection. There comes a time in the development of the mind of the child when he/she begins to evaluate the stories they are being told by adults. Fairy tales, Santa Claus, and stories about monsters that eat you are slowly examined and found wanting. There is no evidence for them; all the available evidence is against them. We give content to the judgments of the growing child, but the basic process of evaluation in terms of true and false is not learned but

emerges spontaneously. Even children can and do ask Plato's question, 'is it really real?'

3. Affirming or Denying

The essential characteristic of the judgment is this quality of affirmation or denial. There is a fundamental difference between considering a hypothesis as a possibility and uttering it as a personal conviction; this difference lies in the activity of understanding which produces now one, now the other. This happens within human minds; it is invisible. The data for the distinction are the data of consciousness not the data of sense. In this section we examine this experience of affirming or denying as products of the activity of intelligence.

A proposition is a statement or a definition. A proposition can be a mere object of thought or it can be the content of a judgment. The old Latin phrase put it *non asserendo sed recitando*, not affirming but reciting. You can teach the philosophy of Kant merely as an [203] object of thought. A teacher could go to great pains to explain clearly and accurately Kant's position. But it may not be the position of the teacher who will constantly remind the students that this is Kant's position, not my own. In that context, Kant's philosophy is simply an object of thought, a complicated system of terms and ideas; but it is not necessarily affirmed as a personal conviction. A Kantian, on the other hand, is not only teaching what Kant taught, but is also identifying himself with this position; to criticize Kant is to criticize him; for this teacher it is not only an object of thought but also of personal affirmation and conviction; it is true.

A proposition can be a mere supposition, a definition, an object of thought, a synthesis of concepts, a consideration, a hypothesis. Direct insight yields possibly relevant hypotheses which can be produced at will by the simple act of defining or supposing. Logicians often deal with propositions such as 'Socrates is sick', 'all Irishmen eat porridge', 'Louis the fourteenth is the king of France'. These are mere objects of thought. Sometimes for the purposes of the argument they are supposed to be true; meaning that if they are true, then these conclusions follow; if they are false, other conclusions follow. But in logic such propositions are not usually affirmed personally to be really true. Mere objects of thought can be neither true nor false; the categories do not apply. Ideas are products of direct understanding; they are suppositions, concepts, theories, explanations, propositions; they can be brilliant, new, inspiring, appropriate, complicated, or crude. But the question 'is it true?' only arises in the context of reflection.

So, as well as being an object of thought the proposition can be affirmed as true

or denied as false; it can be the content of a judgment. Then it has a completely different status. It has moved from thinking to knowing; it is subject to a new criterion. Mere thoughts cannot be either true or false, but judgments are affirming or denying and must be either true or false.

Another way of identifying the nature of the judgment is to note that judgment adds no new content to the hypothesis other than the simple yes or no; it simply removes the question mark from the interrogation. Is John really sick? becomes, John is really sick. There is a long process of reflection which makes this transition [204] possible. The judgment does not add any new content to the interrogation. It adds the yes or no of affirmation or denial. That is the proper content of the judgment. The material element of the proposition, the terms and what they refer to can be called the borrowed content of the judgment. But the judgment adds no new ideas, information, data, or definitions, other than the affirmation or denial.

The judgment adds only affirmation or denial. But that is no small thing. From being a mere object of thought a proposition becomes an affirmed content of our knowledge. We are no longer merely thinking or supposing, we are knowing what is and what is not. This is what divides fact from fiction, the real world from the world of fantasy, chemistry from alchemy, astronomy from astrology. This element is crucial. What could be more important than whether something is true or false?

A book is a whole series of words and sentences expressing propositions. One can read the book and understand the propositions without passing judgment on their truth or falsity. The ideas, suggestions, arguments, evidence, conclusions of the book can be entertained as simply interesting. It is a further step and a big one to take sides for or against the conclusions. Then we either agree or disagree. That is a judgment.

Judgments happen only in minds. Marks on paper can represent and express the judgments of individuals but the event, the happening is only in a mind. Judgments are invisible. We have access to these affirmations and denials because we can shift our awareness from the objects to the activities. Defining and judging are quite different activities. If you do not advert to the data of consciousness you will never be able to distinguish possibilities from affirmations.

4. Taking a Personal Stand

There is an element of personal responsibility that enters with the judgment,

which is not there when we are merely considering or supposing. As long as we are merely thinking of possibilities we are still sitting on the fence and can go either way. But once we have [205] made the judgment we have come down on one side or the other and are committed to the judgment. It is our judgments that make us what we are as reasonable human beings. The person is involved from the level of experiencing to the level of understanding to the level of reflective understanding issuing in judgment. A whole series of activities finally issue in the judgment.

Lonergan often quotes de la Rochefoucauld to the effect that, 'Everybody complains of his memory but no one of his judgment.' We feel that we are not responsible for our memory. Either we have a good memory or a bad memory; it is a God-given gift to his chosen ones. We are not embarrassed if we forget someone's name and we blame our memory as an excuse. But in some way we are responsible for our judgments. We take personal responsibility for the judgment because it is a commitment. We made the judgment on the basis of the evidence. We could have looked for more information, we could have asked for clearer definitions, we could have asked further relevant questions, we could have introduced appropriate qualifications and reservations. We apologize for our bad memories; we do not apologize for our judgments.

We cannot be excused for mistakes of judgment; we are held responsible. A meteorologist is expected to know his trade and his judgments are expected to be accurate within a given degree of probability. The judgment is a free act and if there is not sufficient evidence, we should reply, 'I do not know.' Besides the absolute affirmation or denial there is a range of possibility or probability in between. We are responsible for assessing the evidence and enunciating a judgment which correctly mirrors the weight of the evidence as probable, highly probable, or certain.

Strangely enough we cannot avoid making judgments; we have to take a stand. Paradoxically, even sitting on the fence involves taking a stand. Consider the philosopher who says, 'Judgments are not important, we can do without them,' but in the very act he is making a judgment. Or consider the skeptic who says, 'I know nothing,' yet he is positing a judgment. Or the relativist who claims that everything is relative, except this statement that everything is relative. There is an inescapability about judgments; we have to take a stand, even if our stand is to run away. [206]

5. Completes the process of Knowing

When you posit an affirmation, the entire series of activities involved in the

knowing process come to a term. When you have solved and checked a mathematical or a chess puzzle you know that your solution is correct and you simply move on to other matters. The problem no longer holds your interest, you have exhausted it, it is no longer challenging, it is in fact boring. All the activities of questioning, searching for images, looking, drawing, considering, remembering, defining, exploring, testing, checking, reviewing, reflecting, come to a full stop when we posit the judgment. The judgment sweeps everything into one affirmation or negation. A unit of knowledge is added to our habitual store and we move on to other matters.

We are at a stage now when we can clearly distinguish *three levels of cognitional process*. It will help to define the judgment if we give a summary of these three levels here; the levels will be defined in greater detail in the chapter on Cognitional Structure where a helpful diagram is also presented.

Our concentration at the beginning of this text was upon direct understanding. This level of cognitional operations is characterized by the activities of defining, distinguishing, considering, forming hypotheses, classifying, identifying, explaining, relating, correlating, counting, measuring, calculating, supposing, conceiving, etc. We identified the characteristics of this level in chapter two. Understanding gives us a possibly relevant hypothesis, a bright idea, a set of concepts or definitions, which may or may not be correct. This we will refer to as the *second level* of cognitional operations.

But understanding presupposes something that is to be understood. It presumes a level of presentations, of data, of the given. It presupposes the level of experience where data are given but are not yet understood. There has to be a content to the act of understanding; we have to understand something. What is the something, where does it come from? Examine your own activity of knowing and you will find that the matter, the content comes from [207] the senses, from memory or from imagination. This we will call the *first level* of experience.

But understanding gives only possibilities; it is only thinking, and a further question arises as to whether this thinking is correct or not. So we move into the reflective mode when we are weighing the evidence, checking the results, studying the link between the conclusion and the premises, examining the reasoning, etc. This is the level of reflective understanding that issues in the judgment. When the judgment is made the whole process comes to a halt; it has reached a term; there is a closure. This we refer to as the *third level* of cognitional process. It presupposes the other two and would be impossible without them, but does go beyond them to add its particular

singular contribution to the process of knowing.

6. Contextual Aspect of Judgment

Judgments occur in developing minds and within a context of many other judgments on which they depend in various ways. A judgment can rarely stand in glorious isolation. We have already identified the context of description and explanation: judgments of description will presume the knower as the center of reference and all descriptive judgments will be coherent with that assumption. Explanation will assume the context of relating things to one another. If you do not distinguish the two contexts endless confusion can follow. Higher viewpoints will depend on a previous context of lower judgments. Preliminary confused judgments will lead gradually to further clarifications in more refined judgments.

Our own individual judgments today depend on our previous judgments and on the whole context of questions, insights, formulations, etc. that is our intellectual history. The expert in any subject is the one who has set up such a context of judgments and experience that he can deal expeditiously and immediately with any new problem or question within his field. Habits of inquiry and research are built up over years and the competent person immediately knows how to cope. Alternatively if we have not built up the context of the expert or if we have not developed the habits of the intellectual pattern of experience, we will suffer for it now as we [208] struggle to exclude extraneous interference and clarify what remains confused in our mind.

The content of our present judgments may be in conflict. There may be an apparent conflict between judgments of common sense and those of explanation. There may be ambiguity in the use of terms. It is the task of logic to establish the coherence or incoherence of different judgments within the one system. If logic cannot reconcile our various judgments then we must suspect that some one or other of them is wrong and we have to sort them out.

Our judgments also look to the future. We realize how little we understand and how much remains to be done. Our knowing is dynamic: a restless devotion to the task of adding increments to a merely habitual knowledge.

7. Belief and Tradition

1. The Notion of Belief.[lxv] If you examine the convictions that you hold to be true and the reasons for holding them to be true, you will probably find that most of your

judgments are not immanently generated but are some kind of belief. What we have been talking about so far is immanently generated knowledge, knowledge that we personally have acquired: we have experienced and understood the grounds for these judgments. But if we examine most of what we judge to be true in history, geography, politics or economics, even the empirical sciences, we find that we have not personally experienced the grounds of our judgments and we accept them as true on the authority of a teacher, author, publisher, photographer, editor, reporter, and so on.

It is common to contrast Science with Belief, on the assumption that all science is immanently generated knowledge and that belief is on the borderline of superstition. But if you have learned any empirical science you notice see that most of the time you take the author's or professor's word for what he says. You do crucial experiments, but you do not find it necessary to repeat every experiment and calculation. Belief as we are using the term is as much part of the collaboration of the scientific enterprise as of any other discipline. [209]

We understand belief as accepting something as true, not on the basis of personally experienced evidence but on the ground of a trustworthy source. The source can be an individual, a friend, an announcer, a scientist, a professor; or it can be a medium, a radio channel, a periodical, a historical document, a newspaper; or it could be a community, a tradition or culture.

The ground for belief is the communicability of truth. When we reach a judgment we find that the conditions for the truth of the judgment do not depend on us. The judgment is true independently of us. Truth, then, can be communicated without necessarily communicating the immanent reasons for the truth; it can be accepted as true on the basis of our own grasp of the conditions for its truth and also on trust that someone else has grasped these conditions and is honestly communicating his results to us.

2. What belief is NOT. We are NOT using the term belief as equivalent to opinion. Translations of Plato usually use opinion and belief as the two forms of sense knowledge that Plato held not to be true knowledge at all. 'Belief' is used in a similar kind of way in the contemporary analytic school. We are using the word as a technical term, which is generally in line with common usage but which differs from many philosophical schools.

We are NOT using it in a religious sense. The word is, perhaps, most commonly invoked in theology and religious belief, but our usage of it is purely neutral and secular

and has as much to do with empirical science as with theology. Belief is part of the human collaboration in the enterprise of knowing in all fields, because of specialization and the simple fact that we cannot repeat all the experiments and research that has produced the results which we take for granted in order to move ahead.

We are NOT using the word belief in any vague, loose, commonsense meaning. In ordinary usage we often say 'I believe that is true', but we do not always have the distinction that we are making here in mind. Here we are giving that word a technical meaning and will try to use it always in conformity with that definition. There is after all a big difference between the person who has done the research and knows for himself, and the person who listens to him lecturing and accepts what he reports as true. If we are [210] serious about analyzing our judgments then we have to be clear on this distinction and we have to introduce a critique of beliefs as a parallel track to our critique of mistaken judgments.

3. Importance of Belief. To accept belief as a legitimate activity in furthering knowledge rests on a judgment of value. What dangers are we leaving ourselves open to and what are the values of accepting belief as a reasonable part of human progress? When we examine the state of current knowledge in the sciences and other areas we find that there is such an accumulation of information, research results, books, documents, tables, traditions, that if we were to start at the beginning to repeat all the experiments and observations for ourselves then we would never reach even the state of knowledge of the nineteenth century. Not only that but in any branch of science where we wish to specialize, we still find that we are dependent on the results and methods and instruments that pertain to other sciences. Are we to check them all out before we proceed?

We are really faced with a choice between primitive ignorance and accepting belief as a legitimate process that enormously facilitates learning. Belief is a kind of short cut to the end. Instead of doing the complicated calculations and experiments that may involve expensive materials, we accept the results as true on the basis of the reports. Someone should check out the results and repeat the calculations, but it is not necessary that everyone repeat the process.

Not only are we dependent on the veracity of teachers and authors but we also take it for granted that the instruments that we are using have been made to correct specifications. We use slide rules, barometers, thermometers, tables of logarithms, computer programs, calibrated scales and measures of various kinds. We do not know that they are all made to specifications unless we check for ourselves. We believe that

they are correct and only when things go wrong do we begin to suspect that maybe they are not up to snuff.

Our knowledge of the past is gained through the study of history, and our own immanently generated knowledge is limited to our short life span. But history is mostly belief, not knowledge. We are trusting a whole series of human sources that have communicated [211] what really happened. We have the reports of eyewitnesses, the documents of state, the files of government offices, the annals of armies, the diaries of individuals, and the putting together of all these by a series of historians down the ages.

Our immanently generated knowledge of geography is limited to what we have seen and heard; usually very little depending on our propensity to travel. We depend on those who have seen, those who have reported the conditions, those who have drawn the maps, measured the temperature and rainfall, photographed, examined the flora and fauna, and published this in an orderly and honest fashion.

Our conclusion must surely be that primitive ignorance is to be avoided and that our participation in the development of human understanding is much facilitated by reasonable belief. As we have explained, it is usually quite reasonable to accept as true what we find in chemistry, geography and history textbooks, not that this will be a totally blind acceptance. In normal circumstances where appropriate checks and balances are in force, it will be reasonable to believe and a bit paranoid to try to check everything for yourself.

Belief can be quite certain. We do not distinguish judgments and belief on the basis that judgments are certain and beliefs are slightly dubious. We distinguish them on the basis of how we come to grasp the true as true. In the case of judgments we rely on our grasp of the sufficiency of the evidence for the conclusion; in beliefs we rely on the trustworthiness of the source to communicate truthfully. But immanently generated knowledge as in the empirical sciences may only reach a degree of probability, whereas a belief can be quite certain. We can be quite certain that Ireland is an island. Few people have actually personally traveled the coastline of Ireland to see for themselves but yet the accumulation of witnesses attesting to the fact and reporting on their limited experience is sufficient to accept the belief as certain. The scientist is giving the best available opinion of his time; his conclusions are probable rather than certain, as we explained earlier.

4. Critique of Beliefs. Just as there can be mistaken judgments so also there can be

mistaken beliefs. Beliefs are particularly prone to wander from the truth because the evidence is detached from the conclusion. To set up a critique of mistaken traditions we have to examine the source, the communication and the message. We will give some brief indications as to what to look out for in these different areas.

Source. You have to ask how trustworthy is the source, how honest is the individual, would it be in his interest to lie or to slant the truth. You look for evidence of bias, prejudice, self-interest, self-glorification, etc. One suspects anyone who has much to gain by propagating some information. You look for a neutral source, a non-involved observer, someone who has nothing to gain for himself. You look for competence, for someone who is in a position to know: you go to a doctor for information on medicines and a meteorologist for information on the weather and not vice versa.

Communication. There can be quite a gap from the source to the believer. There can be translation involved from one language to another and that always involves an interpretation. There is the interpretation of the text and of its importance and of its message. There are publishers, editors, commentators, copiers, reporters, etc. Generally speaking, the farther we are removed from the source, the more reason we have to be careful. Historical studies of the Scriptures have revealed the work of editors, composers, additions, and subtractions, changes of various kinds. Successive translations can wander slowly from the original intention.

The message itself. Is it credible in itself? Does it fit in with the context of what we already know? Is it reasonable in itself? A legend reports how a monk interrupted Thomas Aquinas at his studies to report, "Look," said the monk, "There is a cow flying." Aquinas lumbered over to the window to see this great sight, whereupon the monk laughed as he was only joking. Aquinas rejoined, "I prefer to believe that cows could fly, than that a monk could tell a lie." By our education we build up a context of what is possible, what is probable, what fits in what does not fit in. We develop a sense of what is credible. If we are doubtful we check for ourselves and do the crucial experiment. Alien abductions we judge to be incredible; life on other planets we judge to be possible; black holes are now asserted to probably exist; it is certain that there are millions of galaxies besides ours. [213]

There are so many different circumstances that the only general rule is to be ever intelligent and reasonable. Don't be gullible. Don't be too credible. On the other hand it is reasonable to believe and we would be unreasonable to want to see all the evidence for ourselves. Much of what we have to say about judgments and reasonableness in the next chapter can also be applied to beliefs.

5. Belief is assent. Belief requires a value judgment about the value of believing in general, and also a value judgment that this particular person is worth believing in this specific instance. Belief involves an assent, a decision, a willingness to collaborate in the process of human knowing and a willingness to accept this person's word for this truth. Belief differs from judgment in motive and origin. Judgment is motivated by the strength of the evidence; but belief is motivated by the desire to collaborate reasonably in the search for knowledge. The origin of a judgment is rational necessity; the origin of a belief is a free and responsible decision to believe.

In conclusion, the notion of judgment raises the critical question of whether we can know the truth or not. How do we move from thinking to knowing, from possibilities to truth. Here we have simply identified the activity of judging as the answer to the question for reflection, as affirming or denying, as adding no new content, as knowing coming to a term. Our next chapter deals with reflective insight which is the intervening act between the question and the judgment.

Comments on Exercises.

(1) This is just to illustrate that judgment depends on definitions, in this case the definition of intelligence. In some cultural systems boys will get a better education than girls. Does this mean that they are more intelligent? Also that bias will often enter into this area of research and judgment. Why is so-and-so a feminist? Because she is a woman!

(2) The logical positivists sometimes have difficulty with this. How do you prove it? How do you set up an experiment where there is a body that is NOT interfered with by other bodies and then see what happens? It is simply not possible. Our approach would be that the principle is verified indirectly countless numbers of times in every experiment concerning movement and gravity. The alternative hypothesis that bodies in motion will come to a stop when they are not longer being pushed can easily be disproved. It is an inverse insight.

(3) Most of us do not know the answer to this and have to believe those who purport to know. There are vested interests at stake and it is legitimate to ask who sponsored these studies and who carried them out. For most of us it is a question of belief, not of immanently generated knowledge.

(4) Drawings can produce the appearance that one line is longer than another. You can verify that they are the same size by using a ruler.

(5) The relativist says we cannot make true judgments, but what is the status of his own judgments? This raises the question of coherence between saying and doing discussed in the chapter on intellectual conversion.

7

Reflective Understanding

The needed higher viewpoint is the discovery, the logical expansion and the recognition of the principle that intelligence contains its own immanent norms and that these norms are equipped with sanctions which man does not have to invent or impose.[lxvi]

Preliminary Exercises.

(1) If the letters A and B represent any propositions, does the conclusion follow from the two premises?

If A, then B. But A. Therefore B.

If A, then B. But B. Therefore A.

Think of concrete examples.

(2) A sick person goes to Doctor A and is not cured. He goes to Doctor B and is cured. Is Doctor B a better doctor than Doctor A?

(3) If you have sufficient evidence for a conclusion is it reasonable not to affirm that conclusion? [216]

Is there any case when you can affirm a judgment without sufficient evidence?

(4) If pairs of black socks and pairs of white socks are mixed in the ratio of three to four, how many single socks do I have to draw blindfolded to guarantee getting a matching pair?

(5) The letters represent the numerals from zero to nine. Find the numerical values of the letters in this addition sum:

H O C U S
+ P O C U S
P R E S T O

1. Introduction

We have explained what is meant by a judgment; now we wish to outline the structure of the reflective insight on which the judgment depends, and from which it proceeds. We are in a sense going backwards to the insight which produces the judgment. We do it this way for pedagogical reasons. It is relatively to identify what is meant by a judgment, but it is more difficult to identify the reflective understanding on which it depends. That is our task in this chapter.

At the level of direct understanding we recognized the question for intelligence, leading to the direct insight, leading to the formulation. We note an analogous progression at the level of judgment where questions for reflection, lead to reflective insights which issue in the judgment. It will be helpful to keep these parallels in mind as we strive to identify the reflective insight in our own cognitional experience. We have already compared questions for intelligence asking for further understanding and questions for reflection asking for a yes or no answer. We have also compared the conception or hypothesis, the term at the level of understanding, to the judgment which is the term at the level of judgment. Now we will concentrate on the comparison between the direct insight and the reflective insight.

What are the grounds for uttering a judgment? It is easy to affirm conclusions, to have strong opinions about anything and everything, [217] but what is the foundation for these positions? There is a common assumption of our contemporary culture that judgments are the result of arbitrary choice. There is often an assumption that we can choose our moral values or life style; that we choose our opinions about religion or science; that we choose our cultural beliefs and values. Serious arguments will break down when one party simply asserts, 'well, that is my culture,' or 'if that makes you happy so be it.' If arbitrary choice is the basis for judgment, then there is little point in arguing. Arguing presumes there is a rational basis for conclusions. If that

is the case then, what is true for me must be true for you. But if arbitrary choice is operating there is no basis for excluding one of contradictory alternatives; different views might indeed be incommensurable, having no common origin and no common basis for discussion. The challenge of this chapter is to uncover this rational process as it actually operates and to show that choice is not the basis for judgments of truth.

In studying direct insight we noted that the actual moment of illumination is followed later by the expression of the insight in terms of a definition or a formulation. First the idea is grasped; then concepts are formulated, made explicit, put into words, expressed in a definition, written down and explained to others. Similarly at the level of judgment, you have first the grasp of the connection between evidence and conclusion and then that is expressed in a judgment. There is a parallel between the process from direct insight to formulation and the process from reflective insight to judgment. Both are discursive processes moving from a question through a series of individual activities, eventually reaching an answer.

There is a rational process which produces judgments. We noted already the heuristic structure by which the mind proceeds from the question to the answer, from the known/unknown to the known, from a puzzle to a solution. We noted this in the production of ideas from images and concepts from ideas. The same heuristic is operating here as we move from the reflective insight to the judgment. We know that if we have no evidence for something we are merely guessing. We know that if we have sufficient evidence for a judgment it is silly not to make the judgment. In between silliness and guessing we have the process of weighing the evidence [218] for the making of a reasonable judgment. But weighing the evidence is a metaphor borrowed from physical procedures of using scales and measuring weights. We need to go somewhat beyond vague metaphors to identify precisely and in explanatory terms what the structure of the reflective insight is that grounds the judgment.

Spontaneously we ask the question, is it true? and proceeds to assemble the evidence or counter-evidence for a judgment. Young children tend to believe anything; but then slowly, inexorably, inevitably, the question emerges in their minds, is it true? Tell a good fishy story in a pub; very entertaining but nobody believes it is true. Spontaneously we sort out what is reasonable from what is unreasonable. There is something about this activity that we cannot be taught, if it is not there already. Our aim here is to identify this spontaneous critical questioning, and then to objectivize, to pin down and say precisely what is the process by which we move towards satisfactory answers.

In the general case, reflective understanding is a review, a looking back at the processes involved in direct insight to check whether proper procedures have been followed, whether anything has been left out; it is a kind of critical checking as to whether a conclusion is warranted; it is a reflection on the sufficiency of the evidence for the conclusion. It is checking whether the question has been answered and whether the criteria set in the question have been satisfactorily met. The reflective insight is a single insight which gathers together a multiplicity of data, insights, propositions, hypotheses and grasps the rational necessity of positing a judgment.

If you go back over any of the exercises given in previous chapters, you should be able to identify this process of checking which takes place spontaneously yet is difficult to identify and isolate. Not any old answer will do. We automatically discard answers which do not satisfy the demands of the question. We want to be right. But how do we know that we are right? Review the conditions set by the question and ask, are they fulfilled in your answer? Is there any other answer that would satisfy? Has any data or condition been forgotten? Were the calculations correct? Mathematicians are taught to check their answers by working backwards through their calculations to the problem posed. In [219] earlier chapters we concentrated on identifying direct insights; now we can use the same examples to identify reflective insight issuing in a judgment.

There is an imperative which is immanent and operative in this procedure. There are norms which are operating and they do not come from outside, they are not imposed on us, they are already there. You should not affirm something for which there is insufficient evidence; you should not withhold judgment when there is sufficient evidence. That is not just a logical rule; it is more than that. The desire to understand is purposive; once understanding is reached, we spontaneously ask if it is the correct understanding, if it is true. This imperative constitutes and obligation which we will examine in detail.

We will start with a description of the process of reflective understanding; then we outline the general schema of terms and relations which will help us later when applied to particular examples. Finally we will consider the criteria by which we know that we have reached a correct judgment and illuminate our treatment by a contrast with other theories of judgment.

2. Description of Reflective Insight

1. Five Characteristics. Because it is an act of understanding, the process of reflective insight will include all the five characteristics of direct insight which we have already identified in chapter two. Reflective insight is intelligence at work; it is grasping a relationship, a unity, a connection. The scope and depth of our reflective insights will depend on the tension of inquiry. Do we ask the relevant questions? Are we serious enough to do the research? Are we concentrating on the problem? The insight will come suddenly and unexpectedly while we are to some extent passive; it may not be as dramatic as the direct insight. It will pivot between the abstract and the concrete; we verify our judgments by reference to the concrete; theory is verified in instances. Reflective insight is a function of the inner conditions of inquiry, education, intellectual habits, context, and formulation of the problem, rather than outer circumstances such as what kind of typewriter you are using, or the [220] state of the weather. It passes into the habitual texture of the mind; our judgments put together who we are, what we stand for, and set the context for further questions and answers.

The reflective insight is, however, more complicated than the direct insight. Direct insights are included in a reflective insight as part of the content. Reflective insight reviews the whole ensemble of data, images, ideas, concepts, propositions, connections, and relations to pass judgment on the whole intellectual process. Reflective insight gathers into a unity a vast

multiplicity of factors. But it does focus on one aspect, namely the sufficiency of the evidence for the utterance of a correct judgment. It is because so many factors are involved that it is difficult to identify and appropriate the procedure of reflective understanding. We tend not to see the wood for the trees; there are so many factors involved in the evidence or argument that we fail to see the unity grasped by reflective understanding.

2. Critical Question. It is the question which sets the criterion which the correct answer must satisfy. We have distinguished between questions for intelligence and questions for reflection. Typical questions for reflection are, is it true? is it correct? is it really so? does it really exist? is John really sick? The critical question is searching for the truth; truth is what is found when questions for reflection are answered correctly.

3. Unity in Multiplicity. Etymologically, the phrase 'to reflect' means 'to turn back upon.' We use the term 'reflective' in the sense of looking back over, reviewing, checking back, overviewing a whole process. This is what reflective insight does. We have a bright idea, or a possible hypothesis, a complicated theory. But is it true? With this critical question the person begins to review all the evidence from the very beginning; to line up the arguments; to check on the data; to look for counterexamples, loopholes, mistakes, confusions. If he is satisfied, he has grasped the sufficiency of the evidence and prepares for the expression of the judgment.

Reflection as it is used here is does not mean a comparison between what is in the mind and what is outside the mind to check whether they correspond. Sometimes the question of truth is posed in this imaginative form. We are incarnate subjects and are quite incapable [221] of getting outside our minds in such a way that we could be able to compare ideas in the mind to those outside. For us reflection means reviewing the process of knowing from the sense data, to the understanding to the judgment; all these activities are conscious, and so we can notice whether anything has been left out, whether proper procedures were followed, etc. In this sense we do look back upon the activities of knowing.

The assembling of the evidence can be a very complicated affair. Galileo was convinced that the heliocentric theory of Copernicus was correct and that the geocentric theory of Ptolemy and Aristotle was wrong. But where was the evidence to prove it? On either hypothesis mathematical calculations from the movements of the planets were highly complicated. The fact that the moon had mountains, the sun had spots, that Jupiter had moons, tell against Aristotle's astronomy but not necessarily against his geocentrism. Galileo presented the phenomenon of the tides as his clinching proof that the earth was moving; the tides were supposed to be the sloshing around of the waters of the oceans because of the movement of the earth. In fact this is not the correct explanation for the tides. Galileo had much circumstantial evidence but he was in fact jumping the gun, as there was no convincing argument at that time for heliocentrism. So it took millennia to assemble all the relevant data on the movements of the planets, and to sort out the arguments for the correct judgment between a heliocentric and a geocentric astronomy. The judgment itself is a simple yes or no; but the evidence can be voluminous and highly complicated.

The unity which is grasped in this multiplicity is how these data, calculations, observations constitute evidence for the conclusion. Reflective understanding focuses on the relation between the evidence and the conclusion. No matter how complicated the evidence or the arguments, the only interest of reflective understanding is the connection between, on the one hand the data, the arguments, the evidence and, on the other hand, the conclusion. That is the unity expressed simply by the yes or no of the judgment.

The connection between the evidence and the conclusion may not be certain or necessary. It will often be given in the form of probabilities; there are various degrees of probability from highly [222] probable to barely possible. Reflective insight preserves the correct proportion between the evidence and the conclusion. If it is a theorem from Euclid, then, if you grant the principles then the theorem follows certainly and necessarily and must be posited as such. If it is a law of classical science that has been verified over and over again, then it must be posited as so highly probable as to be almost certain. If it is a statement of average life expectancy based on data of a census which has been carried out carefully, then the conclusion can be affirmed even though it is only expressing a probability. If there is not sufficient evidence to reach a conclusion, reflective insight can only issue in an 'I do not yet know' answer.

4. Intelligence is the criterion. There are many extraneous influences which push towards either an affirmation or a denial. Temperament and feelings as well as prejudice and self-interest may push us very strongly in one direction or another. The affirmations of persons who are temperamentally prone to jump to conclusions may often be correctly called rash judgments. Other persons are careful, do not want to commit themselves, are afraid of making a mistake; these hesitate to pass a judgment even though the evidence is overwhelming and thus are called indecisive or timid. The criterion that should be operative in the passing of a judgment is the reflective grasp of the connection between the evidence and the conclusion, and extraneous interference should be put aside. That connection is grasped by intelligence, not by imagination, not by feeling, not by desire, not by sense.

5. The Critical Mode. The question for reflection, is it so? puts us in the critical mode, as opposed to the brainstorming mode. In that mode we are verifying our conclusions by working backwards through our calculations, reasoning, arguments to the data on which they are based. Everything is criticized and evaluated. Were the samples pure? Is the calculator working properly? Were the interviews carried out by competent persons? Is there a possibility of crosschecking? Are there counter-examples? Are there exceptions? These are not necessarily questions for reflection but they are motivated by the question for reflection and are ultimately in view of the yes of no of the final judgment. In the normal process of thinking out a solution we move very quickly from suggesting possibilities, [223] to evaluating and rejecting them, to looking for further possibilities. We move from direct insights to reflective insights and back again; that is the nature of discursive movement towards a correct solution.

3. General Form of Reflective Insight

1. Definition. Having described above some of the qualities of reflective understanding, we can now define it as the act of understanding which grasps the sufficiency of the evidence for a prospective judgment. It is an intellectual grasp or insight; its precise focus is the sufficiency of the evidence for the judgment; the judgment is only prospective because it can be expressed as a judgment only after the reflective grasp of the sufficiency of the evidence.

The question now is whether there is a general form of the reflective insight. Is the same kind of reflective insight present in common sense examples, in the natural sciences, in statistical method, in philosophy, in mathematics? If it is the same in all these different cases then what is its general form? Can we outline a general case and then apply that to all the particular examples? Is there a universal form or structure to the reflective insight as such?

It seems that there is. The hint for Lonergan seems to have been the discovery that all the figures and modes of the syllogism can be expressed in the form of the hypothetical syllogism.[67] From there it is not hard to include other kinds of argument such as induction, concrete judgments of fact, mathematics, and all other branches of knowledge. To elaborate on this we will start with a general schema of terms and relations and later apply it to particular examples.

2. Terms and Relations. Any prospective judgment is a conditioned.[68] It need not necessarily be true. But if the conditions are fulfilled, then it will be true. It is a contingent truth. A conditioned judgment, then, is a prospective judgment which depends on certain other conditions in order to be true.

The 'virtually unconditioned' is a conditioned in which the conditions have, in fact, been fulfilled. We use the term 'virtually unconditioned' to distinguish it from 'formally unconditioned'; the [224] formally unconditioned has no conditions whatsoever, so it is foolish to ask if they are fulfilled. Necessary being (which we usually call God) is the only instance of a formally unconditioned judgment. No other judgment is entirely without conditions; all other judgments are true only if certain conditions are fulfilled.

We use the term 'virtually' unconditioned in the sense that the judgment is unconditioned 'in virtue of the fact' that there is sufficient evidence; it is unconditioned 'because' the conditions have, in fact, been fulfilled. Instead of 'virtually unconditioned= we could also say 'actually unconditioned' or 'factually unconditioned' or 'verified'. The judgment is conditioned in itself but now the conditions have been fulfilled and we can posit the judgment as true, as a virtually unconditioned. (We are not using the phrase virtually unconditioned in the sense of >almost= unconditioned; as in he has virtually won the election, meaning that to all intents and purposes he has won the election but there are a few technicalities to be seen to.)

There is then:

(1) A conditioned, namely, a prospective judgment.

(2) A link between the conditioned and its conditions.

(3) The fulfillment of the conditions.

(4) The virtually unconditioned.

The conditioned is transformed into the virtually unconditioned if there is a link between the conditions and the conditioned, and if the conditions are fulfilled. Reflective understanding directs attention to the conditions to see if they are really fulfilled and to the link that binds them to the conditioned. If everything is in order, then, the conditioned, which we started with, can now be affirmed. It can be affirmed as certain, highly probable, probable or merely possible depending on the assessment of the evidence and the link between the evidence and the conclusion.

This is just a schema of terms and relations that is handy to have around when we come to particular examples. It does express the general form of the reflective act of understanding. It makes explicit the conditions on which the prospective judgment depends in order [225] to be affirmed as true. Spontaneously when we have a question for reflection, we ask what kind of evidence would be needed to show that it is true; then we go to see if that evidence or data exists; if the evidence is sufficient and linked to the conclusion we answer the question in the affirmative. We are objectivizing the spontaneous activities of critical inquiry in a technical terminology and formal structure.

3. Hypothetical Syllogism. Can all the different modes and figures of the syllogism be reduced to one general form? It would seem that they can and this general form would seem to be the form of deductive inference.

Where A and B represent one or more propositions, the deductive form is:

Question Is B so?

Major Premise If A, then B.

Minor Premise But A.

Conclusion Therefore B.

B is the conditioned; it is the prospective judgment. The link is represented by the major premise, If A, then B. This asserts that there is a link between the conditions and the conditioned. The minor premise, But A, asserts that the conditions are fulfilled. The judgment follows by rational necessity. In the hypothetical syllogism, if we posit the antecedent, the consequent follows. This is an example of positing the antecedent. Think it out for yourself. If the two premises are given the conclusion must follow of rational necessity. It is not a matter of choice. There is something very basic and inevitable about this reasoning process.

This is the most basic form of the syllogism because for any other valid syllogism the premises can be represented by A and the conclusion by B. Any other syllogism could then be presented:

Question Is this syllogism valid?

Major Premise If the premises are true, the conclusion follows. [226]

Minor Premise But the premises are true.

Conclusion Therefore the conclusion follows.

Inductive arguments can also be presented in this form. In inductive argument can be presented in the form:

Question Is this inductive conclusion true

Major Premise If the evidence gathered by observation or experiment is sufficient, then the conclusion follows.

Minor Premise But the evidence gathered by observation or experiment is sufficient.

Conclusion Therefore the inductive conclusion follows.

Let us move to applying these schemes of terms and relations to more concrete examples of reasoning towards a conclusion.

4. Application to Typical Cases

1. Concrete Judgments of Fact. It might appear from the above that all judgments are reached by syllogism and hence by deduction. If that were so then every premise would be a judgment and would be validated by another syllogism, and you could go on to infinity. Where does our knowing start? Are we open to the skeptics' criticism that we must have an infinity of syllogisms, the argument from infinite regress. We answer that the fulfilling of the conditions may not be a judgment but may be given in sense presentations.

One could hardly imagine a simpler judgment than, 'the wall is white.= This is so simple, in fact, that some philosophers would not consider it a judgment at all. For them it would be a datum, a given in the senses, an item of sense knowledge. But we have already distinguished between

data and facts: data are given in sense presentations but in themselves do not constitute a judgment: animals can perceive colors but do not utter judgments. A fact is a judgment passed on presentations through the mediation of understanding and definition. [227]

Identifying and affirming a color is a case in which the fulfilling conditions are not some previous judgments but direct sensory experience. If you want to check, you look again, you look more carefully, with discrimination. But the looking is accompanied by understanding. We have learned the meaning of >white= and distinguished it from creamy, gray, blue, etc. We have learned to classify our sensory experiences and if we have studied art and painting we can do this at a very sophisticated level; one can dispute over where to classify a particular color. This reflects on the difficulty of pinning down descriptive knowledge in any precise way. We can have disputes not because we are seeing different colors but because our definitions of colors differ. The fulfilling of the conditions need not be a judgment but can be given in sense experience.

Disputes in the natural sciences can be resolved back into the data of sense. That is the plank on which the strength of the sciences is built. But disputes in the area of philosophy or cognitional theory can be traced back to the data of consciousness. We are making assertions about how we understand and reason. You are invited to ask yourself are these assertions true. To answer that question you are invited to become aware of the spontaneous activities of your own mind as you struggle to solve a problem or answer a question.

In simple judgments of fact the link between the conditions and the conditioned is given in cognitional process; it need not be a separate judgment. What is it that links the prospective judgment with its fulfilling conditions? We have shown how questioning of data given in the senses leads to direct understanding, and how questions for intelligence are followed by questions for reflection leading to the judgment. This is a very basic and inevitable process in knowing. The dynamic linking the experiencing, the understanding and the judgment is the questioning of intelligence and reflection. The one question applied to some aspect of data leads to understanding a possibility which is seen as only a half-way house as we continue to seek the evidence that will turn the possibility into a judgment. There is a parallel between the basic technical terms and relations we identified above, and the very [228] structure of our minds as questioning, experiencing, understanding and judging.

We ask questions about sensory experiences of color. We have to learn and identify the names of the different colors. We have to recognize the borderline that distinguishes different primary and secondary colors. We have to check whether our understanding is correct by recourse to a teacher or a color panel. This is all presumed when we utter a simple judgment that 'the wall is white.' Children do not need a course in cognitional theory to learn their colors. The fulfilling conditions are given in the seeing; the link between questioning, experiencing, understanding and judging is given in the structure of our knowing.

The link then is not a judgment but the very structure that is immanent and operative in cognitional process. The judgment is one act that proceeds from reflective understanding which scoops up into a unity the sensory experience, the definitions of color, and the relation between them.. We do not have to learn the procedure of asking questions, seeking understanding and how to pass judgments. That procedure is spontaneous. But we do have to learn the content of each particular judgment of fact, no matter how rudimentary.

This example is relatively simple but the same principle applies whenever the fulfilling conditions are given in sensory experience. Einstein's theory of relativity would hardly be classified as rudimentary. Yet the crucial verification was performed by looking through a telescope at the apparent position of a star during a solar eclipse. The seeing in this case was guided by high precision instruments, extremely accurate calculations of where the star should be on Newtonian principles, and calculations of how the sun might deflect the light as postulated by Einstein's theory. For all the acumen and sophistication, without the seeing there would have been no evidence for the verification.

2. Commonsense Judgments. We make many commonsense judgments every day as a matter of course. Because they belong to the field of common sense, they are full of analogies and metaphors, undefined terms and vague generalizations. Arguments in the context of common sense can go on for ever; evidence is presented [229] in bits and pieces; valid arguments intermingle with dubious inferences; who shouts the loudest or the last usually wins. Common sense procedures are not the result of analysis or critical reflection, they are spontaneous but confused. Usually they are approximately correct, they work for the most part and are successful. There is a body of experience and custom built up over years that we rely on. But the underlying spontaneous procedure of common sense is to seek for evidence, look for a link between the evidence and the conclusion, and to be reasonable in positing a conclusion or solving the problem.

3. Classical Method. In classical science verification is attained by noting that the concrete measurements converge on the abstract laws. Judgments are based, not on the expectation of a perfect coincidence between the abstract and the concrete, but on the expectation of a convergence. We have already given a detailed description of Galileo working out the law of natural acceleration so let us stay with that example and use it to call attention to the process of reflective insight in classical method.

Galileo was convinced that Aristotle was wrong, wrong on the principle that the heavier the body is the faster it will fall, and wrong on the principle that a body falls faster and faster because it is getting nearer to its natural place of rest. But it is not enough to say that somebody is wrong, you have to produce evidence. Again, there is an issue of correct judgment, and there are consequences one way or the other. Galileo had many enemies and he knew that his findings would be carefully scrutinized. He was motivated to check very carefully each step of the way because if he issued hasty or wrong conclusions he would soon be exposed.

One can imagine the care he took. The critical reflective mode is operating from the beginning and influences all the experiments and activities to the conclusion. He carefully thought out his methods. He took all possible care with his apparatus, his measuring, his timing, and his calculations. He repeated the experiments again and again. He changed the length and measured the time; he changed the time and measured the length. He pushed to the maximum length that the apparatus would allow. He tried different inclinations of the plane. He tried different ways of measuring the time. At one stage he [230] was using his pulse. He also used a sand clock. He was also worked with a bucket of water with a small tap that could be turned on and off; the time was measured by the amount of water that flowed while the tap was on. He tried the experiment with different materials. He worked on the tables of correlations and always found that the distances were proportionate to the time squared. He considered other possibilities. Eventually the further questions were exhausted; it was getting boring; there was sufficient evidence; it was time to publish and move on to other areas of research.

If you formalize his reasoning it comes out like this:

The conditioned: It seems that the nature of a free fall is such that the distances are proportionate to the time squared.

The link between the conditioned and the conditions: If the nature of a free fall is such that the distances are proportionate to the time squared then an indefinite series of measurements of a free fall will show that concrete results converge on the abstract formula that the distances are proportionate to the time squared.

The fulfilling conditions: He did a series of measurements which converged on the law that the distances were proportionate to the times squared.

The virtually unconditioned: The nature of acceleration is that the distance traveled is proportionate to the time squared.

Experiments have continuously confirmed this law. Results have continued to converge on the abstract law. The more sophisticated the equipment and the more accurate the measurements, the closer actual measurements converge on the dictates of the law.

4. Statistical Method. We considered the hypothetical case of a social survey designed to see if there was a significant statistical correlation between incidence of lung cancer and cigarette smoking. This we took as a typical example of statistical method issuing in abstract laws from which the concrete cannot diverge systematically. Let us continue with that example to make more explicit the role of reflection in the whole process. [231]

It is well known how open to abuse such surveys are. Vital issues are at stake effecting the lives of many people. The process is open to bias from interest groups, interference from governments, personal prejudice of the surveying team, etc. Special precautions have to be taken from the beginning not only that truth be attained but that it be seen to be attained. Surveys are large-scale operations and cannot easily be duplicated; the results of a survey have to be presumed to stand as it may not be possible ever to duplicate the process or check the results by other means. The methods that can be used in social surveys are never as precise or controllable as experiments in a laboratory. But it is important that this difficulty which is inherent in social surveys be not compounded by sloppy method, or deliberate prejudice.

The important thing to note, from our point of view, is that the process of reflection permeates the work from the beginning. Critical questions have to be asked from the very beginning and at every step along the way. Although we have represented reflective understanding as coming after direct understanding at the third level of cognitional process, we should not think that in a process like a social survey we wait until the end to ask, is our insight correct. It will not be correct unless all the procedures and preliminary judgments and definitions are informed by the same detached reflective mode. We have to ask at each step of the way, Is this the correct procedure? Is this the correct way to ask the question? Is this the right size sample to use? Are these calculations based on probability theory correct? A mistake at any stage of the process vitiates the final results.

Having followed all the correct procedures and checked over all the results at the end of the process it is possible to make a reflective assessment of the link between the conditioned and the fulfilling conditions. Putting everything together in the final report with a synopsis of the significant findings it is possible to say Yes, the evidence justifies these conclusions. The all-embracing reflective understanding grasps the unity between the multitude of conditions and the final conclusions. The evidence is such that we can affirm a certain conclusion with a given degree of probability. [232]

4. Judgment on the Correctness of Insight[69]

Our examination of concrete judgments of fact revealed that the fulfilling conditions for a judgment are often given in presentations rather than in previous judgments. Further, they revealed that the link between the conditioned and the fulfilling conditions can be given in cognitional structure itself. Experience, understanding and judgment work together, as we have indicated briefly already. Understanding mediates between the levels of experiencing and judging. How do we know that our understanding is correct? How do we know that our definitions of color are correct? The purpose of this present section is to explore these questions.

Our appeal, again, is not to some theory of knowledge but to our own experience of knowing. If you have tried to do the addition sum suggested in the preliminary exercises, hocus, pocus, presto, you will have been involved in a series of individual insights. Some of them will be correct; you think a little and realize that they must be correct and, secure in that knowledge,

you move on to the next step. For instance, it is not difficult to see that P must be equal to one. There are no single numbers which, when added together along with one, will give you twenty. So that the P of presto must be equal to one. All other possible values are excluded. No further questions arise. There is no need to delay over the matter; you move on to the next clue. Write down everything you know about the values of the letters. Substitute the values that you know. Look for clues. Is there any other letter that we can pin down? You can say that the letter O is even; any number added to itself gives an even number. What about R? It must be either 1 or 0. But it can=t be 1 because P is already 1. So it must be 0.

You might then focus on H and say it must be 9. But must it? Consider other possibilities. Ask further questions. Oh, yes, it could be 8, if there is a carry one from the previous column. After that it is a matter of trial and error. The important thing is to recognize the point at which you know that you are right and must be right, and the point where you are still considering possibilities and still asking questions. In mathematical examples it is very clear when we have reached a correct insight because there is a checking process that shows that it is correct and a complete closing off of further [233] questions indicating that nothing further could interfere with the conclusion already reached. A mistaken insight is open to be overturned by the asking of further questions and the realization that we left out some possibility or necessity.

Note then that insights give rise to further questions. There may be questions about the matter in hand which have not been settled and other possibilities have to considered and checked. Or our questioning may conclude that the matter in hand has been solved and further questioning on that matter is fruitless, so we spontaneously move on to further matters which have yet to be understood.

Hence we introduce an operational distinction between vulnerable and invulnerable insights. We operate spontaneously on the principle that an insight is invulnerable if no further pertinent questions arise that could overthrow it. Contrariwise, an insight is vulnerable if there are further pertinent questions to be asked and answered about the matter in hand. This is a law immanent and operative in cognitional process. Go over your experience of solving any of the puzzles and you will notice it at work. You know that a student in class has solved a puzzle, when you see him relaxed, gazing about the room, getting bored as he waits for the others to find the solution. He has no further questions to ask and it is boring to spend more time on the matter.

This criterion has to be treated with some care. It is not as easy as it sounds. An insight is invulnerable if no further pertinent questions arise, but we have to allow the questions to arise. We have to be open to all possibilities, we have to be able to ask the relevant questions, we have to have the time and the interest to follow up the further questions, we have to be able to exclude other distractions as we pursue our investigation to the end. Questions can come to an end for many reasons other than that we have reached an invulnerable insight. So we have to lay down further qualifications.

Give further questions a chance to arise. The first insight, however brilliant and exciting, may not be correct. You have to ask the question for reflection, is it true? is it correct? and that may reveal that something has been left out and the whole process has to [234] start again. A judgment is a rash judgment if it is made hastily with too little reflection and no time for further questions to arise.

We try to prevent further questions arising if we are unwilling to change our established position and feel that asking further questions may undermine our position. So we avoid the further question by reinforcing our limited stance, digging in our heels; we resort to rhetoric and prevent reflection. Openness to all further questions is a characteristic of the pure desire to know and is the knife that cuts through prejudice, bias and dogmatism. We can avoid all mental activity by indulging in a well-meaning activism which aims at changing the world without first understanding it.

We noted before that each individual judgment is dependent on a context of other judgments. Our present judgments are dependent on our past judgments. Our judgments are linked to our direct insights and our various experiences. There is a whole context of our education, mental habits, ways of thinking, opinions, and judgments that has been built and intertwined over a lifetime. There can seem to be a vicious circle here. Single judgments depend for their validity on a context of prior judgments. But if the prior judgments are wrong or warped or biased, how do we get out of the mess? This is something like the problem of the hermeneutical circle. To understand the whole of a book you have to first understand the parts; but you cannot understand the parts without understanding the whole. This seems to lead to a logically impossible position.

We would solve this by appealing to the *self-correcting process of learning*. How, in fact, does our understanding develop? It develops in small painful increments. We get a vague idea of the whole from the table of contents and we get a vague idea of the part by skimming the first chapter. We go back to the whole and have a better understanding as we return to the parts. It is the process of learning that breaks the supposed vicious circle.

It is the same with a context of judgments that has gone a little bit awry. We do not have to reject the whole lot in order to start again afresh. Descartes recommended the system of methodic doubt; discard everything that can be doubted and, if there is anything left, start there. This seems rather radical especially as, if you start doubting everything, there is no obvious place to stop. But Newman [235] suggested an alternative procedure; accept in general what you reasonably can, but if you spot a mistake dig it out root and branch. He was recommending the self-correcting process of knowing. Keep asking questions, be open to alternatives. If there is an incoherence it will eventually be exposed. If there is a mistake, then, it will show up by not fitting in with other data. We can learn from our mistakes. Why did we overlook such data, what other mistakes might have been made; correct the context and see how that effects other things. The context that is skewed can be straightened out, reoriented, and purified.

The process of reflection tends to be discursive not deductive. It is discursive in the sense that we proceed step by painful step; we often take two steps forward and one backward. Questions in one area tend to a limit where we are satisfied that we have sufficient evidence; maybe in another area we turn up evidence that would have a bearing on the previous material. We go round in circles, we move up spirals, we go over our tracks, we make mistakes but the later context will often reveal them to be mistakes. Our thinking is rarely deductive; we rarely proceed logically from premises to conclusions. That may be the form in which we present our conclusions but that is not how the whole process of questioning, imagining, formulating, defining, reflecting, evaluating, etc. goes on. Our minds conduct a kind of mixed up conversation with ourselves in which there are many voices, many levels, many desires operative, but the general orientation is towards the reflective understanding leading to judgment.

Interference with the process of knowing usually comes from the motive force, from the temperament, the intention, the self-interest of the knower. Rashness and indecision are usually rooted in temperament. Some people are prone to jump at the first possibility; they have not the patience to wait, to think, to reflect. Others have sufficient evidence but are paralyzed by fear of being wrong. They are so afraid of making a mistake that they do nothing and affirm nothing. The ditherer cannot make up his mind.
More serious distortions can be introduced by twisted motivation. To live continuously by the pure desire to know and to be open to all questions is a rare achievement. More common is [236] taking up a position that one likes and then finding the evidence to bolster it.

6. Immanent and Operative Norms

Our appeal from the beginning until now has always been to our awareness of the activities of knowing. We will continue that focus here in our consideration of reflective understanding. By now we should be familiar with the experience of the process or stages of knowing; the puzzlement with data which does not fit together; the attempt to organize data into some schema of cause, correlation, theory or explanation; continuous failure and frustration as nothing seems to check out; sudden and unexpected insight; we think we know; we check back again over everything; we know; we reflect further and we know that we know. In solving a simple mathematical puzzle these stages are compacted into a minute of intense intellectual activity. In solving a historical problem such as the assassination of John Kennedy these stages can be extended over years of painstaking

research and we may never reach the point of really knowing for sure.

The naturalist fallacy claims that you cannot argue from a statement of 'what is' to a statement of 'what ought to be'. What we are doing, however, is showing that *there is* an obligation and an imperative operative in asking questions and seeking answers. It is simply a fact that these obligations operate; observation and attention to the process of knowing reveals these norms operating. It is the nature of the case that these imperatives bind. We know what a thing is by knowing how it operates. We have been observing the activity of knowing as it unfolds in experiencing, understanding and judging; it is in correctly understanding that activity which justifies us in talking about the nature of human understanding. We can experience and observe imperatives at work in this unfolding; we are entitled to conclude that they are immanent and operative in the very structure of human knowing.

What norms are operating which move us from one stage to the next in that process of coming to know? What norm is satisfied when we reach the stage of knowing that we know? What norm is [237] not satisfied when we have a very likely hypothesis but there are still loose ends? We can distinguish between the experience of a problem which is not solved, is still open: we have doubts about the possible solutions and the experience of closure, of everything fitting together, of the problem being solved, everything has been checked and rechecked, it is boring to waste more time on the matter.

The dynamic is the desire to know which pervades all the activities and is satisfied only when knowing is reached. The stages of knowing have their own immanent and operative norms; we can name them simply as, be attentive, be intelligent and be reasonable. We call these norms immanent because they are part of the very structure of knowing; they come from the inside rather than from the outside and they must be operative in any human knowing. They are not imposed from outside: they are not an invention of philosophy or logic or scientific method. They are not learned; rather, all learning presupposes the operation of these obligations. Knowing contains its own immanent norms of operation. Guided by what we have already discovered about the complete process of knowing let us extract and identify these immanent and operative norms.

Be attentive. In general this means to be alert, to notice data which might prove significant, to be sensitive, to use all the senses, to exploit their potential to the full, to extend the range of the senses by using instruments. Our knowing begins in sense experience and continues to depend on the senses for verification. All scientific conclusions must have some sensible consequences, you must be able to point to some data through observation, experiment or research.

This is an imperative to be attentive to all the data, not to exclude on a priori grounds any of the data. Most scientists attend to the data of the external senses; they rule out of court appeals to mental activities as unverifiable. But we find the data of consciousness are equally part of what is given in experience. Just as we can attend to dissecting a frog, so we can attend

to dissecting the act of understanding. It is obscurantism to brush aside data just because it does not fit within our already established categories.

Significance is grasped by intelligence. Animals have senses and are attentive but only to what is relevant to their survival and the [238] satisfaction of their needs in the biological pattern of experience. Our senses are under the guidance of the desire to know, in the context of the intellectual pattern of experience. Our seeing is guided by the question which directs us to what is relevant, significant, of possible importance. Our searching is guided by the expectations of theory. We reject entirely the principle of the empty head: that the senses should not be interfered with by theory and should be left on their own, raw sensation. Empiricists seem to adopt this position in the name of 'objectivity.' We consider that the work of intelligence is not interference but necessary guidance to understanding the intelligible in the sensible.

All the data must be explained. It may not be explicable in terms of classical laws, but then we have recourse to statistical method. There are degrees of intelligibility attainable in different areas, from description to explanation, from different kinds of causality; we do not expect the same precision in ethics as in mathematics.

Be intelligent. Think things through to the end. Our ideas must be coherent, they must fit together with the data, the facts, definitions of our own discipline and other areas of study. Logic is useful to determine the coherence of definitions, divisions, arguments and conclusions within a given system. Mathematics usually plays the same role in the empirical sciences. One of the normal developments in thinking is to move from confusion to clarity. We discover many inconsistencies by simply clear, straight thinking about a problem. Solving the mathematical sum, hocus pocus presto, does not require mathematical genius but it does call for clear, straight thinking about what you know and what you do not know.

The simplest explanation, all else being equal, is to be preferred. Entities are not to be multiplied without necessity. Theories must imply sensible consequences; otherwise they remain as imaginable possibilities.

The process from individual insights to conceptualization, to generalization, to abstraction, is thinking out the implications of the insight. It is not easy to delimit precisely our generalizations. Ideas such as justice, honesty, virtue need to be defined if you are to work out a system of ethics. We discussed this process in Developing [239] Understanding: Formulation. Here we are drawing attention to the imperative to be clear, precise, sophisticated, differentiated, coherent in moving towards correct formulation. It is an imperative which is intrinsic to the process.

Being intelligent means being open to possibilities, looking at a problem from every angle, making

connections. Often our imagination and memory confine us to limited perspectives; they act as

blinkers excluding other possibilities. Intelligence is an infinite openness to make or to become all things.

Be Reasonable. We can assert as true only that for which there is sufficient reason or justification. The critical question arises spontaneously; possibilities have to be evaluated in terms of the question, are they verified? Judgment is the criterion of the real, not imagination, not our sense of the real, not feeling, not tradition, not prejudice, not profit. These and many other extraneous influences tend to skew the process from evidence to conclusions. Truth is not a question of shouting the loudest, thumping the table; it is not determined by opinion polls or majority votes.

It is not a matter of choice. It is a question of living in the real world and not the world as we would wish it to be. It is moving from fiction to fact, from alchemy to chemistry, from astrology to astronomy, from legend to history, from superstition to science, from quackery to medicine. We do not have a choice about the world we live in. We might succeed in choosing our truths for a while, but eventually reality catches up with us.

Affirmation adds only the yes or no of judgment; it does not include an image to go along with it; affirming the suitability of an image is often a separate affair. To affirm that a person has a soul is a judgment; to imagine it as a ghost in a machine is quite another.

These three norms are operative at every stage of knowing and in every discipline or subdivision of knowing. They operate at the level of common sense; an argument in a pub in its own confused way applies these norms. If you are caught in a contradiction you have lost; someone points out data which has not been considered; counterexamples are produced; someone demands a better [240] definition of the terms; etc. The norms operate in a more refined way in science, in the human sciences, in philosophy.

They operate in all cultures, at all stages in the development of cultures. Even the mythological mentality is expressing what is and what is not, in terms of symbols and myths. Ultimately these terms will not satisfy as they are too vague, too imaginative, involve contradictions, are too undifferentiated, but there is no culture which does not try to understand correctly human life, destiny and the world. To understand correctly means to attend to the data, to the given, to what is experienced; to understand it, to make sense of it, to identify and distinguish elements, beginning and end, etc; and to understand it correctly, to reach truth, to distinguish it from untruth, to be able to point to evidence of its truth.

These immanent and operative norms are also sanctions; those who violate the norms are punished. There is a self-correcting process at work in the unfolding of any area of human knowing. We might have a favorite theory and come across some data which does not fit in with it; we can ignore it, but that is obscurantism, intellectual blindness; we become incoherent, wanting to know but not willing to face the facts. We might have our own theory

but someone else expounds a better theory; what do we do? We can bury our head in the sand ostrich-like, we can ignore the opponent=s theory, pretend it does not exist, stick doggedly to our guns. But everyone recognizes this as blindness, as dogmatism, as lack of intellectual honesty.

There is something fundamentally wrong with being inattentive, unintelligent, or unreasonable; it is not the wrongness of breaking a law but of a subject being incoherent and self-contradictory. You cannot really argue between being attentive and inattentive, intelligent and stupid, reasonable and unreasonable. Any argument presupposes that we are trying to be attentive, intelligent and reasonable. There are very few authors or writers who explicitly espouse a position of being stupid or unreasonable! These norms are immanent and operative; we are naming them, making them explicit, identifying them, distinguishing them, showing how they operate. We are making explicit what is already there implicitly. We are not inventing rules or laws; but expressing what is already there. [241]

7. Criterion of Truth

Our approach to the question of truth is not by declaiming dogmatically from the housetops what it is; but by observing how we are in fact bound by the imperatives of attention, intelligence and reason. It is only in correct judgment that we attain to truth: at the level of understanding we get a possible hypothesis; at the level of experiencing we get data or presentations. How do we know that we have reached a correct judgment? In answering this question we will distinguish a proximate and a remote criterion of truth.

1. Proximate criterion of Truth. Truth is only attained in a correct judgment; correct judgments are generated by reflective grasp of the virtually unconditioned. The immediate criterion of truth, then, is reflective understanding, as it grasps the sufficiency of the evidence, the link between the evidence and the conclusion, and the rational necessity of positing the conclusion as certain, probable or merely possible. In the immediate context we know that we have reached the truth if we have sufficient evidence and that evidence entails the conclusion. We have already examined in sufficient detail the form of this reflective grasp of the virtually unconditioned.

How do we know that there is a sufficiency of evidence? It is only reflective understanding which can determine the correct proportion between the evidence and the conclusion. Sometimes in mathematics or geometry the evidence will justify a certain, necessary conclusion; sometimes it will warrant a highly probable conclusion; sometimes we have to be content with a moderately probable opinion. The only universal appeal we can make is to the operative norms of be attentive, intelligent and reasonable. We cannot lay down specific rules because these will only apply in specific cases. The only universal appeal we can make which applies in all fields, at all times, in all cultures, is to the process of reflective understanding and the norms that operate within that structure. We will elaborate on this when we deal with Cognitional Structure.

2. The remote criterion of truth. Individual judgments usually depend on the context. The context can be very wide indeed; if the context is in itself skewed then the individual judgment will not be [242] reliable. How do we ensure that the context is correctly oriented, that it is not itself mistaken or deformed? We appeal to the general context of all knowing where the dynamic which is operating is the pure, detached, unrestricted desire to know. It is the proper unfolding of that desire which is the remote criterion of truth. It is the implementation of that desire which guarantees that the overall context of our individual judgments is sound. The desire to know is the source of the imperatives of being attentive, intelligent and reasonable.

By pure we mean that the context is free from prejudice and bias. It is not too difficult to imagine how prejudice and bias can distort the context and lead to wrong conclusions. We examined the process of doing a social survey as an example of statistical method; we pointed out the precautions and care that must be taken. But the overall context of the survey can be totally distorted if it is being carried out by an interest group which has already determined what the conclusions are going to be. You do not ask policemen to investigate corruption among the police; you do not invite criminals to reform the criminal justice system; you do not ask cigarette companies to do research on the connection between smoking and lung cancer; we do not usually trust a public opinion poll carried out by one political party.

Motives can be pure or they can be mixed or they can be totally devious. We have explained in detail rational process; but all of this depends on decisions and the motives behind these decisions. Intelligence can be used by a thief to perfect his thievery; or by a scientist to forge desirable results; or by a demagogue to stay in power. For rational process to reach a correct result we have to presume that the context of motivation and intention is wholesome.

By detached we mean that the searcher is open to all possibilities, is willing to accept the truth whatever it may be. We are presuming an intellectual honesty in research, in thinking, in use of data, in publishing the whole of the story, in acknowledging mistakes, in admitting the limitations of our knowledge.

There is a very fundamental way in which the context of a judgment can be warped by a dialectic operating in us between [243] different kind of knowing. We will elaborate further on that theme in the chapter on Intellectual Conversion.

8. Clarification by Contrast

It might be a useful exercise to contrast our position with those of the relativists, the skeptics, the empiricists and the logicians.

1. Relativism. We have admitted that descriptive knowing is of its nature relative to the knower; hence we have admitted that descriptive knowing is relative to the perspective of the observer. But we can escape these limitations by way of explanatory knowing, relating things to one another. There are many forms of legitimate pluralism, a pluralism of cultures, of

differentiations of consciousness, of historical periods. In some sense our knowing is related to our culture, to our stage of development, to our use of language. All that is admitted. But we do not and cannot coherently admit that all our knowing is completely relative and hence has no ultimate or absolute value at all.

Relativists sometimes argue that in order to know one thing, we have to know everything. Because everything is related to everything else you cannot isolate one area from the rest; everything is tied together. But our experience of knowing belies this argument. We can solve simple puzzles and know that we have reached a correct solution. We can devote ourselves to a historical or scientific subject; we learn all there is to be learned; we do our own experiments and investigations; we become masters in the field; we are competent to distinguish between what we know with certainty and what we can only guess. There comes a point when we do know and we know that we know; an area closes itself off from other areas and we become proficient, we pass correct judgments. Despite our experience of the limitations of our knowing there are some things we can know with certainty and that experience disproves the contentions of the complete relativists. Once you have solved even a simple mathematical puzzle for yourself and know that it is correct then the claim of the absolute skeptic collapses.

Some think that any valid knowing must be certain and absolute knowing. But most of our knowing concerns various degrees of [244] probability; that is the human condition; probable knowing is valid human knowing. Some ask for too much; they ask that we must prove that we cannot be mistaken in order to posit a judgment. But that is not the way human knowing works.

A complete relativist position is incoherent. If one claims that ideological influences totally undermine the validity of our knowing, then the same ideological influences undermine the relativist position. Arguments which deconstruct on the basis of ideology can be equally turned against the deconstructionist. But this is just revealing the fundamental incoherence of a complete relativist position. There is an incoherence between the content of what is being said and the performance of the assertion.

2. Skepticism. There are various grounds for skepticism; let us deal with them one by one.

Firstly, the skeptics have an overpowering sense of the failure of the project of human knowing; they point to the effort that has been put into science and philosophy and the wide range of disagreement and contradiction that are still present. If the greatest minds have produced so little, how can we consider the enterprise of knowing worthwhile, how can we trust the results, how do we know who is right? We would tend to admit that the history of philosophy has been a story of disagreement and contradiction; this does not prove that it is worthless, but only that it is difficult. Our approach is to trace these disagreements back to their source. For us the source is a confusion about human knowing; if we can sort out clearly what human knowing is, then we can compare that with what others think it to be and unravel the apparent contradictions. This will become clearer when we deal with intellectual conversion.

Skeptics, like relativists, point to the mistakes that have been made and claim that this proves that neither sense knowledge nor intellectual knowledge is to be trusted. But the making of mistakes only proves that we are not infallible; it does not undermine the validity of the knowing process. The point we would emphasize is that we can recognize mistakes as mistakes. There is a criterion of truth which is operative and, in the light of that, we can recognize that some data has been overlooked, some concept was incorrectly defined, some text was wrongly interpreted. There is a [245] self-correcting process of learning; mistakes can be made but further research, or reflection, or data will usually reveal an incoherence, hence the suspicion that a mistake has been made, leading to a recognition of the mistake, identifying the reason for the mistake and a resolve not to make the same mistake again. There is an absoluteness about the truth of any judgment which will be explored when we deal with absolute objectivity.

Complete skepticism is also incoherent. To claim that we can know nothing involves a contradiction between the content of the assertion and the assertion itself. The content is saying that we can know nothing; the performance is making a judgment, claiming to know. The only coherent complete septic is the one who keeps silent, as Aristotle pointed out long ago.

3. The Verification Principle. This was an attempt within the empiricist tradition to formulate clearly a criterion of truth. The verification principle was stated at the beginning of this century as something like, >the meaning of a proposition is identical with the method of verifying it', or 'a proposition means the set of experiences which are together equivalent to the proposition's being true'. The idea was to eliminate all propositions which could not be directly verified in some sensible experience. The background was an empiricism of the kind espoused by John Locke and David Hume.

But the ambiguity here lies with what is meant by 'to verify'. Hume did all in his power to reduce all the activities of human knowing to the level of sense imagination and memory; intelligence was simply the laws of association of ideas at work. To verify, for him, meant sensible experience and nothing more, because there was nothing more. The tradition has found it very difficult to follow out this program coherently. There have been constant revisions and contradictions. What does 'to verify' mean? Is one sensory experience enough to verify a proposition? Is one counter-example enough to invalidate a proposition? What happens if the experiment of its very nature cannot be repeated? What happens to a proposition like Newton=s first law of motion, where a single experiment cannot be set up to prove it because you cannot in principle exclude [246] extraneous influences? How many cases of white swans do you have to 'see' to verify the proposition that all swans are white?

These difficulties led to a series of reformulations of the principle but none of these faced up to the root problem. Some said that repeatability was the crucial criterion; some that predictability was the key; others that falsifiability was the real test of verification.[70] Most contemporary studies in the philosophy of science are wallowing in the mud of empiricist presuppositions about knowing. All seem to presume that verification is an operation of sensible experience. No one has made explicit the processes of direct and reflective understanding involved in any process of verification.

We have distinguished three levels of cognitional activity, those of experiencing, understanding and reflection. For us verification is an act of reflective understanding which occurs at the third level of cognitional activity and presupposes and builds on the other two as well as subsuming them into the unity of a prospective judgment. Verification does not take place at the level of 'seeing' but at the level of judging. We return to a fundamental theme of this text that any truly human knowing is a compound of experiencing, understanding and judgment. The empiricists are suffering from a confusion between 'seeing' as a cow sees, and 'seeing' as a man sees: namely, as he senses, understands and judges.

A further fundamental problem with the verification principle is where does it come from. Can the principle itself be verified? What sensible experience could possibly verify such a principle? On what authority is this principle invoked rather than any other principle? There is again a fundamental contradiction between the content and the performance of the verification principle.

9. Rehabilitation of Reason

One could go on forever considering various defective theories of knowledge - they are multitudinous - but let us conclude. Our position has been built on the facts of our experience of understanding correctly. From the beginning of this text our constant appeal has been to the data of your own consciousness. Have you been able to recognize the characteristics of direct insight, [247] the difference between image and idea, the transition from description to explanation, the phenomenon of inverse insight and statistical method and finally the experience of reflective insight leading to the judgment? We have discovered that all correct human knowing is a compound of the activities of experiencing, understanding and, finally, judging.

Particularly important even though difficult has been the awareness of reflective understanding generating a judgment. This is where thinking becomes knowing, where possibilities are affirmed or denied, where the process of human knowing comes to a term. Our examination of judgments reveals the strengths and also the weakness of human knowing. It does not issue in infallible judgments; it does occasionally give what can be called certain judgments, but for the most part we are dealing with varying degrees of probability. But that is human knowing; it is not unreasonable to deal with probabilities. There is a criterion of progress in the application of the norms which are immanent and operative in our consciousness. We move towards higher degrees of probability; we extend our knowing to new areas; our knowing moves from descriptive to explanatory, from confusion to the clarity and precision of definition. By way of higher viewpoints we understand more deeply, more comprehensively; by way of inverse insights we get an indirect grasp of the unintelligibilities of our world and of mistaken theories about it.

Reason is not highly respected in most contemporary philosophies. The optimism of rationalists like Descartes and his followers has been discredited. The Age of Reason, with its expectations

of unending progress, replacement of religion and superstition with Science and Reason, controlling disease and the economy, has also come and gone. Reason has been equated with deductive reasoning, with formal logic, with the conferring of certainties, with unrealistic expectations for human knowing and for social progress. As a reaction, contemporary philosophy is characterized by a distrust of reason, an undermining of any certainties, almost an espousal of the irrational, and choice considered as the grounds of judgment. [248]

The fact that reasoning has been somewhat misunderstood and misused is no excuse for going to the opposite extreme. Reason for us means the discursive process leading to judgment. Sometimes it is inductive, sometimes deductive; sometimes it works by analysis, sometimes by synthesis; sometimes it is descriptive knowing that is sought, sometimes explanatory. Aquinas compared reason to intelligence as movement to rest; reasoning was movement towards understanding. Reasoning involves activities such as assembling ideas and facts, analyzing and synthesizing, imagining and remembering, dividing and defining, accepting and rejecting, going backwards and forwards. The formal presentation of correct processes of reasoning in logic should not be confused with the actual process of discovery and understanding as they take place in fact. Our actual reasoning is a confused conversation; a medley of voices; an overlapping of data, ideas, images, examples; sometimes going round in circles.

But there is a purposiveness to our reasoning; it is aimed at knowledge and is not satisfied until knowledge is attained. We are very much aware of the limitations of our knowledge, but still it is knowing and it is knowing that we know. There is a need to rehabilitate reason in the sense of the immanent and operative obligation to be reasonable. It is reflective grasp of the virtually unconditioned which is the immediate criterion of truth; it is the proper unfolding of the desire to know which sets the remote criterion for that truth. We do have a limited grasp of truth. But we can distinguish certainty from probability from possibility; we can recognize our mistakes and correct them. We can know the limits of our knowledge; like Socrates we can be aware of our own ignorance; but none of that is a council of despair because there are some things we know that we know; we have discovered a method of moving from the unknown to the known; reason in the end is vindicated; it is its own criterion of what is true or false. [249]

Comments on Exercises.

(1) The reasoning in this first hypothetical syllogism is correct. We do not say it is correct because the rules of syllogism are observed; we do not say it is correct because Aristotle, or Aquinas or a teacher says it is correct. You have to see it for yourself that it has to be valid and is the basis of all our reflective understanding.

The second one is strictly speaking not correct; it is the fallacy of positing the consequent. The conclusion does not necessarily follow. Take a general example. If my theory is true, then certain sensible consequences will follow. But certain sensible consequences follow. Therefore my theory is true. But the sensible consequences might perhaps be explained by a different

theory..

(2) This is just an example of the fallacy of *post hoc ergo propter hoc*, namely, if something follows after something else then it is caused by that. There are many reasons why people get sick and many reasons why they get better. If you take medicine and get better it does not follow necessarily that the medicine is the cause of your getting better - even though it normally is.

(3) We usually recognize that if there is sufficient evidence it is unreasonable not to make a judgment. There can be many motives and fears which inhibit us from passing judgment but it is not reasonable behavior. Perhaps the only exception would be in the field of religious faith where love seems to have a priority over rational knowledge.

(4) Don't be distracted by useless information. Imagine what you get when you pick. What is the difference between the socks?

(5) This problem was dealt with in the text. [250]

8

Cognitional Structure

Knowing, accordingly, is not just seeing; it is experiencing, understanding, judging, and believing. The criteria of objectivity are not just the criteria of ocular vision; they are the compounded criteria of experiencing, of understanding, of judging, and of believing. The reality known is not just looked at; it is given in experience, organized and extrapolated by understanding, posited by judgment and belief. [lxxi]

Preliminary Exercises.

(1) Arrange the numerals from one to nine in the boxes such that vertically, horizontally and diagonally the sum of the numbers will be fifteen.

[252]

(2) Are computers intelligent? What is the difference between the 'intelligence' of a computer and the understanding of a human being

(3) Should philosophers be able to verify their conclusions? Is it the same process of verification as in the empirical sciences?

(4) A. Pick out some experiment that you remember performing in physics, chemistry, botany or biology.

B. Identify the activities that you performed during the course of the experiment.

C. How was the final verification related to the previous activities?

1. Introduction

We have examined the parts in great detail; now it is time to put them together. This chapter will be a summary of what we have done so far, a kind of synthesis and a reprise of all cognitional activities. There is a basic unity of knowing. It is not the unity of a single activity, but the unity of a multiplicity of activities bound together in the dynamism of the structure of knowing. We will be showing how all the pieces fit together into this dynamic unity. The preliminary exercises are designed to help you to identify both the parts and the whole in your own consciousness.

A structure is a whole made out of functionally interrelated parts.[72] Our clearest image of a structure is a house, with a foundation, two stories and a roof. The parts have their own integrity but are also subsumed into the unity of the whole. The whole is dependent on the parts; the parts can only exist within the whole. Of course, like most images, that of a building limps when it comes to details. Particularly, the image of a building does not reflect the dynamic aspect of knowing. The image of levels, on the other hand, does catch the idea of dependence of the higher on the lower, although this should not be taken too literally.

What we are trying to do in this chapter is to set up a completely explanatory account of the process of knowing. We want to define each of the basic activities of knowing in themselves and in their relations to one another. We want to set up a network of terms and relations such that the terms define the relations and the relations [253] define the terms. Our procedure will be analogous to the setting up of the Periodic Table of Elements, or Aristotle's schema for the virtues.

Because we have been doing self-appropriation we will be able to verify these terms in our own experience. We will be able to apply this schema to our own activities, to illuminate the order, system, relationships that are already there. It will be not just a theory out of the blue, not just a model that is handy to have around, rather, it will be a whole structure that can be verified in our own cognitional activities. It will be a special kind of theory based on the data of consciousness.

Although we are constantly tempted to simplify, to consider knowledge as a single activity at a single level, we will emphasize again that knowing is a combination of a multiplicity of activities. It is truly rare that any theory of knowledge respects the richness and complexity of human knowing; but every attempt to oversimplify distorts and destroys the whole enterprise. In this chapter we will unify the many activities in a way that respects the full reality and richness of human knowing.

We are at last in a position to present a diagram (see below). This is an attempt to show how the activities and levels are related. Each of its terms will be defined in the text; the diagram indicates schematically how they are related to one another. We are concentrating here on the first three levels of cognitional operations. That is the area that comes within the direct aim of this text. In the Epilogue we will present a diagram incorporating the further dimensions of deciding and loving to fill out the fullness of the human context. [254]

I.	**Data. Perceptual Images.**	**Free Images.**	**Utterances.**
II.	**Questions for Intelligence.**	**Insights.**	**Formulations.**
III.	**Questions for Reflection.**	**Reflection.**	**Judgment.**

Diagram of Three Levels of Cognitional Process.

2. Cognitional Structure

1. Level of Experiencing. *By this we mean the level of sensible experience, variously referred to as sensible presentations, sensible impressions, the given as given, what is received through the senses. We include the experiences of hearing, seeing, tasting, feeling, smelling, as well as the internal sensing of memory and imagination and coordination; we include experiences of pain, hunger, depression, etc. as well as the common emotions of anger, fear, anxiety, joy, etc.*

The biological basis of most of our sensations is structurally similar to that of the higher animals. Our eyes are not basically dissimilar from those of a cow, nor are our other outer senses. Animals have a memory as they can remember sights and sounds and smells; they seem to have a basic imagination as they know their way home. They also have some capacity for conscious control and coordination of response. They have some kind of consciousness as we have defined it; an awareness of objects with a concomitant awareness of some center of coordination: there is a difference between a dog that is asleep and one that is awake. This basic substratum at the sensible level of nerves, neurons, cells, brain, is an inheritance we share with the animal population.

An infant starts off almost exclusively at the level of experience or sense. He/she is a bundle of emotions, feelings, needs, responses [255] to stimuli, etc. The early years of a child have been compared to those of a monkey and other animals; the only distinguishing feature of the human at this stage is that he develops more slowly and continues to be dependent on the parent for a longer time. Then, over time, intelligence emerges in the form of manipulating objects, control over motor activities, recognizing objects and people, reacting to stimuli and, finally, in language. Gradually objects are identified, classified and correlated; the past is distinguished from the present and future; objects or people who are absent are remembered and distinguished from those who are present. Intelligence begins to direct the senses, fill the memory, control the imagination and little by little transform sensible experience.

This is why it is so difficult for an adult to have a 'pure' experience: it is difficult to isolate a sensation that has not in some way been influenced by the enhancing and transforming influence of intelligence. Do we see as cows do? The infrastructure of retina, optic nerve, brain, neurons, etc. is the same but our seeing is transformed by identifying, classifying, distinguishing, defining, controlling, etc. which are all activities of intelligence. A BBC documentary tried to recreate for us what a fish sees as he swims through the water, based on the size of the lens of its eyes, its perception of color as studied in experiment, the distance of objects, effect of water on light rays from the surface, etc. But even after such recreation of the seeing of the fish we are not able to achieve more than the illusion of seeing as a fish sees. Our seeing differs from that of the fish not only in the size of lenses, focusing and perception of color; but fundamentally in the intervention of intelligence by which we automatically recognize things and properties and distinguish them from one another. Insofar as we are using intelligence, we have moved out of the biological pattern of experience. Thus, while the eyes function biologically, they are controlled or mediated in this function by intelligence which attends to and selects the data, then processes it according to its ends.

Some philosophy textbooks use the phrase 'sense knowledge.' What do they mean? If they mean sensation as such without any intervention of intelligence then we would have to call this animal knowing to distinguish it from properly human knowing. Lonergan [256] uses the term elementary knowing[73] to describe a 'knowing' at a level which prevails in the animal kingdom. To the extent that such an infrastructure

continues in humans we might justify use of the term elementary knowing, but only on the proviso that it be strictly distinguished from that more properly human knowing which includes understanding and reflecting.

Another meaning of the ambiguous term sense knowledge would make it equivalent to concrete judgments of fact. Statements such as, 'It is raining,' 'this is heavy,' 'the book is white,' are often considered so rudimentary as to be activities of sensation. But for us, if statements are affirmed as judgments, they are fully human knowing and involve the whole structure of experiencing, understanding and judging.

We started the appropriation of cognitive operations by identifying direct insights. It is only when we have done that that we can define experience as 'that into which we have insights.' Experience provides the raw materials for insight; insight is into presentations and incorporates those elements of sensation which are essential for the insight. The essence includes common matter (as the scholastics used to put it), namely, material elements such as flesh and bones in the definition of man. Understanding has to have a content: *what* do you understand? Understanding presupposes the prior level of experiencing; we have insisted that you cannot have insights without images which are sensible.

In the diagram level I is that of Experiencing where data and perceptual images are received. Free images refers to the power of the imagination to construct images out of the material already received. It is doubtful that animals have free images, as it is usually under the influence of intelligence that we construct images of things never seen. It is a crucial function of human imagination to be able to consider various possibilities and changes in the given images. Utterances seem to refer to the grunts and groans, sighs and cries, screams of anger or fear which are the sensible preparation for human speech.

2. Level of Understanding. Experiencing is something we share with animals; what moves us beyond animals is the questioning of experience, not the formulated question but the inquiring, striving, [257] searching attitude of intelligence. This provides the dynamic that slowly transforms our experience and moves us towards understanding. It is spontaneous, it is not taught, it is the dynamic precondition of all understanding and judgment. Questioning is about data of experience and is moving towards understanding and judging.

For Lonergan this untaught questioning is the pure, detached, and unrestricted desire to know. It is pure in the sense that it is at the heart of all our other desires and ambitions. It is detached in the sense of not seeking self-interest or personal profit or satisfaction; we do not use detached here in the sense of not caring about what happens, or having no emotions about something.

It is unrestricted in the sense that, in principle, we can ask about everything and anything; there is nothing about which we cannot ask questions. It is true that our minds are limited in what they can actually know, but it is also true that we aspire to know everything and can ask questions about anything. We may not know God by his essence but we can certainly ask questions about him. Aristotle talked about the natural desire to know; Aquinas talked about the natural desire to know God. Lonergan talks about the pure, detached, unrestricted desire to know, and this desire to know implicitly includes God.[74]

We ask about what we have experienced. We have to ask about something; there has to be some content to our questioning. There are no questions without a content; questions occur in the concrete when something stirs our curiosity. We are all familiar with the ten-year-old and his incessant 'why?' questions. But they are all about particular things and places, and there is no end to it. There is no point in the development of human understanding when there are no more questions to be asked.

Our first kind of questions are questions for understanding. We ask, what is it? why does it do that? where is he? who is that? how does that work? We are looking for causes, reasons, explanations, correlations, classifications, definitions, divisions, hypotheses, bright ideas. We are looking for more information that will help us to understand. We can be looking for direct or inverse insights, classical or statistical laws, understanding of history or mythology [258] or logic or mathematics or religion. We are trying to distinguish sense from nonsense, the relevant from the irrelevant, the important from the unimportant, the significant from the insignificant, as we have already discussed in the chapters on understanding.

The insight is the central moment of breakthrough when intelligence becomes effective. Insight arises from the questioning of the data given in sensible experience. It occurs or happens at a different level in cognitional structure from the level of experience, but is not separate from it; insight is into data but goes beyond sense. The simplest way to recognize this is to refer to your own experience, your own self-appropriation, which should be fairly advanced by now. Insight is the magic moment of breakthrough that we prepare for, hope for, move towards, but can never force to come automatically. Insight grasps the universal in the particular, the intelligible in the sensible, the abstract in the concrete.

Insight incorporates elements from experiencing into a definition or concept. There is a material aspect to a definition: the definition of a circle incorporates lines, points and planes. The definition of a tree may include many components from physics and chemistry as well as biological distinctions between different kinds of cells, structures of cells, and the complicated sub-systems that define a species of tree. A definition must always be a definition of something.

We therefore distinguish insight from formulation. Insight comes first but the correct formulation may come much later. The formulation is expression in words or concepts

that is systematic. Archimedes had an insight in the baths of Syracuse but it may have taken him days to work out explicitly the laws of displacement and specific density implicit in his procedure. Most people can recognize a circle but not so many can correctly define one. Formulation adds expression to the insight, makes it explicit, puts it into words, makes it clear. On the same lines, we have distinguished idea from concept. The idea is what is understood; the concept is what is conceived. Conceptualizing is very similar to formulation: it is putting the idea explicitly, systematically, clearly, abstractly. Conceptualizing can be considered as formulation. [259]

We are affirming here a basic priority of insight to language. As we see it the insight comes first while the effort to express it adequately, fully, and clearly might take some time. It is important to emphasize this, as many philosophies of language seem to regard language as ultimate. But for us language is a means of expressing insights. Language is not ultimate but shifts and turns according to the dictates of understanding. We can confer new meanings on old words; we can invent new words to express new concepts; we can recognize in history the shift in the meaning of a word. What is fundamental is meaning, not the words used to communicate meaning.

This is not to say that language has no effect on our thinking, far from it. We are educated into a language and a language does impose its own provisional limitations, structures, deficiencies, and to some extent concepts. Language is a symbol system and symbols can be appropriate or inappropriate. But the point is that we can break out of our language, invent new concepts, go beyond the bounds of out tradition. We do this by creative insight.

At some point we realize that our insights however brilliant and exciting only give possibly relevant hypotheses. We have to raise the further question for reflection; we have to move into a critical mode. Our intelligence is purposive, is not usually satisfied with thinking possible objects of thought but wants to know what is real. Inexorably we move to the level of reflection.

3. Level of Judgment. *The question for reflection is a question like is it so? or is it true? which looks for a yes or no or anything in-between kind of answer. It is a new sort of question, one that is not looking for further information or further understanding but is moving into a critical mode and asking is our understanding correct? Is it merely a bright idea or is it a verifiable idea? The question arises spontaneously but we can short-circuit the system by not letting it arise or by substituting other criteria for the criterion of sufficient evidence.*

The structure of the act of reflective understanding we have examined in detail. Reflective understanding is an insight into the sufficiency of the evidence for a conclusion and the sufficiency of the link between the evidence and the conclusion. It is adding no [260] new insights other than the insight into the connection between the conditioned and its fulfilling conditions. It is not a comparison between the world in-here and the world out-there in order to see if they correspond. Often in mathematics when you get the answer to a problem you have the possibility of checking the answer by working backwards from the answer to the problem to confirm that the answer is correct. This is the kind of act that is involved in reflective understanding.

The uttering of a judgment is a further act, one which can be delayed by factors such as fear, bias, prejudice, selfishness, etc. If we are temperamentally very timid we may delay judgment unnecessarily; if we are very impulsive we may have passed judgment before all the evidence was in. But in a normal mind governed by the pure detached unrestricted desire to know, the judgment emerges in response to the reflective act of understanding and utters the final yes or no that is a term in human knowing.

It is a term only in the sense that that particular problem has now been solved, for it may set off a chase for further questions and problems and information that are related to the first. Yet it is a term because in each increment to our knowledge we have moved from experiencing to thinking to knowing.

3. Dynamic Unity of Functions

Cognitional structure constitutes a whole made out of parts. In the course of our self-appropriation we have identified different activities and divided these activities into three levels. There is a progression from each activity that we have identified to the next and also there is a progression from each level to the next. The lower levels are incomplete without the higher; the higher are impossible without the lower.

The unity of a building or of a motor car or of a symphony is somehow imposed from without. But cognitional structure is self-constituting. It puts itself together. It builds itself up. It is a unity from within, a synthesis of parts and not just a juxtaposition. [261]

In knowing, it is not only the activities involved which form a unity but also the subject of all these activities joins them together in a unity. It is the same subject who performs each activity. If it were not the same subject who experienced and who understood, then who would reflect upon the correctness of the insight in relation to the data and the question?

Consciousness, as we have explained, is an awareness immanent in cognitional operations. As well as experiencing the book being white, I am aware of my experience of the book being white. As well as experiencing the joy of insight, I am also aware of my experience of joy in insight. As well as experiencing reflective understanding I am also aware of my experience of reflective understanding. I am the same subject of all of the

different operations. As well as being aware of the objects of the operations we can be aware of the experience of the operations. But it is the same subject who is aware at the different levels and also aware of the unity of the one subject of all the activities.

The levels can be separated only in the sense that the lower levels can occur without the further levels necessarily following. You can experience many things but it does not always necessarily follow that you understand them all. If no question arises, then it ends there. When we do understand something, that goes beyond experience, sweeping it up into a higher activity. Yet, similarly, the forward movement can stop there; you have a bright idea and that is all that you have. The further question may not arise. If it does not then you are left with a mere object of thought and that is it. Understanding does have an integrity of its own. The process can stop there. You can have a direct insight without having a reflective insight; this is understanding, but it is not yet knowing.

The structure of cognitional activities is dynamic. This is where the metaphors of a building or an automobile really limp. The parts of cognitional structure are themselves not bricks or wheels, they are activities. Activities are in motion; they are not static; they move on to other activities; they are dynamic. The whole is also dynamic in that knowing is never satisfied. Our desire to know is unrestricted. We can ask about anything and everything, and we do. As soon as we have solved one problem we move on to another; we are forever [262] digging deeper; there is no end to it. We are always either progressing or declining. We can stem the flow of further questions; our curiosity can be blunted, our enthusiasm can wane, our energy can wear out. We can settle for the more restful cocoon of a fixed viewpoint. But in principle our desire to know is unrestricted and is never fully satisfied.

Nor does everything always work smoothly and efficiently. We can be quite confused by a mass of data. We can be asking the wrong questions and barking up the wrong tree. We can make mistakes in our assumptions, in our calculations. We can have oversights when we simply do not see what is relevant. We can reach mistaken conclusions either because our data is defective, or our definitions are not correct, or because we have not taken some point into account. We can go through long periods of frustration and confusion before things come into focus. An intelligent person catches on quickly, sees the relevant point, clears away the confusion and moves on. One less intelligent may be left floundering and have to make up with hard work what comes easily for others.

Although there is a unity in human knowing it is not the unity of simplicity. It is not a unity that does not have parts but a functional unity of components or interrelated parts. Human knowing is not an intuition, not a seeing interiorly and intellectually which is analogous to physical seeing in that we just open our eyes and perceive what is there to be seen. Neither is it knowledge of sense alone. Experiencing is part of our human knowing. In animals it is what constitutes knowing; in humans it is the biological foundation on which all our human knowing is built. Nor is it understanding alone as if

human knowing consisted in having bright ideas, nor is it judgment alone, as judgment is inconceivable without understanding and experiencing. Empiricists tend to reduce all knowing to the level of experiencing. Idealists tend to reduce all of human knowing to the level of understanding. Rationalists tend to reduce all of human knowing to the level of reflection alone. But here we want to embrace the full complexity of human knowing in all its integrity and richness. [263]

Human knowing is a complicated, protracted affair involving many different activities at three different levels of operation. Our thinking is discursive; it proceeds through different activities over a period of time. There is such a temptation to try to oversimplify the process and to conflate the three levels into one, but that can only fail. The data of human consciousness shows clearly the many sided, complicated, discursive emergence of human knowing through questioning of data given in sense experience. It is important to emphasize this, as most theories of knowledge try to simplify by denying some of the components involved. Our self-appropriation will have shown us that we know by way of complex sequence of operations which can be distinguished into successive stages within one knowing.

4. The Way Up and the Way Down

We can also distinguish between the 'way up' and the 'way down.' The way up is the process we have been concentrating on as we have moved from experiencing to understanding to judging. But there is also a way down, by which higher levels exert an influence and a control on lower activities. Let us try to delineate these two movements more clearly.

We can best define the relations between the levels in terms of sublation. This is a term introduced into philosophy by Hegel but used here in a slightly different sense. We will identify three elements in a sublation.

> ..what sublates goes beyond what is sublated, introduces something new and distinct, puts everything on a new basis, yet so far from interfering with the sublated or destroying it, on the contrary needs it, includes it, preserves all its proper features and properties, and carries them forward to a fuller realization within a richer context.[75]

Relating sublation specifically to cognitional structure, Lonergan says,

> ..intentionality analysis that distinguishes four levels of conscious and intentional operations, where each successive level sublates previous levels by going beyond them, by setting up a higher principle, by introducing new operations, and by preserving the integrity of previous levels, while extending enormously their range and their significance.[76] [264]

The act of understanding sublates the act of experiencing. (1) Understanding goes beyond experience, introduces something new, is a higher integration, a higher unity or organization or relation. Understanding cannot be reduced to experiencing; it is a new reality. (2) It does not destroy or invalidate the level of experiencing; experience at the level of sense has its own place and validity and value. Most animals survive quite successfully with experiencing alone. To emphasize understanding is not to denigrate experiencing. (3) On the contrary, our understanding incorporates elements of experience to subsume them into a new unity. It does confer a higher control or criterion. It confers a new and higher value on experience. Not only has experience a perfection at its own level of being, but it leads the way to understanding and attains a new level of perfection.

Similarly judgment sublates understanding. (1) It does introduce something new, different, beyond, higher. Judgment cannot be reduced to understanding. We encounter a new kind of question, a different type of insight, and an original expression in a judgment. It is a movement from thinking to knowing. (2) But judgment would be impossible without understanding. Understanding is not destroyed or denigrated or left behind. It has an integrity of its own at its own level within its own limits of thinking. (3) Judgment enhances understanding, gives it added value in view of a higher goal.

The way up as we have called it is the normal process of learning by achievement, what we have called immanently generated knowledge. But there is a reverse process, a way down. There is a way in which judgment exercises a control which reaches back through understanding to pattern our experiencing. And there is a way down which is characteristic of belief, used in the technical sense that we have defined. Let us consider each of these in turn.

Basic scientific method can be defined as theory verified in instances. Verification is characteristic of the level of judgment, theory is characteristic of the level of understanding, and instances occur at the level of experiencing. Some philosophers of science think that the observer should approach the observed with no theoretical assumptions or presuppositions at all. They suggest that theory interferes with the objectivity and neutrality of observations [265] and experiments. Theory is considered to be a kind of prejudice or subjectivity which might interfere with the observations. They advocate a kind of theory-free observation. This is really the principle of the empty head: the emptier your head is of ideas, theories, hypotheses, possibilities, the more accurate and neutral will be your observations.

For the empiricist verification takes place at the level of experiencing. If you see something, that is the verification; there is no difference between data and factual. For us verification is at the level of judgment incorporating elements of understanding and data: theory verified in instances. It is the theory which guides experiments to produce sensible occurrences which will be significant. It is extremely important to consider a

wide range of possibilities, to define the hypothesis clearly, to devise strategies of verification.

There is no interference with the integrity of the level of experience when theory sets a problem which can only be verified by a return to a precise, particular aspect of data that was not adverted to before. Did Einstein's theory interfere with the observation of the apparent position of the star during the eclipse? Provided the seeing sees what is there to be seen and the whole of what is there, and does not indulge in wishful thinking, then experience is being incorporated into science and there is no problem.

There is also the way down of belief, in the sense defined earlier. Most of our traditions we accept on the authority of our parents and leaders rather than on the basis of immanently generated knowledge. Belief is a kind of short cut to knowledge. It is legitimate; it is part of the normal collaboration in progress of knowledge. It is basically a good thing, although it is open to abuse. It is a way down because it starts with judgments, ideas, and principles that are accepted on trust. The tradition or culture of a group does set the context in which knowledge is pursued and this context does have an influence on our interests, priorities, our way of thinking, etc.

Cognitional structure is an integrating framework in which we can grasp the unity between these two different movements. There [266] are in fact constant ups and downs in the actual process of solving any serious problem. It is not that we have to eliminate one way or the other, the knowing process is too complicated for that. Our knowing is discursive, a kind of conversation, a shifting from one level to another, a constant interplay of images, ideas, concepts, hypotheses, affirmations, corrections, refinements. We have identified a self-correcting process in knowing, which proceeds in spirals rather than straight lines.

Lonergan's exposition in *Method in Theology* exploits this distinction between movements up and down to the full. The first phase of theology he represents as the way up, proceeding from data through interpretation to history to dialectics and conversion. There follows, then, a second phase, a way down, by which this conversion becomes foundations and leads to doctrines, systematics and communications. Nor does this process pertain only to knowing in the discipline of theology; it has relevance also in the areas of science and philosophy, wherever a tradition is first appropriated and then handed on.

We have reached an account of cognitional structure that is explanatory. Within the multiplicity of intentional activities we have been able to discern a basic pattern of operations. We have spent chapters describing these activities and inviting you to identify these activities in your own consciousness. We are at the point where we can claim to have reached an explanatory account of these components of the one human knowing. The terms we are using are experiencing, understanding and judging. We have defined them in their relations to one another, relations that we have called sublation. We have defined questioning as the dynamism that moves us from one level to another.

This identification of implicitly defined terms and relations puts us in a position to be very precise and accurate in identifying the mental operations involved in human knowing. We can see how all the components fit together, we can identify the different levels of activity, we can identify the distractions that tend to lead us astray chasing after red herrings.

The pattern that we have discovered is not just an option. It is not neutral; it is obligatory. There is only one structure of human knowing and it is this one. This is a normative pattern of operations: [267] we have to be attentive, be intelligent, and be reasonable in order to succeed in moving from questioning to correct knowing. There are few people who would dare to lecture on astronomy by boasting about how little they have observed the stars; there are few who begin a book by boasting of how unintelligent they have been in their preparation and presentation; there are few people who would be proud to be called unreasonable. There is no choice between inattention and attention, stupidity and intelligence, unreasonableness and reasonableness, as there might be between different fashions or menus or careers. To be an authentic human being is to try to be attentive, to be intelligent, and to be reasonable.

5. Not Open to Basic Revision

This account of cognitional structure is not open to basic revision, by which we mean that the structure of terms and relations which are implicitly defined in the diagram is not open to fundamental change. One cannot conceive of another level being interposed, nor of a level being left out, nor of the order of the movement being changed or reversed. In its basic structure we are asserting that our account of human knowing cannot be wrong.

We are not saying that this account cannot be improved. Hopefully it will become easier and more common to become aware of activities of knowing, to improve the terminology available, to compare and contrast various accounts. There may be many subtleties that could be included. As people become more familiar with self-appropriation there ought to be a great improvement in methods of teaching, in the choice of examples, in depth of awareness of what is going on within us when we know. Perhaps cognitive psychology will break free of its behaviorist presuppositions and become a very fruitful source for the study of the subtleties of intelligence in act. But whatever improvements might arise, there can be no change that will subvert, replace or fundamentally alter the structure in its basic outline. In case this sounds like an arrogant claim, let us hasten to justify it by showing that any attempt at basic revision will only serve to reinforce the structure. [268]

Cognitional structure is basically unrevisable because any attempt at revision invokes the very structure it is trying to replace. Let us try to imagine that new data has come to light about human knowing, perhaps on account of better empirical studies, or better

methods, or better instruments or more systematic observation; there is some new data about human knowing that are not accounted for in the above structure.

But if there are data that are not accounted for in a present theory we have to go in search of a more comprehensive theory that will account for the old data as well as the new. We have to try to think of a theory, an explanation, a set of terms and relations, which will be sufficiently comprehensive to include all the data.

Not any old theory will do; it has to be correct, true, verifiable. We do not want to be mocked by our fellows, we want to present something that is cogent, convincing, that will stand up to attack. If we are claiming to replace one theory with another then we have to have a reasonable account of why the second is better.

And so we see immediately that any hypothetical reviser will not be able to challenge our account of cognitional structure without invoking the experience of data, the intelligent formulation of theory and the verification of theory by recourse to data. There is something that is very basic and unavoidable about the three levels of experiencing, understanding and judging. Even a hypothetical reviser must be attentive, intelligent and reasonable.

The same argument can be presented in terms of the a priori conditions for the possibility of any judgment of fact. If there is to be a judgment of fact what are the conditions under which it must occur? A judgment can only be a proposition that is affirmed to be true on the basis of sufficient evidence. We have earlier used the terminology of a conditioned, a link between the conditioned and its conditions, and the fulfillment of the conditions.

If a judgment is to be affirmed, it is presumed that something is being affirmed. What is being affirmed? The 'what?' question is a question for understanding, for intelligence. It is intelligence that defines, classifies, relates, and puts together theories and explanations; a judgment cannot be uttered without intelligence. It is [269] intelligence that grasps the conditioned as a possibility and the link between the conditioned and its fulfilling conditions.

But what is understood? Understanding presupposed something to be understood. What is the raw material for understanding? Understanding presupposes a range of data to be brought into a unity. It presupposes a multiplicity of data of sense, which is both the raw material for understanding and the reference point for the verification of judgment; this is the field of fulfilling conditions.

If a concrete judgment of fact occurs, it is absolutely necessary that there is a judgment, an understanding of the terms and conditions of the judgment, and an experience of data as the raw material of understanding and the reference point for the verification of the judgment. The judgment in question may be a contingent judgment. The statement that it is raining, is a contingent statement in that it is not necessarily raining, but simply

as a matter of fact at the moment. But if you affirm that it is raining, then it necessarily follows that you have understood what you are affirming and verified your hypothesis by reference to sensible experience.

A concrete judgment of fact is one of the simplest types of knowing. We could easily analyze any other knowing and also show by means of it that knowing involves judgments based on understanding of experience that is verified. This procedure simply shows in another presentation that cognitional structure as outlined is unavoidable, unrevisable and invariant.

This structure of human knowing is invariant in the sense that wherever human knowing occurs, there will be present three levels united into one knowing. This is not just what often occurs but what always and what must by definition occur. Common and basic to every realm of knowledge, the three-in-one structure is found in all areas of human knowing even though each area has a method and an object proper to itself. It is common to the natural sciences as theory verified in instances, and to the human sciences in a more complicated fashion because as well as the data of sense there is the data of consciousness to be taken into account. It is the substructure of the practical sciences and productive technologies. It underlies our use of language, our learning of a language and our study of the [270] philosophy of language. It is the basis of philosophy understood as a higher viewpoint, but still human knowing.

Included among these realms of human knowing is transcendent knowledge, our knowledge of transcendent reality, namely, God. In this case the data of sense is only indirectly involved; there can be no direct sensible experience of God in the way that there is direct sensible experience of a table or an atom. This three-fold structure even underpins our theology, presupposing all that we have said while going on to add other significant dimensions. Having grasped the underlying structure of all human knowing, we can see some basis for the unity of all human knowing as well as for those differentiations that define specific sciences and specializations.

6. Cognitional Structure and the Theoretical Sciences

In the context of our contemporary culture the empirical sciences are highly respected. They are considered to be successful, methodical, objective, the most trustworthy kind of knowledge. All you have to do is call in a scientific expert to prove your point or get a computer print-out to bolster your argument. By contrast the assertions of philosophers are often considered to be unverifiable, personal speculation, unreliable opinions and the polar opposite of the precise, verifiable formulas of science. In the light of the position we have now reached, let us contrast the procedures of the empirical scientist with the procedures we have recommended for the philosopher and evaluate how they match up on specific points of method. Which is the most reliable? the most certain? the most foundational?

1. Effects of new data. In the empirical sciences there is always the possibility of new data requiring adjustments or extensions of a theory. Much of the history of science consists in these constant adjustments as new data emerges. New data can totally overthrow an existing theory, as the use of the telescope showed that Aristotle's theory of the perfection of the heavenly was simply mistaken. New data can require extensions, or adjustments, or qualifications, or exceptions be made to existing theory. So a scientific theory is 271] always open to revision because of the possibility of further contrary data becoming available.

Does this apply to cognitional theory? Can our account of human knowing be overthrown by further data becoming available? The data on which we have grounded our account of human knowing are the data of consciousness. We have been concerned with identifying activities rather than contents. The contents could embrace an infinity; but there is a basic simplicity and unity about the activities. There is one activity of physical seeing, but there is an infinity of shapes, colors, forms to be seen. There is one activity of human understanding but a quasi infinity of relations, causes, connections, substances, etc to be understood. There is one form of reflective understanding leading to a judgment but the content of the judgment includes all that has been known, is known or could be known. It is not necessary to explore all the contents of the act of understanding to grasp its basic nature. It is necessary, as we have seen, to examine some examples very carefully; we need to identify, appropriate, discriminate and relate these activities. After attaining a facility in self-appropriation, there comes a point of diminishing marginal returns where examining further examples adds little or nothing to our understanding. Hence new data has a very limited effect on the conclusions of cognitional theory. We have exhaustively examined the relevant data, allowed further questions to arise, and found that every example of human knowing, past present and future must conform to this basic pattern of operations. No conceivable new datum of consciousness can arise to require a radical revision of our cognitional structure.

2. Basic revision of terms and relations. Empirical sciences are open to basic revision of their principles and axioms whereas cognitional theory is not. Scientific theory to be explanatory must rest on certain basic axioms, definitions and assumptions. Euclid clearly defined these for himself before setting up his system of theorems and corollaries. But where did these principles and postulates come from? What if you revise them? If you start from other principles you get different systems of geometry. Today there are many such systems. Newton assumed a certain basic understanding of time and space; Einstein changed this basic [272] understanding and produced a new physics. A science is always open to basic revision because the principles on which it is founded can be reexamined and redefined. Paradigm shifts are to be expected in the development of the empirical sciences; such shifts do not prove the irrationality of scientific method; on the contrary, at times, a total shift in presuppositions, concepts, axioms and definitions is necessary for the progress of science.

By contrast we have already indicated how our account of cognitional structure is not open to basic revision because any attempt at revision reinforces the unavoidability of the basic structure.

3. Description and Explanation. We have seen that all of the sciences proceed from description, to explanation in the technical sense, and return to description. In other words the empirical sciences start by relating things to our senses, move to relating things to one another, and finally return to relating things to our senses. In the normal unfolding of empirical science there is a divergence between description and explanation. Explanation introduces a hypothetical element, a supposition, and a theory, which is then verified by reference back to the data of sense. But the hypothetical element introduced is never totally eliminated by the verification. Galileo repeated his experiments many times, but he did not perform the experiment for every distance, or for every time period, or for every possible material. He did it for a sufficient number of times to reach a reasonable conclusion.

What is important for us here is to note the significant difference between the procedure of the empirical sciences and the procedure of cognitional theory. We noted that the empirical sciences start with description, move to explanation and then return to description. But cognitional theory is an area where description and explanation coincide rather than diverge. Description we have defined as relating things to ourselves; explanation we have defined as relating things to one another. Hence we can see that description in the case of the data of consciousness is also explanatory. If relating things to myself is description and we admit that myself is also a thing, then relating things to myself is a particular case of relating things to one another. Hence the movement away from description to explanation [273] does not happen in cognitional theory because these two procedures of knowing converge rather than diverge. What we are doing in cognitional structure is explanatory in the sense of relating things to one another; but also descriptive in that one of these things is oneself.

Because of this convergence in cognitional theory between description and explanation, when we begin to define cognitional activities we do not move away from description. That hypothetical element which is usually introduced by way of explanatory definition is eliminated, because our explanatory definitions are also descriptive definitions. Each and every instance of knowing is a verification of the explanation that we have given in cognitional structure. As Lonergan puts it, "explanation on the basis of consciousness can escape entirely the merely supposed, the merely postulated, the merely inferred."[77]

4. Antecedent/Consequent. In empirical science the logical form of the demonstration is often in the form of positing the consequent. Strictly speaking the logic of this procedure is invalid. In the hypothetical syllogism you can posit the antecedent and the consequent follows; but you cannot on logical grounds alone, posit the consequent and claim that the antecedent follows. The form of positing the consequent is:

If A, then B.	If he is an Irishman, then he eats porridge.
But B.	But he eats porridge.
Therefore A.	Therefore he is an Irishman.

Galileo for instance was following the same kind of reasoning. If his law of acceleration is correct, then, measurements will be expected to conform to that law. The measurements come out as expected. Therefore the law is verified. Strictly speaking this is not valid. The only reason that it seems valid is that it is very difficult to visualize any other law which would explain these measurements, but that does not prove that such a law does not exist. In the example of the Irishman it is easy to see that there might be other people who eat porridge who are not Irishmen. Much of classical scientific thinking is under the shadow of positing the consequent. [274]

But in the case of self-affirmation we will find that the basic logical form of the argument is in the form of positing the antecedent. From the antecedent the consequent follows of necessity. This is explained when we consider self-affirmation in the move from subjectivity to objectivity._

5. Intelligible/Intelligent. We can attain a valid knowledge of substances, causes, laws, essences, etc. Our universe is contingent not necessary; whatever knowledge we attain happens to be the case but could have been different. The intelligibility we grasp is extrinsic, passive, secondary. Often the scientist attains correlations and not causes; that x follows y but not why x follows y. Even Aquinas acknowledged the difficulty we have in knowing material substances, even though they are the proper object of human intellect. We know them from the outside.

By contrast our knowledge of our own process of knowing is a grasp of intelligence in act, that is of our being intelligent. The laws of the mind are not imposed from outside, not passive, not extrinsic but intelligent and rational process in itself. We learn of intelligence not from the outside but form the inside as active intelligent beings. The imperatives of be attentive, be intelligent and be reasonable are not rules imposed on the mind by logicians, but the intelligent and rational process in its unfolding. We too are contingent and could have been different, but in fact we are intelligent; by that divine spark we grasp the passive extrinsic intelligibility of our universe.

6. Belief. In empirical science, surprisingly, we are usually dependent on belief. No scientist can ever repeat all the experiments of his predecessors. Nor can he check all the research of his colleagues. Nor can he check the reliability of his tables, instruments, and equipment. Science is a collaboration of specialists. Much has to be taken on trust; it is a matter of belief rather than immanently generated knowledge. Hence it is open to mistakes, prejudice, fraud, self-interest of others.

But in cognitional structure we are relying on our own immanent experience, understanding and judging; we do not have to rely on what any scientist or philosopher says about knowing. We reach a personal foundation which cannot be skewed by others. [275]

In our opening chapter we examined how the breakthrough to theory represented an advance over the inadequacies of commonsense knowing. We also indicated briefly that theory itself involves deficiencies which are the source of the present crisis. We are now in a position to compare theory and interiority more precisely and to indicate how interiority goes beyond theory. The above comparisons have shown that scientific theory is always open to basic revision because of possible revision of principles or paradigms; it is always open to adjustments and revision because of the possibility of new data; scientific theory attains probabilities rather than certainties, because of using the method of positing the consequent, because of the hypothetical element which cannot be eliminated, because in understanding any concrete event a combination of classical and statistical methods must be used, and because science often attains correlations rather than real causes; and because science is now a collaborative effort and one can never personally verify everything for oneself.

However, we have seen that explanation based on the data of consciousness escapes many of these limitations. Our grasp of the dynamics of cognitional structure is not open to basic revision; it may be improved or facilitated but not overthrown; in self-appropriation we grasp directly intelligence in act; it is a personal experience and in no way dependent on belief. We seem to have found the personal normative foundations what we were looking for in the introduction. Theory based on the data of sense suffers the limitations outlined above; theory based on the data of consciousness is special; it is not theory but interiority. It is a leap into the third stage of meaning with all the advantages mentioned above.

All these points show that, paradoxically, we can be surer of our conclusions about the structure of knowing that we can be about the conclusions of empirical sciences. In a culture where science is so highly respected and where theories about knowing are so diverse, this is a surprise. Yet it highlights the fruits of the method of self-appropriation; we can establish for ourselves the foundations of our knowing and put into perspective the actual contents of the known. [276]

7. From Consciousness to Self-Knowledge

We have seen that consciousness is simply an awareness of the subject that is concomitant with an awareness of objects. Consciousness is awareness immanent in cognitional operations. We have noted that it is the one subject that is the unifying factor between all the levels of consciousness and all the activities at the different levels. There is an awareness of the "I" that accompanies all of our conscious activities.

But this is only an awareness, it is only an experience; it is only the data of consciousness; it is not self-knowledge. Knowledge is a compound of experience, understanding and judgment; thus, knowledge of the self can only be a knowledge that conforms to our structure of knowing. 'Know thyself' has been an adage from Socratic times but is extraordinarily difficult of attainment. In this section we will sketch out how one moves from consciousness of the self to knowledge of the self.

Consciousness is awareness; it is an experience concomitant with cognitional activities. We can talk of consciousness at different levels. We are aware at the purely empirical level when we are awake but conscious only of feelings, imaginations, sensations, and emotions as we might be when sunbathing on a pleasant afternoon. We are aware of the sensations and also of ourselves as the subject of the sensations.

We are also conscious when we are studying, researching, exploring ideas and concepts, looking for solutions, taking notes, reading a book, listening to a lecture, trying to understand. There exist a multitude of activities in which we can be involved and concomitant with them all is the awareness that it is "I" who is doing the understanding. This is still an experience of our own understanding.

When we reflect about the truth of a scientific theory, or a historical generalization, or a mathematical puzzle, we are conscious at the level of reflection. Reflection means asking a specific question about correctness or truth; it involves a personal commitment, brings thinking to a term in knowing. We are aware of [277] ourselves as subjects performing the activities of reflection and judgment.

First we experience our experience, understanding and judging. We are aware of these activities. The data of consciousness is first experienced simply as data. In most people it will ever remain simply as an experience, simply as a data that has not been identified or analyzed or appropriated. But we have embarked on a program of self-appropriation. So we took this data of consciousness as our starting point. We didn't stop looking out in order to look in; we heightened our awareness of the data of consciousness; we shifted the focus of our attention, precisely so that we could begin to understand it. So we moved from experiencing cognitional acts to understanding them.

Thus we identified the different activities involved in having an insight. We went on to distinguish different kinds of insight. We recognized the peculiar form of the inverse insight and the limitations of a statistical method. We recognized the uniqueness of the reflective insight leading to judgment and examined many different kinds of judgment. We learned to understand our experience of knowing; it was no longer consciousness simply as an experience, but a consciousness that we were able to identify, talk about, name, define, outline the characteristics of, etc. In other words we were trying to understand the data of consciousness: we were moving from the level of experience to the level of understanding.

But understanding raises the question of judgment, so we worked out a theory, a set of terms and relations by which all the different activities could be related, made sense and had a place. But is our account of cognitional structure correct? Why are other accounts false? How do you show that our account is true and verifiable? We have compared the procedures of empirical sciences with the procedures we have followed and found that cognitional theory is more reliable, verifiable and foundational. We complete the reduplication of the structure by which we experience cognitional activities, understand their nature and variety and judge that our account is true. Thus we have moved from consciousness of the self to self-knowledge. [278]

Comments on Preliminary Exercises

(1) The key box is the central one because it is involved in so many of the additions. It seems it should be a number somewhere in the middle to allow many combinations reaching to fifteen…

(2) Computers can follow rules but cannot discover new rules. Computers can calculate rather than understand. Computers are intelligent only in the limited sense that they are a product of human intelligence. There is a huge literature on Artificial Intelligence, but most of it suffers from a very limited appreciation of the creativity and inventiveness of human intelligence.

(3) An experiment in a teaching context is usually a demonstration of the truth of something already known. Note how all of the activities of cleaning, heating, weighing, comparing, calculating etc. are swept up into the unity of a single judgment.

9

Intellectual Conversion

The transition from the neglected and truncated subject to self-appropriation is not a simple matter. It is not just a matter of finding out and assenting to a number of true propositions. More basically, it is a matter of conversion, of a personal philosophic experience, of moving out of a world of sense and of arriving, dazed and disorientated for a while, into a universe of being.[lxxviii]

Preliminary Exercises

(1) Is space real? If God were to remove all the matter and energy from the universe would there be empty space left over?

(2) Are relations of cause and effect real? If a football player kicks the ball and it moves, how do you know that he is the cause? Can you see him causing the ball to move? Can you see causes? [280]

(3) An old Latin tag says, *Actio in distans absolute repugnat*, namely, action at a distance is absolutely impossible. How does gravity work across the absolute vacuum of space?

(4) Do Newton's laws of motion belong only in the mind or do they belong somehow to matter in the real world also?

(5) Is there a fundamental difference between a complicated machine and a live worm? What is the difference?

(6) Where is the human soul located? In the heart? In the head? Wholly present everywhere in the body?

1. Dialectic

In the previous chapter we considered the proximate criterion of truth, namely, the imperatives that are operative in the immediate context of considering data, understanding correlations and verifying conclusions. Mistakes do occur in that context but the self-correcting process of knowing usually kicks in; we can recognize and correct our mistakes, learn from them and so attain truth. Having noted that judgments depend also on a larger context, in this instance we are concerned, not with the proximate context of other judgments, but with the remote context of desires, ambitions, expectations motivating the person in the search for truth. For Lonergan the remote criterion of truth is the proper unfolding of the pure detached unrestricted desire to know.[79] What that proper unfolding is will be examined in this chapter. We are human persons; we are a whole of many parts; intellect is one potential among many; the desire to know is one desire among many other desires. Just as our knowing is an achieved synthesis of sense and intellect, so the unfolding of the desire to know is an achieved balance between the many sometimes conflicting desires of the human heart.

Much needs to be said - and done - about the appropriation of our desires, feelings and actions.[80] In the interests of doing one thing well, we have concentrated until now on the self-appropriation of the process of knowing. However, the deepest source of division, controversy and misunderstanding arises not out of the immediate [281] context of cognitional structure but out of the remote context of the drives, anticipations, and presuppositions underlying our search for understanding. The most radical distortion of understanding comes from twisted motivations and mistaken imaginative anticipations. Our method of self-appropriation can help us to recognize and purge these unconscious and unquestioned background influences. We will consider bias and the hermeneutic of suspicion when we deal with normative objectivity (chapter ten). Here we concentrate on the most basic dialectic involved in the search for knowledge: the presence or absence of intellectual conversion.[81]

There is a radical dualism at the heart of knowing which we have noticed in passing already in this text: sense knowing and intellectual knowing, imagination and intellect, the animal criterion of the real and the human criterion, the >body > and the thing. It is time to examine these explicitly in order to pin down this dialectic which is at the heart of the unfolding of the desire to know.

A dialectic, in the sense we are using here, is the unfolding of two linked but opposed principles. It is development by way of a tension of opposites.[82] The two principles are linked together and unfold in relation to one another. We are not aiming at eliminating one at the expense of the other but of maintaining the tension, discriminating between them, pivoting from one to the other, harmonizing their various activities. We can distinguish sense knowing and human intellectual knowing as the two dialectical principles at work here. We are both animal and rational; we are a unity in tension. Neither term can be eliminated. We grow and develop through the tension of opposites rather than becoming either animals or angels.

We have taken issue with various philosophers on particular points in a specific context. Now it is time to go to the root of philosophical differences and controversies. It is hard to accuse such great philosophers as Descartes, Hume and Kant of being inattentive, unintelligent, or unreasonable, yet we do claim that they are basically and fundamentally wrong in their theories about human knowing. How can this be? Our answer is that at the very root of philosophical differences are unquestioned presuppositions and anticipations of what human knowing must be like. In this chapter [282] we try to uncover those false assumptions and put them in dialectical contrast with our own position.

The theme of intellectual conversion is not a new topic that we meet here for the first time; it is what we have been working at since the beginning of this text. We are now in a position to face it head on explicitly with hope that you are in a position to understand. Working through the exercises you may have become aware of being introduced to a new way of looking at things and you may have realized the enormous importance of some of the insights that you have had. What we have been working towards is a full implementation of what we are now going to call intellectual conversion. In this chapter we will try to encapsulate the transition to intellectual conversion, to thematize it, to help you recognize it as it happens in your own experience.

Perhaps it will seem a bit unusual to use the word 'conversion' in the context of a philosophy of understanding. We are accustomed to encountering the word conversion in the context of religion or moral activity. In such usage 'conversion' signifies a major turnaround in our moral or religious behavior. We associate conversion with decisions to lead a good life, to change from one religion to another, to take seriously the demands of a religious creed. Similarly, we will show that intellectual conversion is a major turnaround in our way of thinking about the world, and that it can be legitimately and helpfully referred to as a conversion.

We are no longer talking about a single insight, or even about a single higher viewpoint. We are not talking about looking at things from different points of view, discovering new theories, or even what has been referred to as paradigm shifts. We are not now talking about particular

theoretical developments. We are talking about rejection of the myth that knowing is like looking, and about implementing fully the implications of the idea that the real is the verified.

A conversion is a turning away from and a turning to. It is a radically new beginning, not just a new area of research but a new way of thinking about things. It is a change in the criteria that we use to determine what counts as human knowing. It is a radical break-through in the fundamental area of how we know at all. We [283] will be using many metaphors and images to try to express this but the crucial thing is, as always, not so much to look at the words in the book as to refer them to your own experience of some of the shifts suggested in earlier chapters. This involves a radical transformation of our way of sorting out what is true from what is false.

We might characterize this shift in terms of a vertical horizon change. A horizon is the limit of our viewpoint, the way we customarily approach things, the categories into which we fit our experiences. These horizons can develop horizontally or vertically. Horizontal developments are such that development takes place along a certain line, the horizon is being expanded but within the same bounds. Changes in the horizons take place, more information is added but the horizons remain intact. There is continuity with the previous horizons. But there are also vertical shifts of horizon when the horizon framework itself is radically overhauled and changed, where there is little continuity with the previous horizon, where there is a real challenge to shift into a new way of thinking. A new sequence begins, something new is born.

This involves a personal decision. It may not be the kind of moral or religious decision involved in turning away from sin and believing the gospel, but there has to be a willingness to change and an acceptance of the challenge and the invitation of intellectual conversion. Teachers will often reflect sadly that you can bring a horse to the water but you can't make him drink. You can do so much for students but in the end it is their decision what they are going to do with your pedagogical pearls. Some will be too lazy to do the work required on their own. Some will resist change simply out of stubbornness, fear of the unknown, or resentment. Some will misunderstand what is required and fall into subjectivism or whatever. Some will grasp what is required but decide that that is not their vocation in life and turn to more practical areas. Teaching is an invitation that is conditional on willing acceptance.

There is a startling strangeness about the world of intellectual conversion, rather like suddenly seeing the world for the first time even though we have been living in it all our lives. It is not in any way an exotic or mystical experience, simply an experience of liberation from confusion and skepticism into a knowing that this is [284] it. It is the experience of Plato's cave man liberated from the darkness and exposed to the light of the noon day sun - as long as we realize that the light is not the light of the sun but of insights and judgments.

We will approach the subject using four terminologies, each of which says the same thing in a different way. Hopefully these four approaches will complement one another and at least one will succeed in communicating the full message. The important thing is to focus on relating these accounts to your own cognitive history so as to identify the beginnings of intellectual conversion in your own life. Hence we will study, from >body' to thing; from naive realism to

critical realism; from >looking= to judgment; and from the world of immediacy to the world mediated by meaning.

2. From 'Body' to Thing

If you reflect on the process of solving some of the puzzles presented in the preliminary exercises you might wonder why did it take so long. Presented with a problem like the fish (chapter two) we automatically assume that to reverse the fish the tail must become the head. But that doesn't work, no matter how hard we try. It is only when imagination allows us to consider other possibilities that we get it. The difficulty is in breaking free from unquestioned imaginative assumptions as to where the solution lies. Similarly, when asked to join nine points with four lines drawn continuously (chapter two), we automatically assume that the lines must be within the square represented by the points. You can try within those assumptions but you will never solve the problem. Again the breakthrough is to extend lines outside the square and then you get it. Unquestioned imaginative presuppositions are a block to the solution. If you examine other problems you will recognize these blocks to understanding at work. If you ask your bridge partner why he did not lead a spade he may reply, 'Oh, I didn't *think* of that!' meaning actually that he did not *imagine* the possibility. We understand what imagination presents to us; if it is not presented it cannot be understood.[83] [285]

A similar block exists when we ask questions about human understanding. Powerful, unquestioned, imaginative presuppositions impose on our thinking like blinkers on a horse. These assumptions are dangerous and powerful precisely because they are unquestioned; if they were the result of questioning, you could name them, evaluate and discriminate between them. Because they are unquestioned they continue to exert a powerful background influence frustrating the finding of the correct solution. The predominant unquestioned image concerning knowing is that it is some kind of contact or bridge between a subject 'in the mind' and an object 'outside the mind.' Intellectual conversion involves questioning, identifying and breaking this imaginative presupposition which distorts all considerations about knowing.

1. Animal 'knowing'. Animals live in the biological pattern of experience. They have five external senses and they do have a limited ability to remember, to imagine and to coordinate responses to different stimuli. Their particular interests are very limited and specialized. The whole orientation of their sensing is to successful survival and the satisfaction of basic needs, to protection and the preservation of life. Animal sensation can be sharper, more sensitive, more specialized, than our own human sensing.

We can talk about 'animal knowing' in the restricted sense of a knowing limited to sense or to experience. But it is a knowing that is preintellectual and preconceptual. Animals do not have insights and they do not make judgments. We may speak of some animals as being intelligent and others as being dumb, but this is a very loose use of the word intelligence; few would put animals in the same category as humans when it comes to intelligence. There is a limited learning in animals, based on principles of stimulus and response, which can be satisfactorily explained in terms of the biological pattern of experience of sensitive living.

Animals recognize objects and that is what we mean by 'body'. Dogs recognize their masters; cats recognize mice; a kitten will recognize a saucer of milk; a male weaverbird will recognize a female weaverbird. But again what we mean by recognize here is simply at the level of physical seeing with a minimal reference to memory, to imagination and to instinct. Animals recognize 'bodies'; [286] they recognize what can be sensed and what comes with the orbit of their needs and the imperatives of survival. It is a purely sense knowing.

Let us characterize this elementary knowing as 'the already, out, there, now, real' of the 'body'. An animal finds the world already constituted; there is no transition from potentially intelligible to actually intelligible; the animal does not grasp intelligible relations, causes, species: it sees what is there to be seen; it just opens its eyes and sees; it is automatic, at the level of sensation. There is no process of questioning, insights, hypotheses, and judgments. The 'body' is 'already' there.

The orientation of this elementary knowing is *outwards* to the environment. Animals do not have identity crises or epistemological problems, and do not reflect on their destiny or lot. The senses are oriented outwards towards external objects. What is real for the animal is an object of sense and it is real if it comes within the range of the interests of survival. It is *there now* in the sense that animals have to situate 'bodies' in time and place; they live predominantly in the present. They do not have an abstract notion of space and time.

Animals do have a criterion of the real. They can distinguish between a saucer of milk and a picture of a saucer of milk. They can often distinguish between a man and a scarecrow; they can sense traps, fear guns, suspect an unfamiliar smell, etc. Their elementary knowledge is often highly successful and ensures that they preserve their niche in the ecological system. What is real is what can be sensed and what is important in the biological pattern of experience. Animal sensing is dominated by the external senses and the predominant orientation of their sensing toward the already, out, there, now, real.

2. Human knowing. Human knowing, as we have seen, is by way of questions, insights and judgments. We already distinguished the insight into the thing and the insight into properties; most of the insights which we have considered concerned laws, conjugates, properties, solutions to puzzles. These kinds of insights focus on one aspect of the data to seek the intelligibility immanent in that particular data. [287]

But there is an insight that takes the individuality of the thing into account and where all the properties of the concrete thing are relevant. We recognize things by having an insight into the unity and wholeness of the data that pertains to that particular object. There is an insight into properties that is abstractive; there is an insight into a thing that is inclusive, grasping the unity, identity, whole in all the data. It is by way of insight that we recognize the difference between satellites, planets, shooting stars and fixed stars. It is by way of insight that we recognize the difference between oxygen and carbon dioxide, between the black smoke of a flame that is unburned carbon and the white smoke of a just extinguished candle that is vaporized wax.

This is what we mean by a thing, a unity, identity, whole grasped by insight. It is an object of human knowing. It is known by a particular kind of insight into the concrete, individual identity and wholeness of the thing. We do distinguish different substances even though they look very much alike, such as sugar and salt, a real person and a dummy in a shop window, food and a picture of food, between malaria and typhoid even though they may produce the same symptoms. Chemistry distinguishes the hundred elements and the millions of compounds; botany distinguishes between the different genera and species of plant life. These are distinctions between things and they are verifiable. Some classifications have been abandoned in favor of better ones, ones that satisfy the data better. The four elements of earth, air, fire and water of the Greeks have been replaced with the periodic table of the elements on the basis of countless experiments into the properties of different subdivisions of the crude Greek categorization. They are verified not by sense differences but by way of insights and judgments.

In the intellectual pattern of experience, then, we ask questions about the data given in our experience of the world; we formulate possible explanations as to why things are like that; and finally we check as to whether these possible explanations can be verified. We proceed by raising further questions about these and related matters to build up a system of verified terms and relations that constitutes an organized scientific knowledge of some particular area of experience. Our developing understanding pivots from the thing [288] understood as a whole to properties of the thing which we compare with other data; from terms to relations and from relations to terms.

3. Distinction not elimination. We have outlined two kinds of knowing; the elementary sense knowing of 'bodies' of the animals and the intelligent verifiable knowledge of things in insights and judgments. The problem is that we as human beings start predominantly in the biological pattern of experience and only move gradually and partially into the intellectual pattern of experience. We are animals and have inherited the senses of animals and operate first on the criterion of the real which goes with the biological pattern of experience. Emerging within that, we have the transforming influence of intelligence directing our attention, going beyond our senses to the intelligible, and implementing a new criterion of the real as what is known in correct judgments. The difficulty is that the two kinds of knowing, of 'bodies' and of things, are almost inevitably confused. It is only with the greatest difficulty that we have been able to disentangle the different threads. It is only after the exercises and explanations of this book or similar books that we can even approach the subject of 'bodies' and things with some hope of being understood.

Both kinds of knowing are successful in their own way, according to their own criteria. The elementary knowing of animals is highly successful in complicated operations such as building nests, or webs, finding food in the oddest of places, mating patterns and rituals that ensure the survival of the species. Elementary knowing is valid if it succeeds in helping the animal to survive and thrive in its particular niche.

Human knowing is valid in its more complicated way, if it is verified in instances. Its criterion is the virtually unconditioned; it constitutes valid knowing if there is a link between the conditions and the conditioned and if the conditions are fulfilled. We know we are right if no further pertinent questions arise. The matter is closed off, we move on to other questions.

What is needed is not the elimination of either of the two kinds of knowing but their critical distinction. What is needed is to be able to see that there are two criteria of the real and where each operates. That is what we have been getting at and that is one way of [289] describing intellectual conversion. It is recognizing that the criterion of the real in true human knowing is verification and judgment while the criterion of the real in elementary animal knowing is sense and imagination of the 'already out there now real'.

4. Confusion. The biological pattern of experience can be so dominant in our psyche that we assume that criterion of the real into what is supposed to be fully human knowing. Most people survive in a sort of in-between world; they have a great respect for Science but are frankly doubtful about the reality of those abstruse theories and laws. This does not do much damage in ordinary everyday life but can be disastrous if it introduced to science and philosophy. The survival of unquestioned assumptions, expectations and presuppositions of elementary knowing in what is supposed to be fully human knowing is the source of endless confusion.

The majority of scientists and philosophers have not learned to distinguish these two criteria and thus live in a kind of confusion of the two criteria. Newton is a good example of a scientist who insisted that the basic principle of science is that everything must be verifiable and verified; he implemented this principle rigorously until he came to the question of space and time. Certain relations of space and time that could be verified he called relative space and time, because there was always some relation by which the space and time was defined and verified. But he was unable to accept this as the whole story; his imagination and expectation was so strong that he was forced to postulate an absolute space and time which was not relative. Although Newton claimed to verify this postulation by means of the bucket experiment,[84] this was just rationalization. Absolute space and time is an example of the 'already out there now real' of animal knowing. Newton's expectation that to be real something must be touchable or seeable or imaginable was so strong that he could not believe that the reality of space and time was fully encapsulated in his laws and relations of motion and time. His absolute space is the invisible intangible empty receptacle which Plato imagined preexisted the work of the Demiurge in the formation of the world.

5. Unverifiable Images. Closely related to this is the question of the unverifiable images. We have already seen that in the field of [290] descriptive relations there are verifiable images, as we are by definition relating things to our senses. But we also saw that in the field of explanation there are no verifiable images because by definition we are relating things to one another.

On the criterion of the out there now real, this is unacceptable. If something is real it has to be imaginable; the image is the criterion of the real. Atoms are little marbles, particles constituted by a nucleus with electrons spinning around in various orbits like the planetary system. Electrons, protons and neutrons are smaller marbles which are also real because they can be imagined. If there are smaller particles out of which these are constituted then those quarks or whatever you want to call them are still smaller marbles. If when you point out that nobody has ever seen an atom, people operating out of this criterion of the real are not put out. They say that this is what atoms will look like when we do see one! If you insist that atoms are explanatory concepts, they will accuse you of idealism and still insist that atoms are real and hence imaginable.

The problem with this whole line of thinking is that the atom is a unit of explanatory knowledge. It is defined in terms of relations of things to one another; it is one of the terms defined by the relations of an explanatory system. There is no verifiable image. There is no 'out there now real'. There is no foothold for the imagination. For pedagogical reasons we construct a model which embodies and symbolizes the relations of things to one another, but the reality is in the equations and not in the model. When the scientist, having verified his equations and laws, tries to tell us what the sub-atomic world really looks like, he is foisting on us unverifiable images. He does it because he cannot distinguish the real as the out there now and the real as what is verified in instances. Such confusion is a perennial source of nonsense.

6. Reductionism. A crucial case is the question of things within things.[85] The scientists tell us that there are about one hundred basic elements out of which everything else is made. Atoms combine to form the compounds that are studied in chemistry; they combine in even more complicated ways to produce living cells which are studied in biology. Cells develop and evolve and form more complicated systems so that eventually we have plant life. Again [291] plants evolve and develop and become more complicated and integrated systems. Then behold, we have animals. The question of things within things is the question, is water nothing more then hydrogen and oxygen? Does hydrogen and oxygen continue to exist as hydrogen and oxygen in water? Is an animal nothing more than the sum of its cells? Do the cells have an existence, meaning, identity, apart from the larger whole? Are atoms things within molecules? Are cells things within organisms?

What is an animal made out of? The biologist will probably reply that it is made out of water, carbon, sulfur, and nitrogen in such and such percentages; if you reduce an animal to its parts

these are the parts out of which it is made. This response is explicitly reductionist. An animal is what it is made out of and nothing more. It is made out of chemical elements and compounds and this is what makes an animal. In this kind of thinking an animal is simply a very complicated machine, no more than the sum of its parts. For such scientists there is no problem of things within things: the atoms survive as atoms in the wholeness of the animal. An animal is simply the sum of its parts and the parts ultimately are atoms and compounds and cells. Cells are nothing more than a complicated system of compounds, and compounds as everybody knows are just combinations of elements. If you think of atoms as imaginable entities flying around in space then you will inevitably arrive at this position. This is thinking in terms of 'bodies'.

We have given quite a different account of knowing a thing. A thing is a unity, identity, whole that we grasp by understanding and judging data in its concrete individuality. In descriptive knowing there is a verifiable image; in explanatory knowing there is implicit definition of terms and relations and no verifiable images. The elements that form the basis of the periodic table are terms defined by their relations to one another in an explanatory construct based on atomic weight. Symbols and images for these elements are constructed for pedagogical reasons, not seen. What about chemical compounds? Are they simply the sum of the parts or are they more than the sum of the parts?

Aristotle faced this problem with the syllable.[86] Is the syllable C A T simply the sum of the three individual letters or does it have [292] something more? He answered that it has something more but that 'more' is not a material entity but precisely the unity of the three letters, which he called a form. We would agree with him. Reality is known not by the senses alone but by insight into verifiable intelligibilities. Chemical compounds are different from mixtures. They have a unity, an identity, a permanence that the chemist studies and explains; they become the terms defined by the explanatory relations of chemistry. The compounds of chemistry have something more than the parts out of which they are made; this more is not another material element but an intelligibility, a unity, an identity, a permanence which is grasped not by sense but by insight and judgment.

To our way of thinking, there is a problem of things within things. We cannot simply say that compounds are the sum of the elements out of which they are made; we cannot say that cells are simply the sum of the chemical compounds and reactions out of which they are made. We cannot say that an animal can be fully explained by enumerating the various parts out of which it is made; an animal is not simply a complicated machine. There are different kinds of unities and identities pertaining to different levels of the real. These are not grasped by imagination but by explanatory insights and judgments. Aristotle distinguished between the material cause (what is a thing made out of?) and the formal cause (what is it?). Those who think in terms of 'body' and 'out there now real' tend to think in terms of material cause as if it were the complete explanation. People who think in terms of knowing as understanding and judging realize that knowing what a thing is made of is useful and helpful; but that there is a further question as to what is a thing. The further question cannot be answered in terms of its parts, but must be answered in terms of its form, its formal cause, what we refer to as the intelligibility, the unity, the identity of the thing.

7. Conclusion. Our theme is intellectual conversion. We are defining a transition from elementary knowing to the knowing constituted by experiencing, understanding and judging. The point of the above is to give an example of this transition. It is of crucial importance. Confusion over the criterion of knowing has pervaded philosophy since the beginning and still pervades and underlies [293] every philosophic discussion. In most cases it is simply taken for granted that what is real is what is 'already out there now'. This is the unquestioned assumption of all forms of empiricism but is also implicit in many other brands of idealism and realism. Our point is not to teach about the history of philosophy or science but to invite the reader to recognize the dialectic of these two criteria of the real in his own consciousness. To be able to differentiate between these two realms, that of elementary knowing and of the knowing of judgment, is one way of defining intellectual conversion.

3. Naive Realism to Critical Realism

We continue to focus on intellectual conversion but we now approach this in terms of what a philosophy considers to be real. We will take a few sample philosophers to try to penetrate their unspoken assumptions about what is real and then outline the critical realist position, which is another way of defining intellectual conversion. At the heart of every philosophy there is the question of what the philosophy considers as real. Some philosophies do give an explicit answer to this question in others the answer is implicit in the criteria they use. Sometimes it is very difficult for a philosophy to face up to this fundamental question and its answer may not be always clear. It is such a fundamental question that the position on the real sets the agenda for the rest of the philosophy

1. Naive Realism. The naive realist is blissfully unaware that there are two criteria of the real, hence he is unable to recognize or distinguish between them. Consequently he operates sometimes on the basis of imagination, sometimes on the basis of verification, in a haphazard and indiscriminate manner. The person of common sense embodies a confused mingling of the realism of the 'out there now' real and the criterion of judgment. Both elementary knowing and critical knowing are operative but in a confused undifferentiated mess. No great harm ensues as long as the person does not try to become a philosopher or a scientist or a philosopher of science. But if he does become a theoretician he will carry the criteria and the mentality of elementary knowing with him into the field of theory and explanation and system. The predominant image in the naive realist is that of the real as out there; if this is assumed into a [293] philosophy or science then nothing but confusion and nonsense can follow.

2. Plato. We cannot pretend here to do justice to the wealth of Plato=s thought on knowledge and his related metaphysics. There have been so many critical studies of Plato's thought that one is almost afraid to say that he held any particular position. Our sketch intends only to illustrate his way of thinking and some of the apparent presuppositions behind that way of thinking. Our route into the mind of Plato is the expressions of the characters in his dialogues. We center on the question of what is real; not on the answers so much as on how Plato went looking for an answer. We can only assemble some fragments hoping that it will be sufficient to make our point.

The problem of negative or false statements was an area of great difficulty for Plato.[87] His difficulty stemmed from his expectation that for every concept or statement in the mind there was something outside the mind corresponding to it. But what exists outside the mind corresponding to negative or false statements? It suggests the ultimate absurdity that there is a non-being that corresponds to these falsehoods, namely, that non-being is. This Plato was not willing to accept so he had to leave the question unresolved. It did not strike him that he might question his unspoken assumption that knowing was a perfect correspondence between in here and out there.

In the *Sophist* Plato explicitly faces the issue as to reality and unreality.[88] He begins with a consideration of the history of the question. Some have said there are three real beings, some have said two, and the Eleatic set say there is only one real thing. All of these fall to the same argument. If we take the Eleatics as an example; they say that the real is only one. But the one is not the same as the real, and the real is not the same as the one; and so there are at least two things, the one and the real! Reading the passage and the rather labored arguments it seems to be that Plato=s real difficulty lay in the expectation that corresponding to every concept in the mind like real, one, being, hot, cold, there must be a corresponding something outside the mind in a sort of one to one correlation with the concept.

Another of Plato's assumptions seems to have been that real knowledge must be 'infallible and of what is'.[89] When he then comes [295] to distinguishing between different kinds of knowledge he divides it into sense knowledge and intellectual knowledge. Only the latter constitutes true knowledge because it is knowledge of 'what is' and what does not change. The trouble with knowledge of sense is that its object is constantly changing. How can you have permanent knowledge of what is always changing? Hence in the metaphor of the divided line and of the cave he teaches that sense knowledge cannot be of 'what is' because the world is constantly changing. Intellectual knowledge can be of 'what is' because of the existence of the subsistent Forms.

The implication of this theory of knowledge is that outside the mind corresponding to sense knowledge you have the material, visible, changing world; corresponding and as it were validating intellectual knowledge you have the changeless, perfect subsistent Forms. The dominant unspoken assumption of all of this discussion is the attempt to correlate what goes on in the mind to the corresponding realities outside the mind. But does this image of correspondence derive from imagination or understanding?

3. The reality of Universals. This dispute dominated the early Middle Ages but has a long history in medieval and contemporary times. Universals include concepts such as man or dog, laws of physics or chemistry such as the law of gravity, virtues such as justice or courage, or accidental forms such as qualities or quantities. The problem arose as to in what sense are they real. Our interest is not so much in the universals but in what was intended by the word real. This examination should help us to see the different meanings of real assumed by various philosophies. For the same of convenience and simplicity we will divide them into three groups.

Firstly, the Nominalists and Positivists deny that there are any natures or essences or universals at all; there are only individual, concrete, particular things. They deny any reality to universals or natures outside the mind. They will admit that we formulate categories of things in our minds, like trees, and atoms, and dogs, but that is only for convenience; the only thing they have in common is the same name, hence, nominalism. There is nothing outside the mind in dogs or atoms or trees corresponding to this linguistic classification. [296]

Secondly, there are the Ultra-Realists, who hold that universals are real, not only in the mind but also outside the mind, as universals. The standard interpretation of Plato would exemplify this position: the Forms or Universals exist apart, perfect, subsistent, unchanging, eternal. Particular things, trees, beautiful art, virtuous people participate in or imitate these Universals and draw their reality from them.

Thirdly, the moderate realists hold that the universal exists as a universal in the knowing subject but that it exists individualized in the particular, outside the mind. This would be the position of Aristotle, Aquinas and mainstream scholasticism. In contrast to Plato, who held that Forms were transcendent, Aristotle held that they were immanent. For Aristotle forms are received materially in the concrete particular; they are received immaterially in the mind; but it is the same form or universal.

The reality of universals is still a contentious issue today particularly in the philosophy of science. Our approach of self-appropriation invites us to ask the following questions: Where do universals come from? What function do they perform? Are they real?

Universals come from the process of generalizing and the correct expression of that generalization in a concept or definition. >Humanity= is a philosophical generalization expressing the idea that all human beings have something in common, belong to the came category, and are somehow the same. We can further define what we have in common as rational animal or symbol-making animal; you can further specify or explain these terms. It is the act of basic human understanding that produces the universal and without that process of generalizing, of grasping a universal, there is no intellectual knowing. The senses know particulars as particulars; intelligence can only know the universal in the particular, namely, the particular as belonging to a category or class or universal. Earlier we outlined the heuristic process by which the human mind produces ideas from images.

Universals function in that they enable us to know individuals as members of a class. The universal is a means by which we distinguish chalk from cheese, humans from non-humans, living [297] from non-living. First we understand the differences between these categories; then we express the reasons why they are different; by a reflex action we can attend to the universal as an object and define it. Primarily, universals function in our science of objects as that by which we classify, distinguish and relate. Secondarily, we reflect on the categories, define clearly the criteria for belonging to that category and formulate the definition clearly.

Are universals real? The Nominalists claim that there is no reality to universals outside the mind; there are only individuals. But we know individuals as individuals by way of the senses; our experience of the process of intellectual knowing indicates that we know things as particular examples of universals, we generalize, we put them into categories; it seems there is some reality to universals apart from our thinking or talking of them.

Few follow the line of Plato today asserting the reality of universals as universals. Individual trees we encounter; trees in general we do not. Individual horses we see; but horseness itself we do not see. Things can be numbered but number itself we do not encounter.

The experience that we have outlined of the process of going from the particular to the general and vice versa seems to indicate both that there are individuals and that they do belong to genus and species. They can be grouped together and this grouping is not artificial and extrinsic but how things are. Awareness of the activity of understanding seems to indicate the kind of understanding appropriate to this world of ours. We do not encounter natures or essences apart from particulars. It is one aspect of organizing intelligence to categorize individuals in classes. This does not seem to be an artificial or arbitrary procedure and seems to be capable of verification. Our experience would seem to indicate that as understanding pivots from the particular to the general, so also the individual is one of a species or genus. We will answer the question of the reality of universals when we state the criterion of critical realism.

4. Descartes. Proceeding from his methodic doubt, to the *cogito*, to the existence of God, to the reliability of our knowledge, Descartes then faces the question of what he considers to be real. He [298] divides the real into two, Matter and Spirit. Matter is identical with extension and therefore there can be no vacuum, no void, no space with nothing in it. Here, metaphysics is determining science: his exclusion of a void is not based on observation but on a deduction from metaphysics. Spirit is thought and does not occupy space. It seems that this distinction between Matter and Spirit is based on imagination rather then judgment as we see from two examples, of qualities, and the mind/body relation.

Matter is extension. Extension is one of the primary qualities that belong to matter; these primary qualities are real. Secondary qualities like color and taste and smell are not real; they are not in the matter as qualities but they are in the matter as powers to create these sensations in us. Secondary qualities do not exist outside the mind as qualities but as powers,

virtually present in that somehow they cause these reactions in our senses. We can catch a glimpse of the unquestioned assumption that to be real is to be 'out there' while to be unreal is to be out there not in essence but only as a power. But does the model of in here and out there provide the criterion of the truth?

If there are two real things, Matter and Spirit, how are they related, particularly in the case of the human person who is both body and mind? Descartes seems to have thought of Spirit as invisible, intangible, outside time and space, but still real meaning, a 'stuff', a ghost, an imaginable, ethereal entity. If matter is coterminous with extension, it is hard to see how it can be affected by Spirit. How can mind, which is spiritual, affect body, which is material, when they belong to such distinct realms? Descartes solved this for himself by postulating one point of contact in the pineal gland. This may have satisfied his imagination, but his successors were more critical and had to invent more complicated theories of occasionalism and parallelism to account for contact between mind and body.[90] Descartes started modern philosophy off on a false dichotomy between Spirit and Matter, soul and body, ghost in a machine, from which it has not yet recovered. Try to recognize the influence of imagination in the definition of spirit and the question of interaction between matter and spirit. [299]

5. Immanuel Kant. Although Kant attempts to break into a new critical philosophy and leave behind the rationalistic scholasticism of Leibniz and Wolff, his thinking continues to depend on some of the basic assumptions of these philosophies. One of these was the assumption of inner and outer, knowing being inner, and the known being outer.

According to Kant, "There can be no doubt that all our knowledge begins with experience."[91] "The capacity(receptivity) for receiving representations through the mode in which we are affected by objects, is entitled sensibility."[92] Phenomena can be known because we have an intuition of them; even though sensibility needs the pure forms of space and time, it is clear that at the level of sensibility we have a knowledge of what is really out there by way of the senses. By sensible intuitions we have direct contact between the mind and phenomena.

But at the level of understanding there is a problem for Kant; if all our knowledge comes through the senses, how can the senses know causality, substantiality, unity, etc.? "But all thought must, directly or indirectly, by way of certain characters, relate ultimately to intuitions, and therefore, with us, to sensibility, because in no other way can an object be given to us."[93] The only channel between the knower and the known, the inner and the outer, is the senses which by definition can only receive representations. Therefore, we have no way of contacting substance or cause to know if it is really out there. In Kant's terminology, we have no way of knowing the thing-in-itself, the noumenon.

If the reality of substance, cause, etc. cannot be grounded in the out there now real, then Kant's Copernican revolution proposes, let us ground it in the mind itself. We need these categories if there is to be any understanding, so let us propose that these concepts are a priori concepts of the Understanding. Hence he elaborates his twelve categories, among them the category of Inherence and Subsistence. He uses both the notion of permanence and the notion of

substratum in proving this inner reality of substance: "In all changes of appearances, substance is permanent; its quantum in nature is neither increased nor decreased."[94] "But the substratum of all that is real, that is, of all that belongs to the existence of things, is [300] substance; and all that belongs to existence can be thought only as a determination of substance."[95]

This thinking led Kant to the impossibility of pure reason knowing the thing-in-itself, the noumenon; nevertheless he supposed that the noumenon lies out there now behind the appearances. His theory of knowledge denied him the possibility of knowing a noumenon but his imagination demanded that we presume a noumenon. Thus he was left with the strange alternative of grounding knowledge in the a priori categories and still supposing that there is a noumenon out there corresponding to these concepts.

6. Critical Realism. The phrase 'critical realism' is sometimes associated with Kant's approach to thinking in terms of the a priori conditions for the possibility of knowing. For Kant the principal task of philosophy it to establish these a priori conditions for the possibility of knowing. There is, however, a certain contradiction involved in establishing the preconditions of knowing when at the same time you are already knowing. Can you look at the mind and at reality from the outside as it were to establish what it can know and what it cannot know? Our strategy has been quite different. We have been examining many concrete examples of successful and correct knowing and examining the mental activities involved in this process. We have been appealing not to any Authority but to successful knowing in each person. We have been appealing to our own experience of the different criteria of the real, and the implications of this for philosophy. We have been discovering for ourselves the actual limits of our knowing, from the inside, not from the outside.

For us, then, critical realism is a realism in which "the real is the verified. It is what is known by the knowing constituted by experience and inquiry, insight and hypothesis, reflection and verification."[96] It is a break with the criterion of the out there now real; it leaves behind predominant influence that imagination imposes on us in terms of in here and out there. It distinguishes elementary knowing and critical knowing. It recognizes the need for explanation and theory and yet accepts that at the level of explanation there are no verifiable representative images. Our [301] knowing is coterminous with verification and verification occurs in judgment. Our knowing is nothing more or less than that.

Are universals real? Very often the question was posed in the context the animal criterion of the real, in other words, are universals 'bodies', are they out there now real. Put in the context of our criterion of the verified, the question becomes can universals be verified. Can you verify that Africans and Europeans belong to the same human race? Can you verify the law of gravity? Can you verify that this is green and that is red? Humanity is real, not in the sense of being apart from individuals, but in the sense that all human beings are really fully human beings. The law of gravity is real not in being apart from matter, but in being intelligibility of matter. To ask where are the laws of physics, or where are the universals is to regress to imaginative presuppositions that to be real they must be in place.

Plato, Descartes and Kant in their own different ways were dominated by the imaginative assumption that knowing is a matter of crossing the bridge from thinking in here to reality out there. Intellectual conversion can be understood as abandoning that imaginative schema altogether. It is correct judgments that define what is real. It is not a question of imagination but of judgments. The question of subject and object will be faced, but it will be done in terms of judgments and not in terms of unquestioned imaginative expectations.

4. From 'Looking' to Knowing

1. Insight/Intuition. Another way of talking about the transition involved in intellectual conversion is to grasp the difference between knowing modeled on ocular vision and the knowing of cognitional structure. Seeing is the predominant sense and offers itself as a ready and dominant paradigm when it comes to intellectual knowing. Many philosophers have fallen into this temptation and talk about knowing as an intuition; for them knowing is conceived on the model of looking. Just as looking is one simple operation of direct sensation, for these philosophers intellectual knowing is simple direct intellectual perception. Just as the sense of seeing is predominantly passive, i.e., we open our eyes and we see [302] what is there to be seen; so also intellectual knowing is passive, i.e., we see with our intellectual vision what is already there to be seen. Just as seeing is immediate - there is no obstacle or intermediary involved in the direct vision of objects - so intuition is a direct vision of essences, causes, being or universals.

In this section we will consider a few philosophers who have elaborated a theory of knowledge based on this assumption that intellectual knowing must be something like seeing. We use the word 'intuition' to describe that sort of knowing which is modeled on 'looking'; Webster defines intuition as "the power or faculty of attaining to direct knowledge without evident rational thought and inference."[97] Intuition is quite different from insight. Insight we have already explained at length; it is understanding of relations perceived in data under the influence of questioning; it can be direct or reflective; knowing is not just insights but experiencing, understanding, and judging; the only distinction we have between sense knowing and intellectual knowing is that between elementary knowing, which is animal knowing, and the human knowing constituted by experiencing, understanding and judging. To avoid possible confusion in the English language between insight and intuition and we have explained the difference. In French there is only the one word *l'intuition* for the two meanings differentiated above. Yet it is clear that the two French authors that we will be considering are using *l=intuition* not in the sense of 'insight' but in the sense of 'intuition'.

2. John Duns Scotus. Aquinas held quite explicitly that the primary and proper object of the human intellect is the essence of the concrete individual. Hence for Aquinas knowing is always through phantasms by a process of abstraction, i.e. understanding. For Scotus however the primary and proper object of intellect is being as being, the universal as such. Here Scotus had to distinguish two kinds of knowing, intuitive knowing and abstractive knowing. Because being as being does not exist as such separate from individual beings, how do we come to know something as a being? By abstractive knowledge we know something as a universal, by intuitive

knowing we know something as actually a being and actually existent. "Intuitive knowledge is knowledge of an object as [303] present in its actual existence and it is against the nature of intuitive knowledge that it should be knowledge of an object which is not actually existent and present."[98]

For Aquinas the proper object of human intellect is the essence of the concrete thing; primarily we know the essence, secondarily by a kind of turning around we can know the individual; but we can never have intellectual knowing of the individual as an individual. For Scotus we have a direct intuitive clear knowledge of the individual. For Scotus there is an intuition that accompanies every act of human knowing, whether it is the intuition of being or the intuition of the concrete individual. One has reason to suspect that what he means by intuition is having a good direct look at something.

3. Henri Bergson.[99] Bergson was not particularly happy with the philosophical system builders of his time. Philosophy had become too abstract and systematic and too far removed from concrete concerns or the life of the spirit. Philosophers were trying to understand all possible and even impossible worlds. His was an attempt to bring philosophy back into the stream of life.

For Bergson there are two ways of knowing, the analytic and the intuitive. The analytic is the method of science and of the philosophical system builders. Intuition on the other hand is immediate consciousness of an object. The object of intuition is reality. Science deals with matter using the method of analysis. Philosophy deals with spirit and its method is intuitive. It is only in intuition that the mind can have direct awareness of the actual movement of life.

The primary object of such intuition is movement, becoming, duration. For Bergson this is reality. There are changes, but there are not, under the change, things which change; change has no need of a support. This is a point of fundamental importance in his philosophy. It is a philosophy of change or of evolution or of life. Analysis kills what is being analyzed; only intuition enables us to grasp a living changing reality. Bergson accuses traditional philosophers of abstracting a lifeless system of concepts from reality and losing touch with the vitality of reality. The philosopher should take as his point of departure an intuitive or immediate awareness of [304] the inner life of the spirit as it is lived, then prolong this intuition in reflection.

It is clear that Bergson is reacting against a conceptualist kind of philosophy which we also reject. But while it would be nice to think that we have direct intuitions of movement, life and duration, all this boils down to a matter of fact. We have constantly appealed to the data of consciousness to identify the characteristics of insight and have found no evidence for Bergson's immediate intuition of the *elan vital.*

4. Jacques Maritain. Jacques Maritain gave a series of lectures in Paris in which he attempted to popularize his renewed Thomism. These were published in *Preface to Metaphysics*.[100] Even allowing for the fact that it was a popular lecture series we get a clear idea of the role of intuition from these extracts from Lecture three:

> **For the intuition of being is also the intuition of its transcendental character and analogical value. It is not enough to employ the word being, to say 'being'. We must have the intuition, the intellectual perception of the inexhaustible and incomprehensible reality thus manifested as the object of this perception. It is this intuition that makes the metaphysician.....**
>
> **We are confronted here with a genuine intuition, a perception direct and immediate, an intuition not in the technical sense which the ancients attached to the term, but in the sense we may accept from modern philosophy. It is a very simple sight, superior to any discursive reasoning or demonstration, because it is the source of demonstration. It is a sight whose content and implications no words of human speech can exhaust or adequately express and in which in a moment of decisive emotion, as it were, of spiritual conflagration the soul is in contact, a living, penetrating, and illuminating contact, with a reality which it touches and which takes hold of it....**

Even allowing for the rather poetic language, we can see the importance of intuition in Maritain's philosophy. You cannot be a metaphysician without it. Even Kant, he goes on to explain, did not have this intuition, this gift, this revelation which he calls an intellectual perception, a sight. It is an intellectual vision, a looking directly at being. It is direct and immediate with no complicated abstractions of universals from images or insights into the sufficiency of the evidence. It is a confrontation model of knowing where the known is over against the knower. We get in contact with this reality, we touch it by way of this direct intuition. [305]

Perhaps Maritain is describing a mystical experience proper more to religion than to philosophy. But as philosophers do we have these intuitions? Is this how we know universals? Is this how we know being? The simplest test is the question of fact. Is this a correct objectification of the process of knowing? Is this what actually happens in our minds when we understand something or judge something to be true? Do we have experiences of direct intellectual visions of an 'inexhaustible and incomprehensible reality'?

5. Correspondence/Confrontation/Identity. If you envisage knowing on the model of looking you will tend towards a confrontational model of knowing. Looking readily suggests a looking subject and a looked at object in immediate contact by way of ocular vision; the object is quite separate from, opposed to, in confrontation over against the subject. This model of knowing will suggest that the intellect has direct immediate contact with its intelligible object in a kind of intuition but the object is quite distinct from and in confrontation with the subject. This in turn will probably lead to an imaginative version of the correspondence theory of truth:

truth lies in correspondence between what is in the mind (looking) and what is outside the mind (the looked at).

Aristotle proposed a quite different theory of knowing, not by confrontation but by identity. Even at the level of sense knowing the confrontation model limps - for Aristotle the sensible in act is identical with the sense in act. For sensation to occur there must be some kind of assimilation, identity, rather then simple confrontation. If a tree falls in a forest with nobody within earshot does it make a sound? I think Aristotle would answer that there is potential sound but no actual sound; to have sound you have to have a hearing; there are vibrations in the air (potential sound) but no hearing and so no actual sound. Even at the level of sensation there must be some kind of assimilation or identity between the sensing and the sensed. Sensation is passive reception of sense impressions assimilated according to the mode of the receiving sense.

More so at the level of human intellectual knowing, Aristotle insists on the model of identity rather than that of confrontation: the intelligible in act is identical with the intellect in act; the form received materially in the concrete thing is received immaterially in [306] the intellect but it is the same intelligibility or form; intellect is in potency to become all things. When we know a stone we possess the intelligibility of the stone; the intelligibility of a particular stone is received immaterially in the intellect as an idea. For intellectual knowing to occur there must be some kind of assimilation or identity between the knowing and the known.[101]

Can we transpose this discussion into a terminology with which we are now familiar from examining the experience of insight and judgment? My experience of cognitional process is that it is a complicated procedure combining many activities at different levels into one structure of knowing. It is not simple in the sense of one act with one object, but is instead a series of acts which are components of one whole. It is passive in the sense that the data is given in the senses; but intellect is active in questioning, in searching for theories that explain the data, and in sorting out which theories can be verified and which are to be rejected because they cannot be verified. Knowledge is not immediate, intuitive or simple but is mediated by the senses, the images, the questions, the hypotheses that contribute to a true judgment.

At the level of understanding we can agree with Aristotle that we grasp the intelligibility in an immaterial reception. Our definition of water grasped as a universal concept in the mind is identical with the intelligibility of the individual concrete instance of water. But there does also have to be a differentiation by which we distinguish the universal from the particular, the intelligible from the sensible, the subject from the object but this happens in the judgment. 'This is water', asserts that this sensible data is an instance of the definition of water.

We could espouse a correspondence theory of truth in the sense that there must be a correspondence, not in terms of in here and out there, but between our judgments and what is. How do we know if a judgment is true? It is true if the evidence is sufficient; if other alternatives have been excluded; if there is a proportion between the evidence and the conclusion; if the judgment corresponds with what is. You know your judgment is true if you are sure of your grounds, no further pertinent questions arise, you are sure that your motives

are honest and your methods above board, your inquiry has been [307] exhaustive, there is nothing further to be gained by delaying, you move on to other matters. It is inquiring intelligence which explores every possibility, which ensures that other alternatives are excluded, that there are sufficient grounds for this judgment; and posits the judgment. A wrong judgment will soon be shown not to be in correspondence with the facts, the evidence, the data. If you do not uncover this for yourself, someone else will surely have the pleasure of pointing out your inconsistency.

In conclusion, we do not appeal to the authority of the Aristotle but the witness of cognitional facts. What are the facts of your own experience of understanding and judging? It seems to me that knowing is a complicated series of activities, both sensitive and intellectual, both active and passive, involving elements of identity and elements of differentiation. One single imaginative model cannot do justice to the complexity of human knowing. To think of knowing as looking is most tempting but ultimately fails. Intellectual conversion is accepting the witness of what actually happens when we know and abandoning the oversimple image of knowing as looking. Knowing may begin in seeing, but includes also understanding and judging.

5. From Immediacy to the World Mediated by Meaning

Another approach to intellectual conversion is to trace the evolution from one way of thinking about reality to another as it emerges in the infant, the child, and the adult. What follows is just a sketch of the relevant aspects of intellectual development. More detailed and complete analysis of intellectual development could be found in Piaget or any of the other cognitional psychologists. Unfortunately, none of them focus on the precise development of insight and reflection in which we are interested.

The infant starts in the world of immediacy.[102] What is real is the sum total of what is seen, heard, touched, tasted, smelled and felt. The infant is a bundle of sensations, emotions and experiences. What is real is what can be grasped physically, what can be felt by the hands and usually put in the mouth. The infant has difficulty at [308] first developing a sense of identity or, even identifying the parts of his own body, but soon develops a sense of what is inside and what is outside. The infant lives in the present, is dominated by its needs and the satisfaction of those needs, and is thoroughly egocentric. There is little to distinguish the development of the infant from that of the animal. An infant's sensorimotor development is very slow compared to other animals and the period of dependence on the parent is longer than for other animals. This is the world of immediacy, the world of what is immediately present to the senses. The criterion of what is real in this world is what the senses can see, grasp and put in the mouth.

But the infant slowly and exultantly moves into a world mediated by meaning. Perhaps the first clear expression of intelligence is by way of naming; the parents are named and hence identified, recognized, distinguished from other objects and persons. Other basic objects and needs are named as the process of moving into the world of meaning advances. All sorts of other developments take place. In identifying shapes, distinguishing noises and colors, and knowing the cause and the meaning, associations are built up and general categories and

conclusions reached. The world of immediacy is giving way to the expanded world mediated by meaning.

Eventually the child's world is not simply the present but also a past that is remembered, promises that were made and have to be fulfilled, a rule that was laid down which must be kept, a routine that has to be fulfilled. There is the future, the possibility of postponing gratification, plans laid down for future activities, looking forward to future events. The world is not only what is physically present but what is absent for the moment; places can be named and visited. People who are absent are still part of the child's consciousness and concern. What is learned by understanding is passing into the habitual texture of the mind.

Beliefs about God, fairies, monsters, Santa Claus, mingle in a confused bundle of fiction, fantasy and fact. Each culture will feed the child with its own language, its own stories, its own way of behaving, its customs, clothes, music, prayer and duties. Being so dependent on adults the child accepts most of what it is told on the [309] authority of the parents. The child will move into that world of values, beliefs, causes, and mores which is usually a mixture of fact and fantasy. Stories about Jesus from the Bible are followed by Santa Claus, Cinderella, the man in the Moon, etc., according to the different cultures.

The child is usually very anxious to know about these things and incessantly asks, "Why?" But some answers do not satisfy; a period of silence might ensue while the child digests the answer and then replies, "but..." raising an objection to the proposed answer. It is reason that is immanent and operative, now beginning to distinguish between what makes sense and what does not make sense, that for which there is evidence and that which contradicts the evidence. At a certain point the story of Santa Claus no longer stands up to criticism, the evidence is against it, suspicions are aroused, a test is made, the presents are found hidden in a closet, a myth has been exploded, the child is moving into the hard reality of fact.

A new criterion of meaning and truth is becoming operative: it is verification, in a basic rudimentary way. This is the world of meanings conferred on objects, values that guide behavior, truths about how things work, mathematics that determine what you can buy with so much money, how things are to be shared, how things are made. Natural properties are recognized: gravity in sliding down an incline, fire that burns, water in which you can float and swim, paper airplanes that fly through the air. This is the world of meaning, constructed by insights and generalizations, and gradually being checked against the available evidence.

This world mediated by meaning will expand enormously through education; it can move in many different directions depending on the culture, the educational possibilities available, and the choices of the person. He can move into the world of nuclear physics, the world of scriptural exegesis, the world of historical scholarship, computer programming, literary studies, theology or mysticism. These are worlds not given in the direct data of sense but mediated by insights and judgments and embodied in technology and systems of theories.

Again we can see that two different criteria of what is real are operative. For the infant in the world of immediacy, it is the senses [310] that prove what is real by touching, seeing and

tasting. But in the world mediated by meaning it is the more intangible criterion of verification, sufficient evidence, the correctness of a judgment, that is the criterion of the real. The criterion of verification emerges spontaneously in the context of the prior criterion of sense. The two criteria coexist in a state of tension and perhaps confusion. Most people of common sense never realize that these two criteria are there. It is when you move into theory that you need to distinguish explicitly between these two criteria.

The difficulty arises when a scientist tries to tell us what scientific reality really looks like. It arises when a philosopher gives us a theory of reality without having distinguished the two criteria of the real. The difficulty arises by the persistence of the earlier criterion of the real when what should be evoked is the mature criterion of verification and judgment. But judgment is a very impalpable criterion and we often revert to the basic instinct that what is real is what can be sensed, seen and touched. This is the bane of every philosophy, the underlying and basic dualism unfolding throughout the history of philosophy, yet it is seldom adverted to, seldom recognized, seldom overcome.

Hopefully, we have identified in our own consciousness the operation of these two criteria of the real; our objectification of the process of knowing should have laid bare this basic dualism. It is a constant struggle to apply the principle of sufficient evidence and to deny the expectations of imaginative representation. This again is the theme of intellectual conversion.

6. Clarifications on Intellectual Conversion

From one point of view intellectual conversion can be said to be simple, from another to be very difficult. It is simple in the sense that we spontaneously substitute the criterion of verification for the criterion of animal sensing as we move from the world of the child to the world mediated by meaning. The child rejecting the story of Santa Claus is operating on the principle of sufficient reason. The world mediated by meaning is not confined to philosophers or [311] intellectuals; it includes anyone who operates on the criterion of verified meaning.

The difficulty is in objectifying this process, distinguishing the two worlds and implementing this distinction consistently and universally. It can be very difficult, as we have seen, to identify this dualism in our knowing; it is also very difficult to talk about it as it, as this presupposes some sophisticated awareness of mental processes. Most philosophers and scientists have failed to disentangle this dualism and are in fact unaware of the dialectic between the two ways of knowing. This has led to endless confusion as to what is real, what is objective and what scientific reality really looks like.

Intellectual conversion is not just awareness of the distinction between elementary knowing and cognitional structure but it is the application of the distinction in science and philosophy. It would be of great benefit to scientists to do a basic course in critical realism before they pronounce on reality, truth and objectivity. Not having done technical philosophy the scientist uses the unquestioned assumptions of naive realism as the basis for his pronouncements on what is real and what is objective.

Intellectual conversion is particularly important for philosophers and theologians. It is not just a question of subscribing to a new list of propositions to replace the propositions or the fashions of old. It is not just a new philosophy to be learned, and taught. It is more like a conversion experience, a revolution in thought and method which challenges us to implement a new way of doing philosophy and science

7. Performance and Content

The pillar of our approach to the theory of knowledge has been self-appropriation. The foundation of self-appropriation has been to start with the actual activities of human knowing - to describe them, define them, relate them together, formulate an explanatory account where at each stage and for each term there will be a validating reference to the data of consciousness. The key, then, to our approach has been coherence between the activities and the theory: [312] the activities verify the theory; the theory explains, relates, objectivizes the activities.

There is only one human knowing; there is only one basic set of interrelated activities which produce true human knowing. It is the same human knowing whether it is Aristotle or Sartre, Ireland or America, Africa or Japan. If there is only one set of basically unrevisable activities there is also only one explanatory theory which adequately relates, defines and objectivizes these activities. Hence there can be only one theory of knowledge which is coherent with the actual activities involved in human knowing. We claim that that is our theory and that it is basically unrevisable. We are not talking here about differences in terminology or detail but the fundamental stance on the structure of knowing.

It follows, as night follows day, that in all other theories of knowledge which differ fundamentally from the above, there will be an incoherence between what the philosopher is actually doing and what he is actually saying: there will be a fundamental incoherence between performance and content. The activities of knowing as performed are a constant. These are the activities of attending to data, (doing research, making observations, performing experiments); of being intelligent, (grasping the relevant and leaving aside the irrelevant, defining terms clearly, thinking things through to the end, moving from images to ideas, from ideas to concepts and theories); and finally being reasonable,(checking results, evaluating, asserting, denying, proposing as true, publishing and proclaiming). These are the activities performed by Descartes as he sat down to write his *Meditations*, or to instruct the Queen of Sweden on his new philosophy. These are the activities performed by Hume as he worked on his *Enquiry Concerning Human Understanding*: he was not satisfied with what Locke had written; he thought he could do better; he wanted to show that his understanding was indeed better, clearer, truer, more to the point, more radical. These are the activities performed by Kant in his study at Konigsberg and his daily walks through the town; thinking, reflecting, creating, accepting, rejecting, etc.

The human mind is the same; the activities performed are the same; but oh! what different theories they came up with! The [313] content of the theories was so different from the activities of human knowing that produced the theories.

Descartes taught that clear and distinct ideas were the criterion of truth; but if he attended to his own knowing he would have found many clear and distinct ideas which were not true; and many confused and vague ideas which are true. He taught a distinction between Matter and Thought; but was this based on imagination or on intelligence, the out there now real or the verified? He taught that science could be deduced from principles of philosophy; but does that the way scientist actually work?

Hume taught that all mental activities could be reduced to sensation. Was what he was doing in writing his book at the same level as what an animal does eating a banana? Are images and ideas really the same? What about the creativity of his own work, the evaluations, the concepts, the judgments, the progress, the truth or error? His theory of knowledge did not seem to allow him the power of writing about a theory of knowledge.

Kant claimed that knowledge has a threefold structure, sensibility, understanding and reason. By sensibility we intuit phenomena; understanding imposes the twelve categories on the intuitions of sensibility; reason imposes regulative principles to organize all our knowledge. But his own thinking in writing the Critique was more flexible, creative and original than the twelve categories would allow. His actual judgments on the truth of his own philosophy, his rejection of Descartes and Hume, don=t seem to have a place in the content of the philosophy. His actual moral behavior seems strangely different from applying a universal categorical imperative.

Descartes, Hume and Kant did not use a method of self-appropriation; they did not check their conclusions - except partially perhaps - against the data of their own consciousness. We cannot really expect them to have done so in their age of the breakthrough to theory; historically we seem to advance only one step at a time. Only at the end of the twentieth century do we seem to be ready for self-appropriation and the third stage of meaning. [314]

Nevertheless, we do have to point out the fundamental incoherence in these philosophers between the activities they performed and the content of their theories of knowledge. Because they did not do self-appropriation they could not articulate the dialectic unfolding in their own minds between sense and intelligence, looking and knowing, the animal sense of the real and the real as the correctly affirmed, the world of immediacy and the world mediated by meaning. Being unaware of this dialectic they were unable to resolve it. And so their theories reflect this unresolved dialectic, containing elements that are truly and correctly affirmed in a confusion with other elements which are the result of imagination and the animal criterion of the real.

Descartes, Hume, and Kant were the founders of modern philosophy; almost all contemporary philosophy has derived from them either directly or indirectly, in agreement or disagreement with them. The critique we have applied to them can be applied to their followers and opponents. But just as they the founders were unable to lay bare the root of the dialectic involved in correct human knowing, so also their successors. Just as their philosophical positions are a dialectical mixture of the real and the imagined, so also their successors. One can point to individual

improvements, advances and corrections, but there has been no sweeping reorganization going to the root of the matter.

So our approach to other philosophical positions can only be an invitation to self-knowledge: is what you are saying consistent with what you are doing? No one likes to contradict himself; we are embarrassed if we are caught out in a self-contradiction. But this is the most fundamental incoherence of which we can be guilty. That is how you get to the root of the matter. This invitation to check the consistency between performance and content applies to all schools of philosophy, all varieties of contemporary or ancient philosophy. We have already noted this in relation to skepticism and relativism; but it can also be applied to process philosophy, to Marxism, to Structuralism, to Post-Modernism, to Existentialism, etc.

That is how each one of us can return to the foundations and build the third stage of meaning. We do not use this approach only to bash our opponents, but to continually develop and clarify our own [315] position. It can be extremely difficult to objectivize this dialectic, as we have seen in this chapter; there is certainly room for more accurate studies, self-observation, improved terminologies. In our time literature commonly indulges in self-observation and acute descriptions of feelings, decisions, inner dramas and fears. Perhaps it will become more common to describe how something was discovered, how concepts emerged, how positions were seen to be valid, how the intellect actually works in practice.

We mentioned earlier the possibility of learning from the mistakes of the past. How can we profitably read from the history of philosophy which is so full of mistakes, contradictions and confusions? Can all the data of the history of philosophy be brought together as contradictory contributions to the one goal? We somehow have to be able to account for the repeated mistakes of even great philosophers. Having once identified this basic dualism in our own knowing, we are in a position to be able to recognize it in others. We can understand any philosopher by a combination of direct insights into his positive contributions and inverse insights into the unquestioned imaginative assumptions within which he posed his questions.

In all of the metaphors or ways of speaking about intellectual conversion we noticed this dualism. On the one hand, we recognize an elementary knowing, a simplification of the process of knowing to the analogy of looking. We note the predominance of the image of confrontation, the 'in here' opposed to the 'out there'. We recognize attempts to overcome this separation by means of various bridges such as looking or intuition, or denials of the possibility of crossing the bridge. All this we identified as a kind of sense knowledge of the 'body' characterized by the biological pattern of experience.

On the other hand, we recognize the critical position: that knowing is by way of judgments; that judgments presuppose understanding and experiencing; that knowing is by way of an integrated structure of interrelated operations; that judging uses imagination and images but is not dominated by them; that judgments take place in the intellectual pattern of experience. The real is what is affirmed in correct judgments. Imaginative schema no [316] longer dominate. In explanatory knowing the image is a symbolic constructed image and is not verifiable as an image.

We are in a position to distinguish these two kinds of knowing in our own consciousness. We can also recognize this distinction at work in the history of philosophy. It is the root source of contradictions and opposed positions in the history of the discipline. We are able to discriminate between understandings based on judgments reached in the intellectual pattern of experience, and assumptions taken on board from the biological pattern of experience. We do not have to just condemn those who disagree with our position, but can instead point out the source of what we consider to be mistaken assumptions.

We have attained a viewpoint from which every philosophy can be judged discriminatingly, on the basis of the root criterion of the source of error and the source of correct understanding. We have attained a philosophy of philosophies. That is the power of intellectual conversion.

Comments on Exercises.

(1) The reality of space is the reality that can be verified in movements, distances, times, geometries, etc. What is real is the verified relations of what Newton called relative space. What is not real is the imaginative imperative to think of space as an empty receptacle waiting to be filled.

(2) Do you see causation or do you see succession of events? It depends on what you mean by 'seeing'. If you mean by seeing the biological activity of vision as in a cow, simply at the level of experience, then we do not see causes. But if you mean by 'seeing', the experience of vision along with understanding and judging, then you can see causes. You can know that the football player is kicking the ball not because you see it, but because you see, you understand and you judge about what you see. Knowing is not simply physical seeing, it is a compound of cognitional operations. [317]

(3) The old Latin tag makes sense at the level of commonsense experience of kicking, pushing, throwing, etc. Yet efficient causality is a verified statement of a relation of cause and effect. Whether and when and how that happens is a job for the scientists to find out. But even the scientists tend to think in terms of images and have difficulty with action over a distance unless there are a stream of particles passing over the distance to connect physically the two bodies. They call them gravitons. If they are really thought to be particles, or little marbles, then the imagination might be satisfied but are they verifiable? Does this really help to explain action at a distance? Even at the level of the imagination it seems to cause as many problems as it solves.

(4) If you say that the laws of motion belong only in the mind, then you are in danger of subjectivism. If you say that they belong also to the real world then you have the problem of where are they? and you might, like Plato and Popper, have to invent a place for them. Our approach is that the laws of motion are a formulation of the intelligibility of matter in motion and to the extent that they are verified they are real. Real does not mean out there now, but the verified.

(5) It is not just a matter of degrees of complication. What is at issue is different kinds of intelligibilities, different levels of things. Reductionism reduces everything to the same level. Reductionism thinks of the real in terms of 'bodies'. But we think in terms of unities, identities and wholes that are distinguished from one another by their explanatory properties. Things are grasped not by seeing alone, but by understanding and verifying. Just as laws are verified in relations, things are verified as the terms of the relations.

(6) The soul has been much misunderstood and often rejected. Again it is a problem of imagination and intelligence. If man is recognized as a unity, identity, whole, different and distinct from animals by his activities of knowing and deciding, then he is a different kind of thing. The traditional philosophical term for this is form or soul. The human person does have a [318] unity or integration of acts of different levels and we are justified in saying that he is one thing, therefore one form, one soul. The soul is the principle of unity and integration. Where is it? It is everywhere in the sense that all the physical, chemical, biological and sensitive elements and activities of man are subsumed into a new unity. The soul is localized by its powers, the power to see is localized in the eyes and brain, the power to walk in the legs, etc. Such was the answer of Aquinas and it makes sense. The misunderstandings of soul come from trying to imagine it as a kind of ghost as happens in Descartes.

10

From Authentic Subjectivity to Genuine Objectivity

For it is now apparent that in the world mediated by meaning and motivated by value, objectivity is simply the consequence of authentic subjectivity, of genuine attention, genuine intelligence, genuine reasonableness, genuine responsibility.[ciii]

Preliminary Exercises.

(1) Were there electrons even before they were identified, named and defined?

(2) A schizophrenic hears voices and sees visions. Can we be sure that what we hear and see is really there?

(3) Does sound exist even if there is no one to hear it?

(4) Is it possible to do a social survey on a subject such as marriage, religion or crime and not be influenced by your personal values?

(5) Is it possible to perform a scientific experiment without being influenced by already established theory? [322]

(6) Is all knowledge prejudice? Can we ever be sure that we are not biased in our judgments?

1. Transition

Our argument so far has been limited to considering knowing as an activity. We have concentrated on the facts of knowing, as we become aware of these in our own conscious activity. Just as we could have studied our dreams or our memory, we have studied here the activities of sensing, understanding and judging and given as accurate an account of these activities as possible. We have seen how these activities coalesce into a unity of interrelated dynamic parts in cognitional structure. In intellectual conversion we identified how imagination, the criterion of sense, of the immediate tends to be more overpowering than the intangible assertions of judgment of the truth and how we must constantly struggle to keep a correct balance between imagination and judgment. If you have identified these tendencies for yourself, it should be relatively easy to grasp the correct notion of subjectivity and objectivity.

Our approach so far might also called subjective, for in a sense it has been, as we have emphasized the subjective pole of the activity of knowing. What we have been doing might be called immanentist, in the limited sense that we have focussed on the activities of knowing, as they occur in consciousness, rather than on the content of these activities. It might even be called a kind of psychologism, in the sense of an empirical psychological account of the activities involved in knowing. We have made no claims so far beyond the occurrence of these activities in a patterned structure.

There is a false notion of subjectivity and objectivity in which these are conceived as opposed and mutually exclusive. They are opposed because of the imaginative schema of the subjective as 'in here' and the objective as 'out there'; this is so common as to be almost universal. In the search for objective knowledge in the natural sciences and the human sciences, subjective elements in the researcher are to be eliminated; the objective is good, all subjective elements are bad and interfere with the 'objectivity' of results. In this case subjective lumps together everything that goes on in the [323] mind, prejudice, bias, self-interest, as well as hypotheses, ideas, judgments, values. Knowledge becomes so objective, so logical, and so controlled by rules and methods, as to be able to do without human minds. Objectivity is to be attained by eliminating the subjective.

In this context the critical problem is inevitably presented in terms of a bridge between the subjective in here and the objective out there. Descartes, Hume and Kant all thought in terms of the in here and the out there and their theories of knowledge unfolded against the background of these unquestioned imaginative assumptions. But this imaginative presentation poses insuperable problems when you ask, how do you know that your knowing is true? How do you know that the subjective really attains the objective? In this context it could only be by means of a kind of super-knowing by which we can compare the subjective and the objective to see if they really correspond. But this does not seem to be humanly possible.

However, there is an alternative way of viewing the notions of subjectivity and objectivity, to view them as complementary rather than opposed. Our examination of the subjective aspects

of knowing helps us to distinguish between the proper role of imagination to facilitate understanding and the imperious force of imagination which foists on us false problems and false solutions. Our examination of the processes of description and explanation clarify what we can really know and the actual advantages and disadvantages of these types of knowing. Our examination of the proper unfolding of the desire to know helped us to discriminate between subjective factors such as bias, prejudice, self-interest, which do skew results and subjective factors such as commitment, honesty, ideas and hypotheses which are essential for correct human knowing. Our examination of subjectivity has been precisely in order to attain genuine objectivity. Objectivity is to be found not by eliminating subjectivity but by an authentic subjectivity.

Similarly, developments in the objective pole help us to be more conscious of the subjective pole. We noticed that we had to have examples to work on in order to discriminate between images and ideas, description and explanation. It is developments in the [324] sophistication of scientific research that has make us aware of subtle subjective elements. The shift from classical method to statistical was first made in scientific practice before we could become aware of inverse insights, devalued inverse insights and the empirical residue. Developments in the content of our understanding have immensely helped in discriminating between the activities.

The bridge between the subjective and the objective is a construction of the imagination and has to be simply abandoned. The transition from subjective to objective for us is a matter of a shift of focus from the activities to the content, from the knowing to the known. Most of our text has focussed on the activities, now we are shifting back to the content. The transition for us is a transition from considering judgment as an activity to actually positing judgments for ourselves. Are we prepared to take a stand? Can we move from considering knowing as an activity to actually knowing? Can we make some strategically important judgments which will establish our notion of objectivity? This we hope to do in self-affirmation; then by making further judgments we have the context of judgments necessary for a notion of objectivity based on judgment and not on imagination.

We are now to become aware of the fact that the activities we have identified are intentional: they have a content which is the objective pole of the activity of knowing. In this chapter we move from the subjective to the objective. We escape from immanentism to the real and that which transcends the subject. We explicitly and methodically shift our focus from the subjective pole to the objective pole of knowing. The whole purpose of the work we have already done is to enable us to make this shift correctly and systematically. There has been an ulterior motive in all the self-appropriation that we have been doing; we have been focussing on the subjective pole in order to discover the true meaning of the objective pole. Our previous emphasis on activity of knowing will now enable us to focus on the content of what is known in a correctly objective way.

Our motto is: "Genuine objectivity is the fruit of authentic subjectivity."[104] I hope that our examination of human knowing has been authentic, i.e., attentive, intelligent, reasonable and [325] responsible. We have tried to face up to the data of consciousness, to sort it out, to

identify the different activities, relate the different movements and verify our conclusions by reference back to the data of consciousness. We have been critical: we have allowed further questions to arise and we have faced any conceivable objection. We have not been relying on Authority or Tradition or Fashion. This is our springboard for genuine objectivity. It has taken a long time to prepare the way for this step, because the shift from subjectivity to objectivity is most often misunderstood Let us clean the slate and try to rehabilitate the terms subjective and objective, not in terms of imagination where they are opposites, but in terms of judgment where they complement one another.

2. Self-Affirmation

We have considered the activity of making a judgment and the structure of such a reflective act of understanding leading to a judgment. We have considered many particular examples of judgments, but only as examples. We have not taken a stand with on those judgments personally. The only things that we have been attempting to establish are the facts about human knowing. It seems to be time, then, to make a definitive strategic judgment for ourselves about ourselves as knowers.

1. Affirming the Judgment. The first step in implementing the complementary notions of subjectivity and objectivity is to posit the judgment 'I am a knower'. It is not as if we ever doubted this rather basic statement; it is not that now we are in a position to prove it. Whereas previously such a judgment was implicit in all out knowing, now we wish to posit this explicitly, clearly, foundationally. Our previous work has clarified the meaning of knowing and also of the subject. All the work that we have done so far prepares the way for this judgment, and having made this judgment, the way will be open for the possibility of further judgments.

Let us put this in the form of positing the antecedent in the hypothetical syllogism that makes the procedure explicit.

The conditioned: I am a knower. [326]

Link between Conditions and Conditioned: If I am a conscious unity identity whole who experiences, understands and judges, then, I am a knower.

Fulfilment of the Conditions: But I am a conscious unity identity whole who experiences, understands and judges.

The virtually unconditioned: I am a knower.

What do we mean by knower? We have spent nine chapters explaining and defining what we mean by a knower so there should be no ambiguity about that. A knower is a person who experiences, understands and judges and we have explained in detail each of these terms.

What do we mean by conscious unity identity whole? Our work so far has familiarized us with shifting attention from the content of activities to the activities themselves. So we have dwelt

at length on the activities of imagining, thinking, reasoning, judging in all their forms and details. We have become conscious of these mental activities; we did this by working on a puzzle or problem, then later reflecting back and identifying the activities by which we solved the problem. Now we have to take a further step to become conscious of the subject who is always there concomitantly with our awareness of objects or activities. How can we become aware of this subject, the I, the self?

It cannot be done directly. If you try to turn around and become directly aware of the self, you can to some extent succeed; but what you become aware of by this direct reflex action is the 'subject as object' and not the 'subject as subject'; to the extent that it is possible to direct attention explicitly at the self, then the self becomes an object and not a subject. To become aware of the subject as subject you have to heighten the awareness of self which is concomitant with the awareness of activities or objects. This awareness of self is there in all conscious activities; that is the meaning of a conscious activity. This is an experience of the self which is given; it is the one subject who performs all the cognitional activities at the different levels; this is what unifies the different activities so they are activities of the same subject. The experience of the self endures over time from emerging childhood memories to maturity and old [327] age. The same self who wakes up in the morning, washes, dresses, eats, prays, studies, travels, works, relates to others, relaxes, plays, returns home, goes to bed, to sleep perchance to dream. This experienced unity identity whole is given; without it knowledge would be impossible. It starts as an experience but can become self-knowledge as we explained earlier (chapter eight). The one subject is conscious empirically, intelligently and rationally.

Are we then prepared to affirm the judgment 'I am a knower' in a personal way? Are we prepared to make this the foundation of our philosophy? Are we justified now in making this judgment? This is no longer a game, it is no longer just an example. We are moving from the activity to the content. We are affirming our philosophical position and we the foundation of that position is taking a stand on what we are and what we can know.

There should be no difficulty making that judgment. The terms have been explained not just as concepts but as corresponding to definite activities and experiences. The evidence is there in our self-appropriation. The evidence is given in the data of consciousness. A verification refers back to the data to see if the conditions are fulfilled. It seems to me that the conditions are amply fulfilled. But you have to make the judgment for yourself.

2. Alternative Answers? Let us look at it from the point of view of alternatives. A question for a judgment can be answered with a yes, a no, anything in between, or I don't know. Which of these are coherent, which of them are possible?

Is it possible to say, 'No, I am not a knower'? But that is incoherent. Here you have a person, understanding a question, experiencing the relevant data, understanding what is referred to, and passing a judgment; and yet claiming that he is not a knower! This is deeply incoherent; the content of the judgment is in fundamental conflict with the activity of affirming the judgment.

Is it possible to say, 'Well, maybe I am a knower, but I am not sure'? There is a sense in which this is legitimate. If you have not fully understood the terms of the question, or you have not fully understood the preceding sections, it would be reasonable to say, 'Wait a little until I go over this again'. That is a perfectly reasonable [328] procedure. But having done the bit of review required, having understood the terms of reference, the data, the conditions and the link between the conditions and the fulfilling conditions, can you still be reasonable and sit on the fence? Once one has grasped the implications of the syllogism, then it becomes incoherent to say I am not sure. Once you have sufficient evidence it is no longer reasonable to refrain from judging.

Is it possible to say, 'I do not know'? Again this is incoherent. There is a profound contradiction between what is being said and what is being done. A judgment is being passed, but the content of the judgment is saying that no judgment can be passed. This is not just a clever way of rebutting an adversary; it reveals an intrinsic contradiction between performance and content.

The answer 'yes, I am a knower', is coherent. This is the only answer that makes sense. It is in harmony with the evidence. There is harmony between the activity of knowing and the content of the judgment. It builds on what we have been saying all along. It prepares the way for many other prospective judgments. Let us be brave; let us affirm that we are knowers.

This lays the foundations for a multitude of other judgments. If I am a knower, then other judgments can be posited if there is sufficient evidence. We can make judgments of common sense, accepting the limitations of descriptive knowing but recognizing that it is still valid human knowing. We can make judgments of the classical scientific type if we have moved into theory, defined our terms explanatorily and experimentally shown the truth of our laws. We can make judgments of a statistical type if we have established the ideal frequencies from which actual frequencies diverge non-systematically. In this way we can build up a body of knowledge based on correct judgments. It is not that we first doubted or suspended our knowledge of common sense and science and can now reintroduce them. Our starting point has been the subject as he tries to sort out gradually his position on science, philosophy, and how the fundamentals relate to the details and vice versa.

3. Contrast with Descartes. Our approach to self-affirmation may remind some of Descartes' ***Cogito, ergo sum***, so let us explain [329] where we differ from Descartes. We differ in the method by which we have prepared the way for this judgment of self-affirmation. Descartes approached it by way of the principle of methodic doubt; he systematically doubted everything until he found some principle that is indubitable. Our judgment on that procedure was that if you start down that road it is rather arbitrary what you consider indubitable; we found the criterion of indubitability too demanding as a criterion for most human knowing; we found that the attempt to build a philosophy on certain first principles and then deductions from these, does not conform to our actual experience of knowing.

We on the contrary start with the subject in his native bewilderment and disorientation; but even he can discover for himself what are the properties of human knowing, especially of the

judgment. He can differentiate description from explanation, theory from interiority, knowledge of objects to knowledge of activities to knowledge of the subject. Descartes approach was to doubt everything that could be doubted. Our approach was to investigate how in fact we come to know, how we tend to make mistakes, how we recognize mistakes, correct them, learn form them and build up mastery in a field.

Further, Descartes made little attempt to define his terms, especially the term 'knower'; for him there was little difference between a thinker and a knower. For us this has been the crucial task of our enterprise. Everything we have been doing has been related to the self-appropriation of the knowing subject; we are clear about what we mean by knowing. Descartes more or less took for granted and presumed a kind of rationalist approach to knowing: once he established the self it was pure deductive logic that got him to God and then to knowledge of the concrete universe. We, however, have also been at pains to identify what we mean by the self, the conscious subject, consciousness of self as concomitant with consciousness of objects.

Yet there is a fundamental correctness about Descartes= position on self-affirmation 'I think, therefore I am' and with that we identify. There is something basically incontrovertible about the judgment, 'I am a knower', just as there is something ridiculous in the image of a subject who goes around claiming, 'I am not a [330] knower'. Having examined both positions in detail, we identify ourselves with the first. It is coherent, reasonable, incontrovertible, foundational.

3. Three Partial Notions of Objectivity

Let us define what we mean by objectivity. We will identify three partial notions: the absolute, the normative, and the experiential, as well as a principal notion of objectivity. What we will be emphasizing is that knowledge is by judgments and our notion of objectivity is firmly based on our notion of authentic subjectivity. It is not based on the imaginative schema of 'in here' and 'out there'.

3.1 Absolute Objectivity.

At the level of judging we encounter the partial notion of absolute objectivity. If something is de facto true, then there is certain absoluteness to that truth. If it is true that Caesar crossed the Rubicon, then it is forever absolutely and eternally true that Caesar crossed the Rubicon. Truth has a quality of absoluteness, even if it is a contingent, trivial, transient truth. Here we carefully identify and affirm this aspect of objectivity.

We have to be careful with the word absolute. We are not saying that it was absolutely necessary that Caesar had to cross the Rubicon. But once he did as a matter of contingent historical fact, then it can never be untrue. Once it is true, then nothing, even God, can make it to be untrue. The absoluteness belongs to the truth and not to the material content of the judgment. All historical facts are contingent; everything outside of God is contingent as opposed to absolutely necessary. There is an absoluteness to the correct judgment that is different from the absoluteness of time and space for Newton. Philosophers have searched for the absolute but have often searched in the wrong places. For us the absolute is the virtually

unconditioned. The conditions need not necessarily be fulfilled, but in the actual case of Caesar crossing the Rubicon, they happen to be fulfilled and so the conditioned becomes the virtually unconditioned, the actually verified. [331]

The virtually unconditioned of a correct judgment is withdrawn from relativity to the knower. If you examine what we have said about a judgment, you will see that the truth of the judgment does not depend on the subject but on the conditions being fulfilled. We put this in logical form to make it clear that the virtually unconditioned depends on the conditions and the link between the conditions and the conditioned. If the conditions are fulfilled and the link is established, then the conditioned becomes the virtually unconditioned. In this sense the virtually unconditioned is independent of the knowing subject.

This is the source of the logical principles of Identity and Contradiction. These principles state that a thing is what it is, and the same thing cannot both be and not be at the same time in the same respect. If something is true for today, it can become untrue tomorrow, e.g., it is raining today, it is not raining tomorrow. From the point of view of description a statement may be true, but from the point of view of explanation the same statement may be false. The principles are asserting that from the same point of view, at the same time and in all respects something cannot simultaneously be true and untrue. This is the ground for the absolute notion of objectivity. If it is true that it is now raining here, then that limited statement in relation to this time and place will always be true and the negation of that judgment will always be false. If there is a correct judgment, then within the limits of time and space of the judgment it will always be true and can never be truly negated. The principles of Identity and Contradiction are not conclusions of logic, nor are they only principles of logic. They are the conditions for thinking and knowing. They are inherent in knowing. Knowing is impossible without them. They cannot be proved, they cannot be demonstrated; they are the conditions for the possibility of any thinking and demonstration. They are what thinking, understanding and knowing are about.

Both universal and particular judgments, if true, are absolute. >It is raining= and >water is H_2O=, if they are true and to the extent that they are true, are absolutely true. [332]

Both certain and probable judgments share in this absoluteness of a correct judgment. >It will probably rain= and >it will certainly rain=, if true share equally in the absolute notion of objectivity.

This is extremely important in our answer to relativists, skeptics, and others who think that truth is only found in certain, permanent, immutable statements. Truth is very nuanced; there is the truth of probability statements, of universal statements, of contingent statements, of scientific and philosophic statements. But to the extent that they are true, they are true.

Although in this text we have focussed on the subjective pole, we have to note that the conditions for the truth of a judgment are not subjective. What we know by judgment is 'what is'. We do not make it to be by our knowing; by our knowing we know that it is and, perhaps, why it is. There is a fundamental detachability of the judgment from the knowing subject. There

is a possibility of communication. In knowing, we are knowing what is true, not making it to be true by our knowing.

There is a widespread illusion in our contemporary culture that we create our own truths. There is a field where we humans give meanings to cultures, language, symbols, social institutions, countries, laws of taxation, public order, and in that area we create meaning and truth. But in the normal field of knowledge of the natural world we discover truth rather than invent it. Our knowing is creative in the sense that we need to think of all sorts of possibilities and hypotheses in order to hit on the one that can be verified. This knowing is not creative in the sense that we determine what is to be true or false.

Were there quarks before they were discovered? This is a tricky question. If you say yes, then, you tend to imply that quarks are little marbles that have always existed and we have just come along and put a name on them. If you say No, then you imply that in knowing them we are also making them to exist for the first time.

We get out of this dilemma by recognizing that out knowing develops. We are getting a more and more accurate understanding of sub-atomic particles, events and forces. What is potentially intelligible is becoming actually intelligible. There is a multitude of [333] data that is being uncovered by particle accelerators and the like. But it is only data. It has to be understood, terms have to be defined, hypotheses formed and verified in the reflective act of understanding that grasps the link between the hypothesis and its fulfilling conditions.

In a sense, the quark has always existed, meaning that experiments do not create quarks, but rather lay bare the data that is the foundation for the affirmation of the existence of quarks.

In a sense, the quark never existed before, meaning that the term is new, the hypothesis is new; the verification is recent. Our knowledge of the existence of the quark is recent but there is no reason to think that our knowledge made the quark to exist. The same data has always existed but it is only now that we have instruments to measure and verify it.

3.2 Normative Objectivity.

Here we are using the word 'objectivity' in the sense of excluding influences that are detrimental to the proper unfolding of the process of knowing. We are using it in the sense opposite to the subjectivity of bias, prejudice, wishful thinking, self-interest, obscurantism, etc. The ground for normative objectivity is the proper unfolding of the pure, detached, unrestricted desire to know. It is this desire to know that throws up the further questions that reveal shortcomings in our conclusions. This is the foundation for intellectual probity which reveals undue influences in the process of knowing. The desire is the foundation for the openness that is prepared to ask any question, face any possibility, look at all the data, follow every clue wherever it may lead.

Contemporary philosophy is very conscious of the subtle influences that can interfere with the objectivity of knowing in this sense. Particularly the work of the three Masters of Suspicion comes to mind here, that of Freud, Marx and Nietzsche.

Freud has revealed some of the influences that the unconscious can exercise on the conscious mind to twist our motivations, our interests and the direction in which we move. There are many processes of repression, sublimation, resentment, transference, [334] defense mechanisms, needs for self-esteem, etc. that can distort the process of knowing and vitiate the objectivity of our conclusions. It is often concluded that these unconscious forces are always operating and hence we cannot be sure of the objectivity of our knowing

Marx has uncovered many of the social factors that influence our knowledge. There is the ideology of class that tends to structure and color everything that we know in terms of class interests. There is no such thing as objective knowledge for Marx, only ideologies of different classes defending their own interests. Culture, education and socialization are factors that determine how we will be brought up, what we will be expected to do, how we will be expected to behave. The content of our culture will depend very much on our up-bringing, our education, religion and class.[105]

Nietzsche has further delved into the masks we use to cover up our craving for power and manipulation of others. Moral norms and religious precepts are invented by the psyche to serve these hidden needs. God is merely an invention of an immature psyche still unable to take responsibility for existence and death. No longer can statements be taken at their face value; the question has to be asked in what way does the speaker benefit from this position, who is exercising power over whom here.

If it is claimed that the lust for power fundamentally corrupts the knowing process, then the question arises as to whether this particular claim is also corrupt. If social conditions fundamentally undermine the validity of our knowing, how can you have a theory of the ideological determinants of consciousness? Taken in their full sense these positions are self-defeating. Further the assertions can be turned back on the accusers. Nietzsche claims that religious people have invented God as a Father figure because they won't take responsibility for the world. But what of his own Superman? As Copleston remarks, "In fine, Superman is all that ailing, lonely, tormented, neglected Herr Professor Dr. Friedrich Nietzsche would like to be."[106] Once you start those kinds of accusations there is no limit or control of how it can be used.

Our approach would be, not that these influences totally undermine the process of knowing, but that we can be objective in [335] the sense of controlling these influences, revealing them, making them explicit, and allowing the pure desire to know unfold in its own way. Normativity here, means the obligation to be honest, to be detached, to ask the further questions. Social influences do tend to bias our knowing, but in our view these influences can be brought to light and, to some extent, excluded. They need not undermine the project of objective knowing.

It is precisely to preserve this ideal of objective knowing that logic, method and methodologies have been developed. Logic is needed to check the internal coherence of any set of conclusions;

it includes sets of rules concerning definition of terms, division of concepts, deduction, inference, etc. These are formulated and made explicit to help us to check our conclusions, but these rules come from man not from God. They are devices that we formulate in order to help ourselves be objective. Thinking comes first and logic comes second; logic is itself the result of human knowing and can be hijacked by ideology or self-interest.

The methodologies of the social sciences are formulated to exclude bias on the part of the survey designer, the researchers, the interviewers, the compilers, and the interpreters of the data; they are the result of insight and judgment. Designed to be a help in excluding the grosser forms of bias and prejudice, nevertheless these methodologies also can be ideologically in favor of positivism, mechanism, atheism or secularism. They too can atrophy, become detached from reality, and become little gods. There is nothing that can replace the pure detached desire to know as the ground and source and motive of all our knowing.

3.3 Experiential Objectivity

Here we can think of objectivity as we encounter it at the level of experience, in the sense of facing up to the data as given, rather than as imagined. The data are the given, but even at this level there are ways that we ignore aspects of the data, pick out things that we like, screen away things we are not prepared to face, supply by wishful thinking what is not even there.

The data itself is preintellectual and preconceptual, the given as given. In itself it is unquestionable, indubitable, simply given. The [336] categories of true and false, or real and unreal do not apply until questioning transforms the data into hypotheses and judgments, but even at the level of sense our faculties can play tricks on us.

4. The Principal Notion of Objectivity

The principal notion of objectivity resides in a context of judgments, not in a single judgment. The single judgment, 'I am a knower', is not in itself sufficient to establish the principal notion of objectivity. On its own the judgment I am a knower is consistent with a monist philosophy or solipsism. A monist claims that I am a knower but considers that everything is one and you are identical with the one, then, there is still no objectivity. A solipsist claims that I am a knower but there is nothing else, then this does not establish the principal notion of objectivity.

For us, objectivity arises when you combine the judgment 'I am a knower', with a context of other judgments such as 'this is a computer' and 'I am not this computer'. Now you have a context of judgments that introduce verifiable distinctions between knowers and objects known. The principal notion of objectivity lies in these distinctions. The more correct judgments that we make the more differentiated becomes our principal notion of objectivity.

Note that objectivity does not rest on the validity of a single judgment. It is not a judgment that something is 'out there' as opposed to 'in here'. It is not a judgment separate from the context of judgments. The context of judgments implicitly defines for us our notion of objectivity.

Similarly, the validity of our notion rests on the validity of the particular judgments in question. If the three judgments are true, namely, I am a knower, this is a computer, and I am not this computer, then, implicitly we have validated our notion of objectivity. If these judgments are not correct, then our notion of objectivity collapses.

This is what might be called an economical notion. It is the bare minimum: what can be justified by judgments and is not dominated by imagination. It leaves further questions to be answered by further [337] judgments. It is an example of implicit definition. The principal notion of objectivity adds nothing new to the three judgments; it does not add a fourth judgment. Our notion of objectivity rests on distinctions between knower and known, and not on a distinction between in here and out there. Here we get our implicit notion of subject and object: the subject is doing the knowing; the object is the content of the known. The two are correlative; one is defined in terms of the other.

Note that this is the level of judgment, not the level of experience. Most problems with objectivity arise from trying to solve the problem at the level of sense. The senses give us such a strong paradigm of in here and out there that we are inclined to consider that the problem of objectivity in these terms. But experiencing is only the first level of human knowing; fully human knowing is at the level of judgment. That is where we deal with the problem of objectivity.

This solves the problem of transcendence. Most of our study of knowing has concentrated on immanent activities. Some might think that we are stuck in immanentism. Others might think that the only way out is to cross the bridge between immanent and transcendent by some kind of intuition. We solve the problem by a context of judgments. We can have true knowledge of the universe and the universe is distinct from the knower. So instead of dividing everything into the 'in here' and the >out there=, we are orientated towards the totality of what is and within that totality we distinguish between subjects who know and objects that are known.

5. Self-Transcendence

In this chapter we are making the transition from immanence to transcendence, from the subjective to the objective. We conceive of this transition in terms of moving from the activity of knowing, to the content of the known. We base ourselves on judgment as the one and only form of complete human knowing. We do not establish our notion of objectivity in terms of imagination, nor of the senses, nor of any other incomplete notions. We distinguish a principal notion based on a context of judgments and a number of legitimate partial [338] notions focussing on the levels of experiencing, understanding and judging. This is a difficult message, so let us try to formulate it in terms of personal self-transcendence. This might help us to identify what we have been talking about in our own consciousness.

Our knowing is intentional; it intends an object or a content; it is transitive. Questions aim at the known unknown. They give a direction to inquiry, set the criteria for a correct answer, suggest ways in which questions might be answered. There is a purpose underlining the question leading to the answer. It is the content that is intended; the activity of knowing is for

the sake of the content; we do not indulge in the activities of knowing for personal amusement but in order to grasp the content.

All the activities of our knowing intend objects or contents other than themselves. In all our knowing there is an activity and a content. The content is different from the activity. It is distinct from the activity. There is always a subject pole and an object pole in knowing. This intentionality is present in the desire to know but unfolds in specific ways at each of the levels of consciousness. At the level of understanding there is an intention towards the intelligible, the possibly relevant hypothesis, a possible definition or explanation. At the level of reflection there is an intention towards truth, towards the virtually unconditioned, towards correct understanding. The intention is not satisfied until such verification is attained. The intention keeps the flow of questions coming until all relevant questions have been asked and answered in a satisfactory manner.

There is a kind of self-transcendence at the level of experience. There is already a distinction between the seeing and the seen, the activity and the content. We are responsible for the seeing but not for the seen. The content of sensing is given. We did not invent it, create it, make it to be; it is simply given. The sensing is different from the sensed and already we have a rudimentary self-transcendence in that we attain to what is distinct from our knowing. We do not invent the data of sense that verifies our classical laws; it is given. There is an element of submission to the reality of what is given.

There is a kind of self-transcendence at the level of understanding. We intend the intelligible, the relations, definitions, causes, that make sense of the data of sensible experience. There is a [339] difference between the intelligent and the intelligible. Intelligence intends the intelligible.

There is a further level of self-transcendence when it comes to reflection. We intend the truth, the virtually unconditioned, the actually verified. Such truth does not depend on the knower, the subject. This is the objective pole of the knowing process. It is the term of all the activities. It is quite independent from the knowing subject. The conditions are not in the subject pole but in the objective pole. The knowing depends on the subject, but the truth of the judgment in itself does not depend on the subject.

There is a further level of self-transcendence when it comes to moral decisions and actions in conformity with choices and decisions. But we cannot go into that here.

6. Conclusion

Lonergan divides philosophy into three questions. The first question: What am I doing when I am knowing? This he calls cognitional theory. All of what we have been doing up to this chapter has been answering this first question. The second question is: Why is doing that knowing? And this should give an epistemology. This chapter has offered a very brief sketch of epistemology. Lonergan's third question is: What do we know when we are doing that? The answer gives you a metaphysics. We will not be able to touch on that here.

These questions correspond to the divisions of *Insight*. The whole of Part I, comprising ten chapters, is on cognitional theory. The first three chapters of Part II, (namely, Self-Affirmation, The Notion of Being, and Objectivity) give his epistemology. Then follows a treatment of metaphysics, ethics, and transcendent knowledge.

Our main concern in this text has been to establish the foundation of this new approach to philosophy. This foundation is to be found in cognitional self-appropriation, and nowhere else. If that foundation is built, the rest of the structure follows fairly naturally and easily. If that foundation is lacking, then the rest is largely a matter of playing [340] games with words. Our main aim has been to answer Lonergan's first question: what am I doing when I am knowing?

Lest it be thought that Lonergan was an immanentist or a subjectivist, this chapter has given a brief outline of his epistemology, and his answer to the questions of transcendence and objectivity. It has only been a sketch and should be elaborated by comparison with Aquinas on knowledge, by contrast with Kant and Hume, by further elaboration and examples. But we can do only one thing at a time and our main aim here was cognitional theory. This chapter has been an addendum to show that cognitional theory leads to an epistemology and from there to a metaphysics.

Our aim in this chapter has been to show that starting with the subject does not necessarily mire you in immanentism. We have given a new meaning to objectivity and subjectivity where these are now complementary modes rather than strict opposites.

Comments on Preliminary Exercises.

(1) We tend to think that they were there, with labels on them, already constituted and defined, just waiting to be discovered. I think it is more correct to think in terms of the potentially intelligible becoming actually intelligible.

(2) Our senses can play tricks on us. A person dying of thirst in a desert can see an oasis; but it is only a mirage. We think we hear sound from a certain direction but it is only an echo. A stick in water seems to be bent, but out of water it is perfectly straight. The point is that we can differentiate description from explanation; the stick seems to be bent from a descriptive point of view; but in explanation the principle of refraction defines why it seems to be bent. We can usually recognize the influence of illness, malaria, schizophrenia, exhaustion on the normal functioning of the senses.

(3) This is a version of the old question, if a tree falls in the forest and there is nobody to hear it, does it make a sound? Our answer would be to distinguish between description and explanation. Sound can be interpreted either descriptively or [341] explanatorily. From the point of view of description there is no sound. Descriptively, sound is a relation to the senses, in this case, to hearing. If there is no hearing, there is no sound. But from the point of view of explanation sound is vibrations in the air which can be measured by many instruments and which extend beyond the range of the human ear. There is no

reason to suspect that a tree falling does not cause such vibrations even if there is nobody to hear or measure them.

(4) It is an illusion to think that we can eliminate values either from the surveyors or from those surveyed. Although the study of values properly belongs to ethics we cannot separate values from human knowing and behaving. Truth is a value. Attentiveness, intelligence and reasonableness are values. Value-free surveys are an illusion. Value freedom is often a cloak for behaviorism, for secularism, for a politically correct philosophy, or for some ideology. The best approach would seem to be to make one's values explicit: to be clear about what you are doing and state your starting point, your direction and your values. These influence what you think is important, why you pick certain areas rather than others, why you ask certain questions and not others.

(5) Our general characterization of scientific method is >theory verified in instances'. In this view there is no looking at instances without some hypothesis or theory in mind. This does not make the process of knowing subjective or biased. Knowing is not just looking; it includes understanding and judging. It is active and creative. We have seen that knowing constantly oscillates from data to bright ideas, to further questions, to reflection, and back to data, etc. It is an illusion to think that there is a theory-free observation and that that is human knowing. If there are no hypotheses, there is no understanding; and if there is no understanding, there is no human knowing.

(6) To assert that all knowledge is prejudice, is to assert that all our knowledge is somehow invalid, biased, crooked or warped. But to assert that is to imply that we have a notion of [343] human knowing which is valid, unbiased, genuine and true. To assert that all knowledge is prejudice is to say that knowledge is not possible, while at the same time pronouncing a judgment which shows that knowledge is possible. There is again a contradiction between the activity and the content of this assertion. There is no absolute certainty of not being biased. The control we are suggesting is the self-correcting process of knowing which ferrets out errors, traces them to their source, raises further questions, faces all the data, etc. This helps to reveal biases and their source and to reverse them.

Epilogue: Building on the Foundations

Establishing foundations is important but as yet you do not have a building. In this epilogue let us look briefly at the kind of building these foundations will take, how can the position on cognitional theory and epistemology be expanded into a metaphysics, and ethics, and what is the role of the philosopher in culture and society. This can only be a sketch of possibilities but indicates again the fruitfulness of the approach we have adopted.

1. Expansion into a metaphysics. Metaphysics is often conceived as a branch of philosophy, an ontology, dealing with being qua being, the most abstract of all concepts. However, it seems better to conceive metaphysics as first philosophy, as the peak of the philosophic enterprise, as the most comprehensive view of the whole, the integrating framework for all science, knowledge and life. The difficulty is how can this integrating framework be attained as it is impossible for any one person to be knowledgeable in all fields. Perhaps we have prepared the way in the distinction we have drawn between activities and content; the activities are an invariant pattern; the content is a quasi infinity of objects to be experienced, understood and judged. We can use a heuristic technique to develop this integral integrating framework for all our knowing.

The pattern of relations existing between the activities of knowing will be reflected in the pattern of relations existing between the known contents. The invariant components of the structure of human knowing we have identified as experiencing, understanding and judging. But each component as an activity also intends a content and so we can move to what is experienced and call it 'potency', what is understood and call it 'form' and what is affirmed [344] and call it 'act'. These traditional metaphysical terms can now be defined heuristically: we have determined the activities of knowing and can now define the metaphysical elements as the content intended in these activities. Our desire to know is unlimited; and so we can define being as the objective of the pure desire to know. We do not just sense, we must sense something; that something we call potency. We do not just understand, we must understand something; that we call form. We do not just judge, we judge something to be true; this we now call act. Just as there are invariant activities in the structure of the one knowing so there is an invariant structure of potency, form and act in the unity of a proportionate being.

Are forms a chaos or is there some order? Are our acts of understanding a chaos or are there different kinds of acts of understanding? There seems to be a fundamental difference between an inclusive act of understanding which grasps a unity in all relevant data and an abstractive act of understanding grasping a relation between selected aspects of the data (see chapter five on Things and Properties). There seems to be an act of understanding which grasps things, substances, central forms; and another act of understanding which grasps relations between aspects of the data, namely, accidents, properties, conjugate forms. So the traditional distinction between substance and accident can now be formulated heuristically and elaborated in terms of central and conjugate potency, form and act.

Is there a chaos or a hierarchy in the kinds of existing substances? Is there a hierarchy or a chaos in our acts of understanding? We have noted the characteristic of successive higher viewpoints, where later insights incorporate earlier insights into a higher meaning or unity. So there is a possibility of a systematic unity of the sciences based on the principle of successive higher viewpoints. Physics, chemistry, biology, botany, zoology and anthropology would seem to constitute a hierarchy of successive higher viewpoints dealing

respectively with atoms, molecules and compounds, cells, plants, animals and humans. And so we seem to have a heuristic definition of what was traditionally defined as genera and this can be further differentiated into species and individuals. [345]

Is the material universe static or dynamic? Well, is the activity of understanding static or dynamic? In a multitude of ways we have noted that the desire to know is dynamic; we move from experiencing, to understanding, to judging. We move on to other matters. At a certain point we introduce higher integrating frameworks. We are continually correcting, expanding, integrating, developing our understanding. The desire to know operates as a principle of finality in the unfolding of our knowing. A similar principle of finality seems to be operating in the known universe. An evolutionary perspective is taken for granted in all the sciences; there seems to have been a continuous emergence of higher integrations from earlier or simpler manifolds. Lonergan avoids the term evolution preferring the term 'emergent probability' to stress that this dynamism unfolds, not on determinist lines, not as a pure chance, but on the basis of varying schemes of probability.

What has metaphysics to say about method? There is only one universal method applicable in all circumstances, times and places: to be attentive, intelligent and reasonable and responsible. We can then subdivide methodologies into classical and statistical, genetic and dialectic. Each specialization can then devise the particular methodologies appropriate to getting a correct exegesis, diagnosing an illness, identifying an algae, etc. Metaphysics has something to contribute to the sciences in terms of method and criteria of truth. The scientist is the one competent in matters of particular answers to specific questions. This visualizes a relationship of complementarity between the metaphysician and the empirical scientist where they both need one another.

2. Expansion into ethics and politics: the question of values. In our introduction we explicitly bracketed the question of values in favour of concentrating on the one thing at a time, namely, appropriation of cognitional structure. Having done that can we extend the same method to deal with values, choice, decision, good and bad, right and wrong?

In *Insight* Lonergan is thinking in terms of three levels of cognitional operation ; his approach to the possibility of ethics is based on extension of rationality from knowing to doing. But in *Method in Theology* his vision has been expanded into five levels of [346] intentional consciousness as represented in the following diagram. This fully recognises the human person as not only knowing but also deciding, acting, implementing and oriented to God. The levels are related to one another on the principle of sublation; higher levels perfect, go beyond but respect the integrity of lower levels.

Having used the method of self-appropriation to establish our philosophical foundations, we can now use the same method to identify and understand the imperatives and activities proper to the level of moral decision making. At each level we can distinguish an imperative, a goal and a criterion of having reached that goal.

At the level of understanding the *imperative* is to be intelligent, meaning to seek for the intelligible, try to understand, formulate clearly and distinctly. The *goal* is simply the intelligible, the laws, definitions theories and explanations considered simply in themselves as possibilities. The *criterion* that we have reached this goal is that no further pertinent questions arise: we experience a drying up of further questions, we have eliminated alternatives, it is sufficiently clear and precise. [347]

Transcendental Imperatives	Levels	Questions	Activities	Products
Be in Love(Religic	V. Religious Orier			Infused Charity
Be Responsible (Moral Values	IV. Level of Decid	Question of Value	Deliberation Apprehensions of Judgments of Val	Decisions
Be Reasonable (Cultural Values)	III. Level of Judgm	Questions for Ref	Reflective Insight	Judgments of Fac
Be Intelligent (Social Values)	II. Level of Under	Questions for Inte	Direct Insights	Formulations
Be Attentive (Vital Values)	I Level of Experie	Data	Free Images	Utterances

Diagram of Precepts, Values, Levels of Conscious Operation, Questions, Cognitional Activities, and Products.

At the level of judging the *imperative* is to be reasonable, meaning a critical evaluation of the evidence that justifies the conclusion, the answer to the question, is it true, does it exist, can it be affirmed. The *goal* now is the real, the true, the actual universe and the laws and relations that can be correctly affirmed to be operating. We distinguish a *remote criterion* of truth in the proper unfolding of the desire to know and a *proximate criterion* in the reflective grasp of the sufficiency of the evidence for a conclusion.

Now at the fourth level in parallel fashion we can distinguish between the imperative, be responsible, the goal in the realization of true values and the criterion as a peaceful conscience.

The moral *imperative*, 'be responsible', does not come into existence by being proved rationally; it is an aspect of the [348] spontaneous unfolding of the human spirit; the desire to know is fully the desire to know the truth, to seek the good and make the world a better place to live in. Our method in ethics is not to deduce obligations from the nature of things as in natural law ethics

nor to start with universal categorical imperative as in Kant; but to start with the concrete subject in whom the moral imperative is already immanent and operative.

The *goal* is the actualization of true values. Many activities are involved in doing this. Questions for value arise spontaneously as, should I do this? which is the better course of action? is this right or wrong? how should I behave? We pass through a process of deliberating, evaluating, weighing the elements, looking for advice, attending to our intentional response to the alternatives, consulting our conscience. This process comes to an end in a decision; but the fullness of actualization is only present in the execution.

The *remote criterion* operating is conscience. It has been very difficult to define what is meant by conscience because it is presumed to be an activity in itself. For Lonergan conscience is consciousness at the level of moral decisions.[107] Consciousness is an awareness of the subject concomitant with an awareness of the object or the activity. This awareness of the subject accompanies all cognitional and volitional activities. This awareness of self includes an awareness of the imperative 'to be responsible' operating in the unfolding of the human spirit. Hence it is an awareness of oneself as responding to value, making correct judgments of value, deciding and implementing these judgments; also an awareness of oneself as falling short of these demands, as rationalizing, as compromising, as evading, as simply failing. It is an awareness accompanied by feelings of guilt when we fail and feelings of satisfaction when we respond positively. This awareness is present when the moral question arises, in the process of deliberating, in the decision, in the execution and afterwards.

A *proximate criterion* would be the correctness of the judgment of value itself. Judgments of value presuppose judgments of fact; the higher levels presuppose the lower, but go beyond them. The judgment of value is similar in structure to the judgment of fact but differs in content as it deals explicitly with values. According to [349] Lonergan there are three things required for a correct judgment of value, knowledge of human reality, intentional response to value, and "the initial thrust towards moral self-transcendence constituted by the judgment of value itself."[108]

To make correct value judgments we must be familiar with the social, medical, economic, aspects of the matter; understand the alternatives, the consequences, the means and the ends. To make judgments about just wages, debt relief, inflation, one should have a knowledge of economics. To pronounce on matters of fertility presumes a correct medical understanding of the factors involved.

Feelings have a positive role to play in making moral decisions. Lonergan is trying to pin down this role and uses the phrase intentional response to value. Not all feelings have moral import. But we should feel angry at instances of injustice; we should be revolted by acts of genocide; we should be overjoyed at the triumph of good.

The third factor in making judgments of value is the most difficult. The problem is that we are responsible for the sensitivity or lack of sensitivity of our conscience. Each correct response to

true value constitutes us as a better moral person and hence more sensitive to true values and hence better able to make correct value judgments. Each failure to respond to true values constitutes us as people with a less sensitive conscience and less competent to judge in moral matters. We freely and responsibly produce the one and only edition of ourselves. Our moral development unfolds in stages as Piaget and Kohlnberg have shown. As we pass through each phase we become responsible for what we are as moral persons. Each act and each phase leaves its mark on our psyche, on our feelings, on our understanding and on our conscience. We fully agree with Aristotle that the final moral criterion is what would a truly good and wise man do in the same circumstances.

I feel this is an unexplored area where much work needs to be done. Contemporary moral philosophy is even more unsure of itself than other areas of philosophy, if that is possible. This may be a cause or symptom of common cultural confusion about moral values and behaviour. My conviction is that the method, the foundations, [350] the approach of self-appropriation needs to be applied urgently and in great detail to the field of moral philosophy.

3. Role of Philosophy. What good does the philosopher do? How does he relate to his culture and people? What is the difference between culture and philosophy? Is philosophy practical? Is philosophy one or many?

Perhaps we are accustomed to think of the philosopher as an individual of genius working in splendid isolation and providing original solutions to all the questions of philosophy. We perhaps expect him or her to be competent in every area, to be familiar with all previous great philosophers and to give permanent definitive answers. However, the situation now is that specialization is taking over; the philosophical enterprise has many parts and no one individual can be competent in them all. It is more appropriate to thing of the enterprise of philosophy as an on-going collaboration in view of appropriating critically the truth and values of the past and mediating them to the present and the future. The role of the philosopher is to identify, evaluate, criticise and communicate correct truth and values to the specialist, to the educated and to everybody in the culture. Lonergan has outlined how this ongoing collaboration of specialists can work together in the theological context. I would like to transpose this into the field of philosophy and indicate the meaning of the specializations and how they work together towards a common goal.

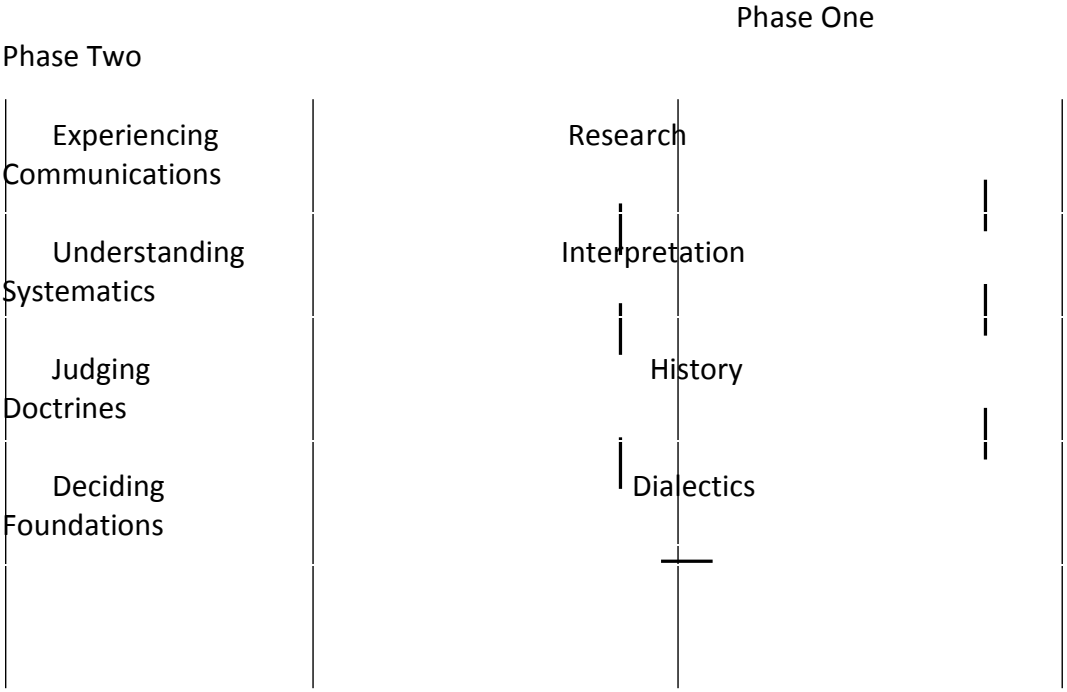
Subject specialization divides a discipline as to the matter taught, for example, Wittgenstein, logic, medieval philosophy, etc; with that we are already fairly familiar. Functional specialization divides the tasks to be done on the basis of levels of cognitional operation which we have identified as experiencing, understanding, judging and deciding; with this kind of specialization

we are not so familiar. But it does make sense and helps us to understand the enterprise of philosophy as unfolding in two phases, appropriating the past and mediating to the present and the future.

Research. Here we are concerned with the data, the authenticity of texts. Which texts are corrupted, which is the oldest, which is the most authentic? It involves producing critical texts, research into the context of the times, the language, the architecture, anything that [351] will be of help to determine the authenticity of the texts. There are still texts of Aristotle which are disputed. Errors of dating had a big influence on the role of Denis the Areopagite, the Pseudo-Dionysius, in the Middle Ages. Much of the data on the language, culture, economy etc will be of relevance to the correct interpretation of a text.

Interpretation. What is the correct meaning of the text in the context of the times. What kind of a person was the author, what did he intend to say, what was the error to be refuted, why was the text written, how was it to be understood in the language of that time? Answering these questions calls for a science of hermeneutics, understood as aiming at the correct understanding of the text.

Diagram of Functional Specialties



History. What was going forward over time. What was being developed, what was being neglected or misunderstood. History is not just a huge videotape of everything that was happening; it is a continuous process of reinterpreting the achievements and mistakes of the past. [352]

Dialectic. How is it that intelligent and sincere philosophers arrive at so widely divergent conclusions? What is the source of such disagreements? Is it a real disagreement or just a matter of words? What procedures can be used to pinpoint areas of disagreement and produce agreement.

This is phase one, appropriating the past, discriminating between development and decline, evaluating the work of individual philosophers. One can specialize and spend ones whole life in any one of the above and still be making an imporatant contribution to philosophy. Most of the above involves scholarship, the study of the history of philosophy, learning from the past; it does not yet explicitly involve taking a personal philosophical stand.

Foundations shifts the focus to where do you personally stand on the issues of knowing, being and the real. For us it is initiated by intellectual conversion which grasps the power of the human mind to know the real by experiencing, understanding and judging; and moral conversion by which we can distinguish true values from false. This text lies in this functional specialty. We are making explicit the role of conversion as constituting the foundations for later specialites. It is a philosophy of critical realism.

Doctrines or Truths. Where do we take a stand? What do we know with certainty, with high probability, with low probability? What do we know by immanently generated knowledge or by belief? Here we distinguish the basic unrevisable foundations and the truths of the sciences which are open to basic revision and are probably approximations to the truth. The truth of a heuristic is different from the truth of a scientific judgment.

Systematics. This framework of judgments and conclusions gives rise to further questions, invites deeper understanding, suggests follow-up and a variety of ways of relating things together.

Communications. This includes communicating to fellow philosophers at their own level in their own language with arguments appropriate to their level of sophistication. It involves also communicating to the leaders in the society, the educated, the scientists, the makers and breakers of the culture. But it also aims at communicating to everyone in the society who absorb the beliefs [353] and values of the culture. This involves familiarity with the media, the improving means of communication, strategies in getting across a message that people are not inclined to accept.

Hence I think it is clear that the enterprise of philosophy needs not just one specialist but a host of specialists co-operating together. The tasks involved can all be called philosophical but there

are only parts in an overall framework. Our grasp of cognitional structure is the foundation for our understanding of the differentiation and the unity of these tasks.

Is there one philosophy or many? There is one humanity, one set of activities of questioning, understanding, judging, deciding and being open to God's intervention. There is one set of imperatives, to be attentive, intelligent, reasonable, responsible, and in love. There is one hierarchy of values vital, social, cultural, moral and religious. These apply to all people at all time and in that sense there is one philosophy.

But the applications of these foundations to particular problems, times and places will take many forms. There is a legitimate pluralism based on the variety of cultures whether they be at the stage of common sense, theory or interiority. There is a positive pluralism based on the varied differentiations of consciousness, the theoritician, the mystic, the scholar, the artist. There is a diversity of specializations of tasks, of audiences, of needs and problems. In this sense you can talk of a pluralism of philosophies; you can talk of an African philosophy, a Greek philosophy, a philosophy of education, etc.

Unfortunately too there is an illegitimate pluralism based on the absence of intellectual and moral conversion. There has to be a discrimination between correct and mistaken philosophies. If the process of human knowing is incorrectly conceived as understanding alone, or experiencing alone, or as based on the imaginary model of in here and out there, huge mistakes will follow in metaphysics and consequently in ethics. The hardest of the functional specializations are dialectics and foundations where these patent disagreements have to be traced to their source, uncovered, brought into the open and if possible resolved. [354]

4. Role of philosophy in Africa. Culture is the actual beliefs and values informing the way of life of a people. It will have its external aspects in the clothes, customs, ways of building, language, economy, organization, groups and subgroups etc. It will have its internal aspects, beliefs in religious matters, priorities, values, accepted norms of behaviour punishment and reward. It will have its good and bad aspects as any society is a mixture of good and bad people; it may be progressing or in decline in any or all areas of the culture. It may be developed or just beginning. There are cultures at a local level but we can also talk of a world-wide emerging culture; that is a set of basic beliefs and values about the inalienable rights and duties of each person. Most of us live in an intercultural context moving from one country to another, from one language to another, from one culture to another. Culture is the actual beliefs and values of the people in all its various aspects. In Africa you have a rich diversity of traditional cultures, with an overlay of influence from modern Western cultures through formal education, and even signs of the influence of post-modernity in the cities and universities.
Philosophy is a kind of critique of culture. Lonergan defines the role of theology as mediating "between a cultural matrix and the significance and role of religion in that context."[109] Perhaps we could define the role of philosophy as mediating between a cultural matrix and the significance and role of truths and values in that matrix. The philosopher is not isolated from his cultural context; he arises out of that context and communicates to the persons of that

milieu. He mediates the best of the philosophical truths and values of the past and transposes them into terms relevant to present problems.

To communicate to an audience you must first be able to understand the audience, whether it is a primary school class, a church congregation, a post-graduate degree course, or a whole culture. If the philosopher wants to communicate to his contemporaries he must understand their culture, their beliefs and values, their problems and ambitions, their images and feelings. Philosophy has one set of roots in the past, the texts, the great philosophers, the history of philosophy; but it has another set of roots in the present, the actual culture in which he and his contemporaries live. [355]

Cultures in themselves are not reflective or self-critical. It seems to me the role of the philosophy to reflect on the ethical and scientific beliefs of his times and evaluate them critically. Public opinion is easily swayed by television portrayals of dramatic events, manipulated by advertisers, pop stars, talk show hosts, and gurus of various kinds. Politically correct language and behaviour may be what is accepted but is not necessarily either true or good. We shift from Victorian prudery to contemporary permissiveness as Paris fashions move hemlines up and down. The role of philosophy is to reflect on changes in beliefs and values critically.

African philosophy is usually divided into three groups; the ethno-philosophers uncover the philosophy implicit in the traditional culture of the area; the sage philosophers interview those respected by the traditional culture as wise men and make that African philosophy; the professional philosophers are usually trained in some Western philosophy but are now teaching in African universities.[cx] Which is the true African philosopher? There seems to be some competition for the title. It seems to me that the philosophical enterprise should be understood more widely and specialists seen as complementary rather than competing. The appropriation of Africa's past is an essential task in the enterprise; it is not the whole of philosophy; it would seem to be phase one of the functional specialites we have outlined. The real difficulty is in phase two, where do we take a stand? The drawbacks of professional philosophy are that though they are importing some valuable developments in philosophy they also bring the decline, the confusion, the narrow-mindedness of contemporary Western philosophy to Africa.

Lonergan's philosophy is the only intercultural philosophy that I know of. It is founded on the very structure of our knowing and choosing. It is comprehensive, practical in the sense of long term practicality. It distinguishes clearly between the foundations in the structure of the unfolding human spirit and particular applications and implications in varying cultures and places and times. These foundations should help students to take a stand in the midst of varying cultural traditions, religious denominations, theories of development. All the great philosophers of the past have had an [356] enormous influence on the culture of succeeding generations but it takes decades, centuries and even millennia for that influence to percolate through the society. Lonergan is such a great philosopher.

It is difficult to draw this text to a conclusion. I think we have succeeded in laying the foundations of what we can know of it. We have discovered the potential of our own minds through self-appropriation and take a stand in the midst of a confused and confusing contemporary situation. But once the foundations are laid the implications and possible applications of the method keep tumbling out. Our guiding conviction has been that the crisis of the present time is caused by the transition from the second stage of meaning to the third, from theory to interiority. Once that has been negotiated all sorts of possibilities

open up, a reoriented empirical science, a critical methodical philosophy, an ongoing theological enterprise, a progressive ethics and politics that goes to the root of the matter, a human science that recognizes the richness of what it is to be human, a culture that fosters attentiveness, intelligence, reflection, responsibility and authentic religious values. There is no end to the new possibilities that arise not only in education but in living. However our principle has been to do one thing at a time. Surely the first thing is to lay the foundations. Then the implications and possibilities can be worked out again step by step with all the detail and argument called for in each area. Rome was not built in a day. Lonergan always thought about the long-term challenge rather than short-term solutions to particular problems. The Lonergan enterprise must take up these various challenges to heal and create as we move into the third stage of meaning.

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[i]End Notes

Aristotle, ***Metaphysics***, ***Book Gamma*** (***Four***). He opens by making this distinction between the special sciences which cut off part of the material world as their field of study and first philosophy which must include everything. Aristotle used the term 'first philosophy' where we would use 'metaphysics.'

[ii] See Frederick Crowe, ***Lonergan***, (Collegeville: The Liturgical Press, 1992) An excellent short intellectual biography by a close friend and colleague

[iii] F. Crowe, ***Lonergan***, 41.

[iv] ***Theological Studies*** 1946-1949.

[v] Bernard Lonergan, ***Verbum: Word and Idea in Aquinas***, edited by Frederick E. Crowe and Robert M. Doran, Collected Works of Bernard Lonergan, vol 2, (Toronto: Toronto University Press, 1997). This studies Aquinas on understanding and judging with a view to identifying the rational process which is the human analogy for the divine processions.

[vi] Bernard Lonergan, ***Insight: A Study of Human Understanding***, Edited by Frederick E. Crowe and Robert M. Doran, Collected Works of Bernard Lonergan, vol 3, (Toronto: Toronto University Press, 1992). First published by Longmans, Green and Co in 1957.

[vii] Bernard Lonergan, ***Method in Theology***, (London: Darton, Longman & Todd, 1972).

[viii] Communications is one of the functional specializations outlined in ***Method in Theology***. I use the term in that technical sense as well as the more general meaning of communications.

End Notes

[ix] Bernard Lonergan, ***Method in Theology***, (London: Darton, Longman & Todd, 1972), 85.

[x] ***Method in Theology***, 85-99.

[xi] Lawrence Kohlberg, ***Collected Papers on Moral Development and Moral Education***, (Cambridge, Mass: Moral Education and Research Foundation, 1973).

[xii] See John Taylor, ***The Primal Vision: Christian Presence amidst African Religions***, (London: SCM Press, 1963). A useful example of an author who has a wonderful grasp of the unity and compactness of simple societies.

[xiii] James George Frazer, ***The Golden Bough: A Study in Magic and Religion***, (London: Macmillan, 1922).

[xiv] Henri Frankfort, ***Before Philosophy: The Intellectual Adventure of Ancient Man; An Essay on Speculative Thought in the Ancient Near East***, (Penguin Books, 1954) Discusses the move from myth to thought in Egypt, Palestine and Greece.

[xv] Rene Descartes, ***Discourse on Method and the Meditations***, (Penguin Books, 1968). His writings are very readable and accessible. Discourse four gives a synopsis of his position.

[xvi] David Hume, ***An Enquiry Concerning Human Understanding***, (Indianapolis: Hackell Publ. Co., 1993).

[xvii] Immanuel Kant, ***Critique of Pure Reason***, (New York: St Martin's Press, 1965) Trans by Norman Kemp Smith. Difficult reading for beginners in philosophy.

[xviii] Herbert Butterfield, ***The Origins of Modern Science***, (New York: Free Press, 1965) This is very readable, a classic on the subject.

[xix] Michael H. McCarthy, ***The Crisis of Philosophy***, (New York: State University of New York Press, 1990). Also Alasdair MacIntyre, ***After Virtue: A Study in Moral Theory***, (Notre Dame: University of Notre Dame Press, 1981).

[xx] See E.A. Burtt, ***The Metaphysical Foundations of Modern Science***, (London: Routledge and Kegan Paul, 1924, 1980) and Roy Bhaskar, ***A Realist Theory of Science***, (Sussex, Harvester Press, 1978).

[xxi] Compare Karl Popper, ***The Logic of Scientific Discovery***, (New York: Harper & Row, 1959, 1968) and Polanyi, ***Personal Knowledge: Towards a Post-Critical Philosophy***, (Chicago: University of Chicago Press, 1974).

[xxii] Thomas Kuhn, ***The Structure of Scientific Revolutions***, (Chicago: University of Chicago Press, 1962). Also Paul Feyerabend, ***Against Method***, (London: Verso, 1988).

[xxiii] To mention two basic texts: R. Harré, ***The Philosophies of Science: An Introductory Survey***, (Oxford: Oxford University Press, 1985). A.F. Chalmers, ***What is this thing called Science?*** (Philadelphia: Open University Press, 1978).

[xxiv] Edmund Husserl (1859-1938) wrote, ***Cartesian Meditations: An Introduction to Phenomenology, The Crisis of European Science and Transcendental Phenomenology, Formal and Transcendental Logic***, and ***The Idea of Phenomenology***.

[xxv] Eugene Webb, ***Philosophers of Consciousness***, (Seattle: University of Washington Press, 1988).

[xxvi] John Phillips, ***The Origin of Intellect: Piaget's Theory***, (San Francisco: W.H. Freeman, 1969).

[xxvii] James Joyce, ***Ulysses***, (Paris: Shakespeare & Co, 1924). William Faulkner (1897-1962) wrote classics such as ***Go Down Moses, As I Lay Dying, Light in August, Requiem for a Nun***.

[xxviii] ***Insight***, 204-211. There is some flexibility in slicing the apple as regards patterns of experience and so my account differs slightly from that of Lonergan.

[xxix] Konrad Lorenz, ***On Aggression***, (New York: Harcourt, Brace and World, 1966).

[xxx] ***Insight***, 22.

End Notes

[xxxi] *Insight*, 347.

[xxxii] There is nothing sacred about these examples; you may find other examples of insight more helpful. Puzzles, games, I.Q. questions, crosswords do provide examples of simple, clear, single insights.

[xxxiii] Quoted from one of his lectures in J. Hadamard, *The Psychology of Invention* (New York:

Dover,1945), 13.

[xxxiv] Helen Keller, *The Story of My Life*, (New York: Doubleday, 1902), 36.

[xxxv] *Scientific American* "Profile: David A. Huffman." Sept 1991, 54.

[xxxvi] E.D. Hutchinson, "Varieties of Insight in Humans," "Period of Frustration in Creative Endeavor," "The Nature of Insight," in Patrick Mullahy(Ed) *A Study of Interpersonal Relations: New Contributions to Psychiatry*, (New York: Grove Press, 1949), 386-445.

[xxxvii] See the books of Pierre Angers and Colette Bouchard in bibliography. They use the method of discovery as a basic educational principle.

[xxxviii] *Insight*, 27-31.

[xxxix] David Hume, *An Enquiry Concerning Human Understanding*, Ed. Charles W. Hendel, (London: Macmillan, 1955) Section Two, Of the Origin of Ideas..

[xl] Aristotle, *On the Soul*, Ed Hippocrates G. Apostle, (Grinnell, The Peripathetic Press, 1981), 429a to 432a.

[xli] See Ernan McMullin "Insight and the Meno", in *Continuum* Vol 2 No 3 Autumn 1964, 369-376.

[xlii] G. Polya, *How to Solve it: A New Aspect of Mathematical Method*, (Princetown University Press, 1945).

End Notes

[xliii] ***Insight***, 188.

[xliv] ***Insight***, see index on description, explanation, description-explanation, measurement, definition.

[xlv] The Sophists were a group of thinkers who held that our knowledge is relative; that intellectual skills should be used to win arguments in court cases regardless of truth. They were skeptical of moral values and truth. Protagoras was one of these.

[xlvi] Paul Edwards (Ed), ***The Encyclopaedia of Philosophy***, (London: Collier Macmillan Publishers, 1967) See article on "Primary and Secondary Qualities" by R. J. Hirst .Also John Locke, ***An Essay Concerning Human Understanding***, (London: Dent, 1947)

[xlvii] Sir Arthur Eddington, ***The Nature of the Physical World***, (Cambridge: The Cambridge University Press, 1928), xi-xv.

End Notes.

[xlviii] ***Insight***, 44.

[xlix] *Insight*, 43-50.

[l] ***Insight***, 126.

[li] Pierre-Simon Laplace (1749-1827), French mathematician, astronomer and physicist. He applied Newton's laws of motion to the planets with a great degree of accuracy.

[lii] ***Insight***, 126. The word 'statistics' sometimes refers to information in a statistical form or to the mathematics involved in dealing with probabilities. We use it in the sense of the prior understanding or mentality behind dealing with probabilities.

[liii] Gregor Mendel (1822-1884), an Austrian botanist, studied the occurrence of traits of tallness and color in generations of peas. He noticed the statistical significance of the patterns of recurrence and formulated laws of genetics, leading to the discovery of genes.

[liv] ***Insight***, 50-56.

End Notes

[lv] ***Insight*** 55.

[lvi] Check index of ***Insight*** on generalization, induction and abstraction.

See "Induction" by Max Black in Paul Edwards (Ed), ***Encyclopaedia of Philosophy*** (London: Collier Macmillan Publishers, 1967). The article reflects the confusion and difficulty for an empiricist philosophy to cope with this problem. He finds it "still lacks any generally accepted solution."

[lvii] John Stuart Mill, ***A System of Logic: Ratiocinative and Inductive*** (London: Longmans, Green, Reader, and Dyer, 1872), 448-503.

[lviii] Bernard Lonergan, ***Verbum: Word and Idea in Aquinas***, Collected Works of Bernard

Lonergan, vol 2. (Toronto: Toronto University Press, 1997), chapter 4, '*Verbum* and Abstraction.'

[lix] ***Verbum*** 38-39, footnote 126.

Frederick Copleston, ***A History of Philosophy: Medieval Philosophy***, Vol, II ***From Augustine to Duns Scotus*** (New York: Doubleday, 1962, 1993), 487-499.

[lx] John Locke, ***An Essay Concerning Human Understanding*** (London: Dent, 1947) Book 2, Chapter XXIII, 245.

End Notes

[lxi] Bernard Lonergan, ***A Second Collection,*** (London: Darton, Longman & Todd, 1974) 81.

[lxii] See Bernard Lonergan, ***Verbum: Word and Idea in Aquinas***, Edited by Frederick E. Crowe and Robert M. Doran. Collected Works of Bernard Lonergan, vol 2. (Toronto: University of Toronto Press, 1997) In this text Lonergan recovers the intellectualism of Aquinas especially the distinction between definition chapter 1 and judgment in chapter 2. These two rational processes are the basis for the human analogy of the Trinity, chapter 5.

[lxiii] Rene Descartes, ***Discourse on the Method of Properly Conducting One's Reason and Seeking the Truth in the Sciences,*** Discourse 4 (Penguin Books, 1968) 54.

[lxiv] ***Insight,*** chapter 9.

[lxv] ***Insight,*** 725-739. This is a rather technical treatment.

End Notes

[lxvi] *Insight*, 234.

[67] See "The Form of Inference," in *Collection*, edited by Frederick Crowe and Robert Doran, Collected Works of Bernard Lonergan, vol 4 (Toronto: Toronto University Press, 1992). Lonergan is also much indebted to John Henry Newman, *An Essay in Aid of a Grammar of Assent* (Notre Dame: University of Notre Dame Press, 1979) and his illative sense. He was also familiar with the work of Peter Hoenen, see *Reality and Judgment according to St. Thomas* (Chicago: Henry Regnery Co, 1952)

[68] *Insight*, 305-306. I find this terminology of conditioned, conditions, virtually unconditioned cumbersome but there does not seem any way to avoid it. It might give the impression that reflective insight is a matter of logic, which is far from the case.

[69] *Insight*, 308-312.

[70] See Karl Popper, *The Logic of Scientific Discovery*, (London: Harper & Row, 1959). He espouses falsifiability but is immersed in the whole empiricist assumption that verification is a matter of sensation.

End Notes

[lxxi] *Method in Theology*, 238.

[72] See B. Lonergan, "Cognitional Structure" in *Collection*, 205-221. Also William Danaher, *Insight in Chemistry*, (Lanham: University Press of America, 1988), The Structure of Knowing, 47-55. Also Vernon Gregson, *Lonergan, Spirituality, and the Meeting of Religions*, (Lanham: University Press of America, 1985), The Subject as Method, 23-58.

[73] *Insight*, 275-279.

[74] *Collection*, "The Natural Desire to See God". 81-91.

[75] *Method in Theology*, 241.

[76] *Method in Theology*, 340.

[77] *Insight*, 334.

End Notes

[lxxviii] Bernard Lonergan, *A Second Collection: Papers by Bernard J. F. Lonergan, S. J.* Edited by William Ryan and Bernard Tyrrell, (London: Darton, Longman & Todd, 1974) 79.

[79] *Insight*, 573. Here Lonergan distinguishes between the remote and proximate criterion of truth.

[80] Bernard Tyrell, *Christotheraphy* etc

[81] See *Method in Theology*, 237-244, 267-271. The term intellectual conversion is not used in *Insight*, but the reality is there in other terminology. See also William Mathews, "Intellectual Conversion and Science Education," in *Lonergan Workshop* Vol 5, 115-141. Also Richard M. Liddy, *Transforming Light: Intellectual Conversion in the Early Lonergan*, (Minnesota: Liturgical Press, 1993).

[82] *Insight*, 242.

[83] *Insight*, 432. Lonergan explains the per se infallibility of intelligence. If misunderstanding occurs it is always because the imagination has presented only some of the data, or distorted data, or no data.

[84] *Insight*, 176. A bucket of water suspended from a twisted rope is allowed to spin. Slowly the surface of the

water forms a hollow because of the centrifugal force of the spinning water. Stop the spinning and the hollow will persist for a time. Newton argued that as the hollow occurs both when the bucket is spinning and when it is stationary, therefore the spinning must be in relation to an absolute space. This is quite specious.

[85] *Insight,* 283-284.

[86] *Metaphysics*, Book 7, Chapter 17, 1041b 10-30. At this point Aristotle discovers that substance is the essence or cause of the unity, identity of the thing. He used the syllable B A.

[87] *Theaetetus*, 187-190.

[88] *Sophist*, 242-246.

[89] *Theaetetus*, 152c. The metaphor of the Divided Line is to be found in the Republic at the end of Book VI and the metaphor of the Cave at the beginning of Book VII.

[90] Occasionalism claimed that the body moved on the occasion of the mind deciding; God is the real cause, the mind is the occasional cause. Parallelism, proposed by Malebranche, claimed that the two realms of psychic and physical were preordained from the beginning to run parallel and in harmony.

[91] Immanuel Kant, *Critique of Pure Reason*, translated by Norman Kemp Smith, (New York: St. Martin's Press, 1965) 41.

[92] Idem 65.

[93] Idem 65.

[94] Idem 212.

[95] Idem 213.

[96] *Insight,* 252.

[97] *Merriam-Webster's Collegiate Dictionary*, tenth edition, (Springfield: Merriam-Webster, 1997).

[98] Frederick Copleston, *A History of Philosophy, vol 2 Medieval Philosophy*, (New York: Image Books, 1993) 498.

[99] Henri Bergson (1859-1941) an influential French philosopher who wrote, *La pensée et le mouvant, L'évolution créatrice; Les deux sources de la morale et de la religion*. For a useful summary see Frederick Copleston, *A History of Philosophy, vol nine, Modern Philosophy: From the French Revolution to Sartre, Camus, and Lévi-Strauss* , (New York: Image Books, 1994), 178-215.

[100] Jacques Maritain, *Preface to Metaphysics*,

[101] Comparison between confrontation and identity is a theme in Lonergan's *Verbum*, eg. 192-193.

[102] *Method in Theology*, 238.

End Notes

[ciii] *Method in Theology*, 265.

[104] *Method in Theology*, 292.

[105] Berger, *The Social Construction of Reality*.

[106] Frederick Copleston, *A History of Philosophy Volume 7 Modern Philosophy*, (New York: Image Books, 1994) 414.

End Notes

[107] Lonergan, *Method in Theology*, P268.

[108] Lonergan, *Method in Theology*, P38.

[109] Lonergan, *Method in Theology*, P xi.

[cx]Ochieng=-Odhiambo, F., *African Philosophy: An Introduction*, Consolata Institute of Philosophy Press, Nairobi 1997.