1979 Seminar Boston College Method in Theology (TC966_M1A)

This is part 3 of first lecture. **Change skew number to 2958BDTE070 and make audio 2958BA0E070.**

... how to make a chocolate cake always results in a chocolate cake. It's a method if you please, but it's not a method that yields cumulative and progressive results. You're always getting the same result. The trick to the scientific method is that you keep on getting further and further results that add up, that are cumulative and progressive – you know more than you did when you started. So in the natural sciences method inculcates the spirit of inquiry, and inquiries recur: recurrent operations. It insists on accurate observations and descriptions, and both observations and descriptions recur. Above all, it praises discovery, and discoveries recur: the great men are the people that make discoveries. It demands the formulation of discoveries in hypotheses, and hypotheses recur, not in the sense of what must be, although up to the introduction of quantum mechanics scientists adopted something of a mechanist determinism ... they followed the laws of mechanics, which were necessary, and everything was determined. They talk about free will, but that was just talk in the scientific world. However you apologize for your lack of deference to science if ... think that you were free ... It requires the deduction of the implications of hypotheses, and deductions recur. It keeps urging that experiments be devised and performed to check the implications of hypotheses against observable facts, and such processes of experimentation recur. So there is a pattern, a set of operations related to one another. The inquiry leads to observation and description. The observations and contrasting descriptions give rise to questions. Questions give rise to discoveries. Discoveries lead to formulations of hypotheses. Hypotheses give rise to processes of checking, experimenting. These distinct and recurrent operations are related. **Inquiry transforms mere experiencing into the scrutiny of observation: probably what Kant meant by the transcendental imagination, trying to promote what you're imagining into something intelligible**. You're trying to get an insight. You're going beyond the data. An act of understanding doesn't repeat what you see or hear or smell or taste or feel. It goes beyond it. It puts the data of sense or experience into an intelligible connection, an intelligible pattern. It's something further, something distinct. So, inquiry transforms mere experiencing into the scrutiny of observation. What is observed is pinned down by description. Contrasting descriptions give rise to problems. Problems are solved by discoveries. What is discovered is expressed in a hypothesis. From the hypothesis are deduced its implications, and these suggest experiments to be performed. And so the many operations are related, and the

relations form a pattern, and the pattern defines the right way of going about a scientific investigation. The results of investigations are cumulative and progressive. The process of experimentation yields new data, new observations, new descriptions that may or may not conform to the hypothesis that is being tested. Insofar as they're confirmatory, they reveal that the investigation is not altogether on the wrong track. Insofar as they are not confirmatory, they lead to a modification of the hypothesis and in the limit to new discovery, new hypothesis, new deductions, and new experiments. It's an ongoing process and a cumulative process. What you have understood remains with you. But you keep adding onto it. And what you add probably gives a new context, some sort of minor shift at least to what you've understood so far.

And note in general that a discovery is not just an insight. Insights are a dime a dozen. It's when you get a lot of them on a single point, and once you do you get ... I once gave a talk at Halifax General to psychiatrists on insight ... and at the end one of the doctors said, 'Our patients have a lot of insights. The trouble is they're wrong.' I agree with him entirely. Insights are not infallible. They're illuminating. But you have to have a lot of them to get something that's worth talking about. You have to keep at it. That's the point to the process of experimentation. You discover the limitations of your insights by the process of experimentation. And because you discover the limitations, the wheel of method not only turns but also rolls along. It is cumulative and progressive. The field of observed data keeps broadening. New discoveries are added to old. New hypotheses and theories express not only the new insights but also all that was valid in the old, to give method its cumulative character and to engender the conviction that, however remote may still be the goal of the complete explanation of all phenomena, at least we now are nearer to it than we were. That's what is meant by probability, not in the sense of [statistics] but in the sense in which science advances; you get nearer to the complete explanation.

Such very summarily is method in the natural sciences. The account is far from being sufficient in detail to guide the natural scientist in his work. At the same time, it is too specific to be transposed to other disciplines. You can't experiment in history. History makes its own experiments. A civilization reveals its enduring work by enduring and its lack of work by failing, by falling apart ... chaos. But at least it illustrates a preliminary notion of method as a normative pattern of recurrent and related operations yielding cumulative and progressive results.

A few observations are in order. Method is often conceived as a set of rules, what someone tells you to do. That's not the way we're thinking of method. We're thinking of method in terms of something that you do and that you know about because you've taken the trouble to find out what happens in your own thinking. [It is conceived as] a set of rules that is followed blindly by anyone and nonetheless yields satisfactory results. Why am I wrong? I did exactly what you told me. Well, one of the things told you, you didn't know about, namely, you have to understand something. That's what's missing in your results ... method so conceived, it's possible that the same results are produced over and over, like the assembly line or the New Method Laundry but it will not do when progressive and cumulative results are expected. Results are progressive only if there are *new* insights. And they are cumulative only if the new insights fit together or are brought together into a single view. This occurrence of new insights and the synthesizing of new insights is something that is not deducible from any set of premises or rules. Those are things that occur according to statistical probabilities. And that's why ... science is so modest. He kept at it, and he saw the results. Tacho Brahe kept marking the positions of the planet Mars for years, and he had them all written down; and Kepler tried to find the law that governs the set of positions, and he tried all sorts of hypotheses ... but they finally discovered that the planet Mars moved in an ellipse ... and the third was ... but anyway he worked this out. But Newton showed *why* it would be an ellipse: universal gravitation.

So our preliminary notion conceived method not as a set of rules but as a prior normative pattern of operations from which the rules may be derived. And the rules are correct insofar as they state accurately just what the operations are, insofar as they introduce people to the operations, and people can recognize them when they occur. It occurred to Archimedes when he got out of the bathtub – the baths at Syracuse were more like swimming pools with different temperatures and so on – shouting 'Eureka! I've got it.' So there can be quite a thrill to insight.

Further, the operations in physics are not limited to strictly logical operations. Logical operations are on terms, relations, propositions. Logic is concerned with things you can talk about. But method is concerned not only with things you talk about – how to describe, scientific description, how to formulate a hypothesis, how to deduce its implications and suppositions and so on and so forth, how to argue. But there are a lot of other operations that are part of method: observation, inquiry, having a problem, seeing something you don't understand and knowing that you don't understand it and trying to understand it. If you want a series of practices, take the things you were taught in elementary arithmetic and ask yourself, Why

does it work? Why does division work? Why does multiplication work? Why does the square root work? Why does cube root work? And so on. Why do the logarithms work? A series of whys. You can be given all the rules – at least the way arithmetic used to be taught, you were given just the rules. So method does not hesitate to move outside the group of logical operations, to speak of inquiry, observation, discovery, experiments, synthesis, verification. What precisely these non-logical operations are will concern us in the next section. But at once it may be noted that modern science derives its distinctive character from this grouping together of logical and non-logical operations. The logical tend to consolidate what has been achieved. The non-logical keep all achievement open to further advance. When you have the hypothesis and the verification, you have something. But your friends can go to work and ask further questions. What about this, and what about that? I performed this experiment, and this happened, and so on and so forth, and that's keeping the ball rolling.

The conjunction of the two, the conjunction of the logical which – insofar as something is logical, it's immovable, it's eternally so, if your suppositions are correct. But they needn't be correct. The non-logical gives you a new setup, and you can put that into logical order. And the advantage of putting it into logical order is that you can discover what's wrong with it. It's clear and precise, and has determinate implications, which lead to the falsification. And so you keep moving. This process contrasts sharply not only with the static fixity that resulted from Aristotle's concentration on the necessary and immutable, but also with Hegel's dialectic, which is a movement enclosed within a complete system. Aristotle's concentration, note: that's Aristotle in the *Posterior Analytics*, with the possible exception of chapter 19 in the second book. But the rest of Aristotle throws in a lot of qualifications to that. How do you get the truth? Philosophy, love of wisdom. Thomas will say that a proposition is a principle if the predicate pertains to the very nature of the subject. Man is mortal. He'll also say that picking the terms 'man' and 'mortal' is guided by wisdom. What do you mean by 'mortal?' Is that really what 'mortal' is? Well, that will depend upon your horizon, your wisdom, how much or how little you have. He knew about horizons. That comes up in the *Prima secundae*, q. 65, a. 4. And Hegel's dialectic, which is a movement enclosed within a complete system – you have a complete system and a movement within the system.

The basic pattern of operations: So we name them – seeing, hearing, touching, smelling, tasting, inquiring, imagining, understanding, conceiving, formulating, reflecting, marshaling and weighing the evidence, judging, deliberating, deciding, speaking, writing. The way to familiarize yourself with those operations and their

significance is a matter of practice. The book *Insight* is a set of five-finger exercises giving you a chance to observe yourself having insights. It's easy enough to know just precisely what is meant by seeing. You close your eyes and open them. There's a big difference, and seeing is the difference. But you don't get an insight that easily. To get an insight, you have to have a problem and not know the answer and come to know the answer. And once you know the answer, well, that is no longer an illustration. It's this coming to know the answer ... it's a hard thing to pin down. It will be assumed that everyone is familiar with some at least of these operations and that he has some notion of what the other terms mean. Our purpose is to bring to light the pattern within which these operations occur. And it happens we cannot succeed without an exceptional amount of exertion and activity on the part of the reader. Unless the reader begins to operate on his own, he'll be missing the point. It will be like a blind man being instructed by a treatise on color. He's never seen a color. Something's missing in the interpretation of this treatise on color. Or if you're tone deaf, an account of music, the difference between a major and a minor key, and so on and so forth. If you're not familiar with what it is to have an insight, the thing to do is not to start from hard examples; start from easy ones. The routine of doing sums, solving problems in algebra, and so on, they're all to the point.

He will have to familiarize himself with our terminology. He will have to evoke the relevant operations in his own consciousness. And that's the point. He will have to discover in his own experience the dynamic relationships leading from one operation to the next. When you get an insight, you want to define it, and you may offer a definition, and your definition may be wrong. Let me illustrate that. [Goes to board, does example with straight line and definition of circle, starts with descriptive.] The definition of a circle as a locus of points equidistant from the circle doesn't work. If you look at the map of Africa on a globe, you'll see that the outline of the coast, all points are equidistant from the center of the globe, but the coast of Africa is not a circle. You have to say it's a locus of *coplanar* points, points in the same plane. If you didn't spot that as soon as I gave you that definition, you would be taken in by a mistaken definition, even though you understood why the circle had to be round. And so on indefinitely. Definitions: you can understand and misstate your understanding.

The operations in the list are transitive. They have objects. They are transitive not merely in the grammatical sense that they are denoted by transitive verbs – I see this, I see you, I see the wall, transitive verbs, seeing is a transitive verb, it has an object – but also in the psychological sense that by the operation one becomes aware of the object. The wall is not merely the object of the verb 'to see.' It is the object that is seen. And its being seen is a psychological event. It's

transitive in a psychological sense. This psychological sense is what is meant by the verb ‘intend,’ the adjective ‘intentional,’ the noun ‘intentionality.’ To say that the operations intend objects is to refer to such facts as that by seeing there becomes present what is seen, by hearing there becomes present what is heard, by imagining there becomes present what is imagined, and so on, where in each case the presence in question is a psychological event: intentionality.

Second, the operations in the list are operations of an operator, and the operator is named the subject. The operator is subject not merely in the grammatical sense that he is denoted by a noun that is subject of the verbs that in the active voice refer to the operations. He is also subject in the psychological sense that he operates consciously. In fact, none of the operations in the list is to be performed in dreamless sleep or in a coma. Whenever any of the operations are performed, the subject is aware of himself operating, present to himself operating, experiencing himself operating. Moreover, as will appear presently, the quality of consciousness changes as the subject performs different operations. The operations, then, not only intend objects. There is to them a further psychological dimension. They occur consciously, and by them the operating subject is conscious. Just as operations by their intentionality make objects present to the subject, so also by consciousness they make the operating subject present to himself. I’m not saying that consciousness does something. I’m saying what is meant by ‘consciousness.’ So, intentionality: the presence of the object; and consciousness: the presence of the subject and the operation. And because of the distinction, the presence of the object is quite different from the presence of the subject. The object is present as what is gazed upon, attended to, intended. But the presence of the subject resides in the gazing, the attending, the intending. For this reason, the subject can be conscious as attending, and yet give his full attention to the object as attended to. To be conscious you don’t have to be thinking of yourself. When you’re thinking of yourself, you become the object, the object of thought. And that is *not* consciousness.

I spoke of the subject experiencing himself operating, but do not suppose that this experiencing is another operation to be added to the list. For this experiencing is not intending but being conscious. It is not another operation over and above the operation that is experienced. It is that very operation which, besides being intrinsically intentional, also is intrinsically conscious. If you have an insight, something is being understood, and you’re aware of yourself as intelligent in this instance. You may be dumb in other cases but in this instance you’re intelligent, in act. You have it without a label on it. You have to decide you’re going to call that experience being intelligent, just as the person in psychiatric treatment has to give names to the feelings that are causing the trouble. He knows

the names of other feelings, and he's able to handle them. But these feelings ... He can't deal with them because they're not objects for him. The object for him ... name ... somehow or other. The significance of having the name is best illustrated by Helen Keller, who was deaf and dumb and had a very good teacher who taught her the use of words. Not that she could pronounce the words, but she would write the signs on her hand. Do these marks on her hand mean anything? The big moment came when it started to mean something, one day when Helen was about twelve. (Tape ends here. Only to p. 8 in chapter 1. From this point on the recording is of the end of the lecture 'Horizons and Transpositions,' which is not part of this 1979 course.)