The Philosophy of Science in Wittgenstein's Philosophical Investigations

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The Philosophy of Science

in Wittgenstein's

Philosophical Investigations

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I

INTRODUCTION

There is an article written by Gilbert Ryle entitled "The Work of an Influential but Little-known Philosopher of Science: Ludwig Wittgenstein" which appeared in "Scientific American" in September 1957. Amazingly, this title would still be appropriate today, 15 years later, in spite of the fact that Wittgenstein is a popular figure in Philosophy and in spite of the fact that he does have things to say to, or about, the sci-
The aim of this essay is to explore this rather neglected aspect of Wittgenstein's thought. Of course, by "neglected" I do not wish to imply that his Philosophy of Science has been totally ignored but merely that it has not been taken up with the vigor and popularity that one normally associates with his Philosophy of language, for example.

In attempting to gain a useful perspective from which to view this present attempt, a brief accounting of the literature which bears directly on his Philosophy of Science will be made.

Initially, of course, there is Wittgenstein's own work, the *Tractatus Logico-Phiosophicus*. The important point regarding this work is that it exerted the greatest influence of any single work upon the group of men known as the Vienna Circle and their subsequent formulation of what came to be known as Logical Positivism.

Based on an interpretation of the *Tractatus*, two basic assumptions are reflected in the doctrine of the Vienna Circle:

1 - All propositions can be classified as being either logical propositions or empirical propositions; or, in the event that they were neither logical or empirical, that is to say neither analytic nor synthetic, they were classified as meaningless.
2 - The determination as to whether a given proposition is in fact meaningful or not can be made through an attempted verification; in other words, some "experiment" must be conceivable which will verify the content of a meaningful proposition.

Of course, it is generally held that the Tractatus is of an essentially different character than the "classical" Positivistic thought of the Vienna Circle. The lack of complete agreement on this point regarding the relationship between the Positivism of the Vienna Circle and the Tractatus, however, is reflected in most of the literature concerned with Wittgenstein's Philosophy of Science which we have to date.

For example, Cornforth in his Science and Idealism¹ equates the principle of verification in no uncertain terms with the thought of the Tractatus concerning what can and what cannot be said. Thus, for Cornforth, Wittgenstein is a Positivist who merely phrases the verification principle a little differently than the Circle, in his (Wittgenstein's) case stating "To understand a proposition means to know what is the case, if it is true".

In opposition to those who would equate Wittgenstein and the Logical Positivists there are those who

recognize a certain similarity of approach but who nevertheless assert the uniqueness of Wittgenstein's thought. Representatives of the point of view include Max Black (A Companion to Wittgenstein's Tractatus\textsuperscript{1}), G.E.M. Anscombe (An Introduction to Wittgenstein's Tractatus\textsuperscript{2}), and others, all of whom note that on Wittgenstein's own terms it is quite possible for the question "How is that proposition verified?" itself to be senseless.

Also, it has been noted that what is perhaps the most important feature of Wittgenstein's thought concerning Science in the Tractatus is not the principle of verification at all but rather a certain "concept of organization" based on his remarks at 6.341-6.343. Here he likens scientific theory to the application of a linguistic "net" with an arbitrary and pre-determined size and shape of mesh. The point being that the "net" will determine what information, what facts, are obtained in any given scientific activity or experiment.\textsuperscript{3} Pointing to this "net theory" further serves to distinguish Wittgenstein from the Positivists insofar as it represents a certain relativization of the scientific enterprise which is not found in the doctrine of the

\textsuperscript{1} See for example p.171 and Chapter LXXXI
\textsuperscript{2} See op.150-5
\textsuperscript{3} The best accounts of this are given by B.F. McGuinness in his "Philosophy of Science in the Tractatus" and by Black, \textit{op.cit.}, pp.347-52
Vienna Circle.

Finally, along these same lines is the article by George L. Proctor entitled "Scientific Laws and Scientific Objects in the *Tractatus*". In this article Proctor presents an investigation into the nature of scientific laws based on "model theory", the theory which is reflected, in his opinion, by the *Tractatus*.

Now, what should be noted at this point is that while the *Tractatus* is only one of the works of Wittgenstein, it has gained the almost exclusive attention of those who are concerned with his Philosophy of Science. The sole exepion to this would appear to be "Science and Metaphysics: A Wittgensteinian Interpretation" by Hugh Petrie which is based on the *Philosophical Investigations*. This article contains helpful insight into Wittgenstein's thoughts about Science found in the *Philosophical Investigations* but it does have one shortcoming - it is not a complete articulation of Wittgenstein's Philosophy of Science as it is to be found in or formulated from the *Philosophical Investigations*. The fact that it does not claim to be so is nugatory.

Thus the need for a further expression of his Philosophy of Science appears evident. This is especially true in view of the fact that there are differences in
his fundamental outlook on language as presented in the *Tractatus* and in the *Philosophical Investigations*, and on this basis one may assume that the fundamental foundation on which his Philosophy of Science rests has also changed. This assumption, of course, is based on the fact that Wittgenstein's thought is essentially geared to linguistic considerations and to the character of language itself.

A more specific statement of the task to be undertaken in this essay, then, is that it will seek a clear and complete formulation of Wittgenstein's Philosophy of Science based on the *Philosophical Investigations*.

The problem of where to begin, that is, how to approach his Philosophy of Science is of no little significance in light of the fact that Wittgenstein does not speak to the problem with any substantial frequency in the *Philosophical Investigations*. Thus we are faced with the task of determining an approach, realizing of course that the choice is for the most part arbitrary and can only be assessed through the basic suppositions which underlie our choice.

A few observations which will be of assistance in guiding us in the proper direction are as follows:
1 - In his "Philosophy of Science in the Tractatus" McGuinness notes¹ that "...in my opinion Wittgenstein's philosophy of science need not involve any departure from his picture theory of propositions." Generalizing this comment, one can say simply that any given philosopher's philosophy of science should be expected to resemble the rest of his philosophy. Here one may point to the characteristic approach of a given individual as viewed through his a priori suppositions, terminology, etc. The inference in this regard is that such characteristics will present themselves as relevant structuring regardless of the immediate subject matter.

Insofar as this is a valid observation, then, we can readily expect Wittgenstein to view Science in the Philosophical Investigations in terms of the basic themes of language-games, meaning as use, Forms of life, etc. This is to say that his philosophy of science should closely parallel his philosophy of language.

2 - David Pole in his The Later Philosophy of Wittgenstein says "It seems that Wittgenstein's interest in Mathematics remained in some sense a focal point in his thinking". This statement refers to the fact that one can find more or less explicit references to Mathematics

¹. p.160
in much of Wittgenstein, in both his early and his later writings.\textsuperscript{1} Once again, if this be a valid observation, than we will do well to direct some effort in this direction with the hope that it will better clarify his thought regarding science, the supposition being that there is a parallel between his philosophy of science and his philosophy of mathematics.

3 - The final observation, which may be viewed as an assumption at this point, is that his views on Science and Mathematics are related to his views on language, that is, that his philosophy of language is in a certain sense the basis of his philosophy of mathematics and more importantly here for us of his philosophy of science.

On the basis of these three observations, an attempt will be made to formulate Wittgenstein's philosophy of science. Our goal will be to show that his philosophy of mathematics, which reflects the concept of constructivism, is grounded in his philosophy of language; and, that this constructivism (appropriately modified to reflect the distinctions between Science and Mathematics) most clearly reflects his view of the

\textsuperscript{1} To assure oneself of this, one need only refer to his Tractatus, Philosophische Grammatik, Philosophische Bemerkungen, and most especially to his Remarks on the Foundations of Mathematics.
scientific enterprise.

Our method will entail two further points:

1 - Until it becomes necessary in our analysis to distinguish between science and mathematics, no differentiation will be made. Thus, for our purposes mathematics will be considered to be one of the sciences, at least initially. Such an approach based on mutually applicable characteristics such as the inherent organization of both mathematics and science will thus be utilized. Furthermore it would appear that we have reason to suspect that Wittgenstein himself would have followed such a course, or recommended that a similar one be followed. For, the final paragraph of his *Investigations* reads:

> An investigation is possible in connexion with mathematics which is entirely analogous to our investigation of psychology. It is just as little a mathematical investigation as the other is a psychological one.

2 - In order to grasp better the potential feasibility of viewing science as a sort of "linguistic construction", selected subjects related to the scientific enterprise will be reviewed. These subjects will include scientific laws, truth, etc.

1. My emphasis
2. A science
3. It is rather a linguistic one, that is to say, one involving the use of language.
To summarize, the method of my presentation will be to give an exposition of what I feel are the important central points in Wittgenstein's philosophy of language in the Philosophical Investigations. Then, I will attempt to show that what he has to say about Mathematics in the Philosophical Investigations and in his Remarks on the Foundations of Mathematics is in harmony with his philosophy of language and leads naturally to a "constructivist" philosophy of Mathematics. Finally, I will argue that his philosophy of science can be construed analogously as a "constructivist" philosophy of science, bearing a marked similarity to his Philosophy of mathematics. Of course, it will not only be necessary to compare Science and Mathematics but also to contrast them as well. In this effort I hope to clarify his position in the Philosophical Investigations with regard to the verification principle of the Positivists and to explore his so-called "grammatical-empirical" distinction.
II

LANGUAGE

It is my intent here to present what I feel are the key aspects of Wittgenstein's philosophy of language in the *Philosophical Investigations* in the belief that it is impossible to investigate his thoughts regarding mathematics and ultimately science without first possessing a certain knowledge of his views concerning language.

In so doing, I intend to present key aspects of
his philosophy of language only to the extent necessary to establish a given position and then to question and examine that position.

To begin, what is perhaps the most basic concept found in the **Philosophical Investigations** is that of language-games. Wittgenstein himself tells us to "Look on the language-game as the primary thing" (656). Almost immediately in the **Philosophical Investigations** he notes:

> We can...think of the whole process of using words...as one of those games by means of which children learn their native language. I will call these games "language-games" and will sometimes speak of a primitive language as a language-game...I shall also call the whole, consisting of language and the actions into which it is woven, the "language-game" (7).

Shortly after making this observation he presents us with a list of activities in order to give us some idea of the multiplicity of language-games (23). Among these examples are such activities as describing, reporting, presenting, etc. This sample listing, of course, is supposed to impress upon us the fact that there is a countless number of language-games, for "something new (spontaneous, specific) is always a language-game" but "we remain unconscious of the prodigious

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1. Paragraph numbers noted in parentheses without additional marking will be used in this essay to refer to **Philosophical Investigations**.
diversity of all the everyday language-games because the
clothing of our language makes everything alike"(p.224).

The analogy of a language-game can accordingly be
viewed in terms of what Zabeeh\(^1\) calls an "open concept". It is "open" in two senses:

1 - As an infinite or repeating mathematical
series is "open", that is, in the sense that it can
always be continued or "added onto".

2 - Insofar as the analogy lacks any natural bound-
ary. Now, this second point refers to a most interesting
observation which is made by Wittgenstein concerning
games. In response to the question "What is common to
all games?" he answers, "You will not see something
that is common to all, but similarities, relationships,
and a whole series of them at that".(66)

This position of his leads directly to the doctrine
of "family resemblance" and the conclusion that "games
form a family"(67). The stress is thus placed on "same-
ness" and questions of difference are surpressed as
when in response to the question "How is the concept of
a game bounded?", he remarks that "that never troubled
you before when you used the word "game""(68). But,

1. F.Zabeeh, "On Language Games and Forms of Life"
in Essays on Wittgenstein, edited by E.D.Klemke,
Specht notes that the concept of games is not viewed in as significant a manner by other philosophers\(^1\) and that perhaps Wittgenstein's reply could have been a bit more informative.

Now, it is most significant to note the vagueness that is associated not only with the concept of language-games but with most of Wittgenstein's concepts. The significance comes to light when one attempts to evaluate the success of the analogy of a language-game, an evaluation that could well borrow Bergmann's title "The Glory and the Misery of Ludwig Wittgenstein"\(^2\).

It cannot be denied that the analogy of the language-game is a most illuminating analogy, one that is quite useful in grasping hold of the phenomenon of language (as is attested by the popularity of his work). Furthermore, it would appear that it is most appropriate that he should feel compelled to use analogies to portray language. A glimpse into the historical use of analogy shows, for example, that a tenet of Thomist philosophy is that there is a necessity for analogous predication with regard to God. The reason given is that we with our limited intellects cannot hope to know

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2. Klemke, *op. cit.*, pp.25-43
Him in a direct and absolute manner and thus are forced to obtain analogously what we cannot directly.

Now I contend that Wittgenstein holds a similar position, only with regard to language instead of with God in his adoption of the language-game analogy. For it is recalled from his earlier work, the *Tractatus*, that language forms the limit of my world (5.6), and that I cannot come to have a knowledge of language as a whole since that would entail reaching outside of the world, which is impossible (4.12). Similarly in the *Philosophical Investigations*, one can only find meaning and thus knowledge in specific language-games, that is, through analogy.

What worked for the Thomists should work for Wittgenstein, but does it? I think that at best there are some difficulties that should not be overlooked.

Wittgenstein characterized his own work as descriptive, explaining nothing, but merely laying the different parts or segments of language before us.¹ Some individuals, however, in opposition to this characterization maintain that it certainly seems that his own activity "takes us outside this monadism of language-games. It stands over and collates them".²

1. Pole, *The Later Philosophy of Wittgenstein*, p. 80
2. Ibid, p. 84
The point here is that there exists a dilemma revolving around the necessity of analogous predication in Wittgenstein (which he must hold if he is merely describing various aspects of language) and the necessity of rising "above" individual language-games (in which case knowledge becomes in a certain sense direct and hence analogy needless). This necessity to rise above language-games and the problem that it poses can be best seen by viewing an individual language-game and asking "On what basis can we determine whether a given action is a part of our game?" The answer to this question must, I feel, be based on Wittgenstein's metaphor of the cogwheel "engaging" (136), which would seem to suggest nothing more than that a given action or fact must "fit" properly into what is already given. Seemingly there is nothing adverse in such a concept, but Pole gives an observation which strongly suggests otherwise:

Here we have a luminous metaphor - and yet no more than a metaphor. For there can be no way of testing whether this or that linguistic wheel has failed to engage, except to grasp the pattern in each case; to arrive at some sort of insight into that unique set of relations which it professes but fails to form a part of.

The point will bear repetition. We require an intuition into the unity of a complex, a grasp of the way in which a set of terms or elements cohere.

1. Ibid, p.81
It occurs that one may here appeal to the already existent stock of language-games and to the "Form of Life" in order to properly be said to grasp the unity, the structure of our given language-game, but in so doing I believe that we will have side-stepped the issue. Perhaps the issue can best be put by asking "What guidelines were there in the "first" language-game?"

The answer can only be "intuition", and by "intuition" I do not mean merely a decision(186) or an unnecessary shuffle(213) but a necessary extra-linguistic insight gained outside of the language-game.

Of course, one may say that this "first" language-game doesn't make sense, it never existed. In answer it is held that it must have occurred based on Wittgenstein's own analogy of language as a city.

Our language can be seen as an ancient city: a maze of little streets and squares, of old and new houses, and of houses with additions from various periods; and this surrounded by a multitude of new boroughs with straight regular streets and uniform houses. (18)

Old houses, new houses - old streets, new streets - there is a passage of time and there is an image of growth. It would seem strange to say that I am not allowed to ask who built the first house and how it was
What I am suggesting is that if we are to consider language-games as houses, it does make sense to question the initial construction of such houses and to further inquire into the "plan" which was used. For, while it may be accepted that the historical development of language is "hap-hazzard" (as is implied by Wittgenstein's analogy), this still leaves unanswered the problem of the origin of language, of the first houses of the city.

The traditional view, however, reflects the opinion that we assume an existing stock of language-games and the related metaphor of Forms of Life.

The metaphor of Forms of life is used only five times in the *Investigations* and yet an understanding of it is of great importance to an understanding of Wittgenstein's ideas concerning language and language-games. There is a certain vagueness to be overcome in articulating the concept because of Wittgenstein's reluctance to discuss it, but initially it may be viewed as "that which is in some sense characteristic of being human". Seen in such a manner it can be related to the concept of games in general so that, for example, it

1. See Specht, *op.cit.*, p.182, for a similar criticism.
2. Paragraphs 19, 23, 241, and pages 174 and 226
ball with a ten foot high rim but will not allow them to play with a rim 1000 feet high. In an analogous sense such is the case with all games. Thus, the concept of Forms of life serves as a control over the creation of specific language-games.

Further suggested articulations of the concept include:

1. The intersection of all existing language-games: a kind of relationship

2. Something the prime example of which is a language-game itself

3. A way of life, or mode, manner, fashion, or style of life, or

4. One of the formal things in life - something typical of a living being, typical in the sense of being very broadly in the same class as the growth or nutrition of living organisms, or as the organic complexity which enables them to propel themselves about, or to react in complicated ways to their environment.

Now the problem with three of the above accounts (A, C, and D) is that they lead to an objectification of

a given form of life and thus destroy the time honored phrase that "the meaning is in the use". Only "B" which says that such forms are nothing more than language-games themselves survives this criticism which is rooted in the very heart of his philosophy. The only problem with accepting "B", however, is that it allows the concept of "Forms of life" to be so vague that it cannot be successfully applied to all situations in which a specific determination is required, nor can it successfully oppose the suggestion that this leads to an infinite regress of games or at best to a "playful" circularity.

In discussing the relationship between various language-games Pole argues that "Wittgenstein, in insisting on the pluralism of language-games, seems to lose sight of the unity of language" and that "If these games are to be thought of as discrete, it must be rather as nuclei in a continuous medium; the matrix they are born of is one."¹

I would like to maintain that whatever vision Wittgenstein does possess of the unity of language is contained in the concept of Forms of life. Unfortunately, this remark will probably go further toward destroying any so-called unity of language than toward establishing

¹ Pole, op.cit., p.92
the concept of the Forms of life. The reason I say this is because while it is quite clear how the concept acts upon our game of basketball, it is not at all clear how it acts upon (screens, allows, forbids) language-games. For there appears to be no criterion, no real basis here which can assist us in determining what does not count as a language-game. Any activity, regardless of how insignificant it may be, qualifies as a language-game within a given life form. We need only focus our attention upon it (an activity) and automatically it becomes a language-game.

But we may still ask, obvious as the answer may seem, "Is the concept of Forms of life essentially linguistic in character or not?" The answer will bear heavily on his philosophy of science, of course. The response to be given is that based on all of the articulations of the concept (previously given) it must be wholly linguistic in nature. By this I mean to say that there appears to be nothing entailed by the concept which Wittgenstein would not readily call "linguistic". Later, however, I shall return to this question.

In continuing our present examination of Forms of life, we note that Hunter, in discussing the matter
says, "I don't know whether to say that Wittgenstein thought there is an interesting analogy here, the drawing of which can make certain things about language-using clearer to us...but what will matter is the points about language-using which are brought out by the notion, whichever way it is taken."¹

The most important notions, of course, are that language-games are meant to imply speaking and activity (as opposed to a static view of language) and that the agreement which is necessary between the players of any game (language-game) is grounded not within the language-game itself but in the Form of life. Wittgenstein himself notes these points. At (23) he comments:

Here the term "language-game" is meant to bring into prominence the fact that the speaking of language is part of an activity, or of a form of life.

And later he notes:

It is what human beings say that is true or false; and they agree in the language they use. That is not agreement in opinions but in form of life. (241)

Thus it appears that the type of possible language-games and the "progress" (activity) that is to be found within them are both ultimately governed by

¹ J.F.M. Hunter, "Forms of Life in Wittgenstein's Philosophical Investigations", in Klemke, 273-97
Forms of life.

The vagueness that surrounds this notion is perhaps its greatest shortcoming; however, it is also its greatest asset. The problems which arise all center around the question "What is the distinction between a Form of life and language itself (in the widest sense of the word)?" If there is no distinction, and I do not believe that there really is one, what is to be gained? For, it seems that this is merely another term for Language, and as such it is simply a new coat tailored to the form of the rather tired view that man is an essentially linguistic animal, that his unique characteristic is precisely his ability to use language. Furthermore, if in fact Form of life is but another name for Language, we can easily see how it is that language-games arise from it; but this surely is not then a terribly profound concept. In effect it is no more useful to say that language-games arise out of a particular form of life than it is to observe that swimming strokes arise out of a particular situation - water.

Of course it is an example of Wittgenstein's genius that he did not say that language-games arise out of

1. Similar thoughts are given by Aristotle, Heidegger, and Chomsky, for example.
2. This is my answer to the so-called "organic" account of Forms of life.
language, but rather that they arise out of various Forms of life. It is the same genius that prompted him to say that the structure of reality determines the structure of language and then to suggest that it is really the other way round. ¹

What this reflects, of course, is an essentially poetic genius which just happens to be utilized in an investigation of Philosophy. An example of this sort of poetic genius utilized in another area (Politics) will help to drive home the point. A current political figure was asked, "What happens if you win this primary election, and what happens if you lose it?" He answered, "If I win, it's like spring tonic; and if I lose, it's like getting the flu."

The method in both cases is the same. An individual is prompted to speak, but when he does so it is always through analogies. Sometimes these analogies are rather transparent devices used to evade an issue, as in the case of our politician who can not admit that a loss is a defeat, even though that is what can be deduced. ² Hence he builds an analogy, which precisely because it is an analogy allows him to say at a later date that what he really meant was that "getting the flu" meant that he would get sick. But of course people never

¹ Pears, Wittgenstein, p. 3
² It is further transparent because he is not taken seriously to be a poet.
bother to analyse politicians in such great detail and so most such analogies are soon forgotten.

However people do analyse the words of philosophers in detail. And because of this propensity for analysis, analogies are more often than not viewed in terms of their "richness" rather than in terms of "evasive devices". Wittgenstein's poetic genius has thus all but insured a continuing debate which will cease to be interesting only in those moments when it is forgotten that his main tool as a poet-philosopher is his habitual use of analogous predication.

Now, a concept closely related to Forms of life is the concept of rules. This concept is important because it helps us to understand to what extent a particular Form of life can affect a language-game and also to what extent we are "free" to act as we please in our construction of language-games.

Concerning rules, Wittgenstein tells us (54) that they do not have a single purpose, but are established for a variety of reasons. Hence we may observe that rules are used as:

A - Aids in teaching a game (Example: Always look honest when playing poker)

B - Instruments of the game itself (Example: Bridge is played, generally, with four
people), or

C - **Natural laws** governing the play (Example: A knight is moved thus in Chess)

In unison, then, these formulations imply that a given language-game must be understood solely in terms of the rules according to which it is played. These rules, of course, serve as standards\(^1\) which on a traditional interpretation of Wittgenstein are found to rest on agreement.\(^2\) This is the basis of all arguments which seek to make him a conventionalist. Moreover, it is stressed that such agreements are always arbitrary, arising out of accepted practice.

Based on the illusory validity of the "conventionalist" argument, Pole has found warrant to claim that "what we have here are two radically different views of language. In the one the key notion is that of a rule...In the other...the emergence of new forms is seen as part of the essence of the system.\(^3\) The concept of Forms of life and the concept of rules are viewed as mutually incompatible.

However, by means of two separate accounts I wish to hold that they are essentially related.

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1. Pole, *op.cit.*, p.35
2. Page 226 (PI) is often quoted in this regard
Account #1 - Rules can be viewed analogously as fulfilling the same requirements that the concept of law fulfills in Plato. On this account we find a number of similarities. Initially we find that laws and rules are both founded on agreement. The lack of the philosopher-king in Plato and the lack of a similar "objective standard" in Wittgenstein (PI) makes this a necessary condition of possible construction in either case. Further, in neither case do we find the possibility to construct perfect "instruments". In Plato there are no perfect laws because every law must be general in nature by necessity (a matter of scope) and hence must disregard the specific instance. Hence all laws will be found to be imperfect if a requirement of universal applicability is imposed.

Now, this is nothing more than a problem of application for Plato. Likewise with Wittgenstein, there can be no perfect, foolproof rules - for every rule has to be understood and applied, and can also thus be misapplied.

A further point of comparison is that in both cases the "instruments" are designed to assist us in the performance of living. Laws for Plato are designed

1. See Plato's Statesman, 294b
to assist us in achieving an ordered life in the absence of the philosopher-king (and his unique ability to apprehend the Forms). Similarly rules for Wittgenstein are designed to assist us in performing language-games.

Finally, the most interesting point of comparison is that both rules and laws are "affected" by a more basic concept - one which does not determine which laws or rules should be established but which merely guides us in our choice. For Plato this concept is the Forms (and Nous) and for Wittgenstein it is, of course, Forms of life.¹

Account #2 - Rules reflect the possibilities afforded to us by Forms of life. As such, they can be regarded as sample instances of a probabilistic knowledge of the unique character of a given Form of life. In such a case if we are granted the luxury of equi-probability (which Wittgenstein is quite willing to give)² with regard to individual rule-instances, we can be found to possess the necessary tools for Form of life "determinations". Now, if such determinations are possible in theory, and I believe that they are, then they can only be so based on the existence of an es-

1. As a coincidence it should further be noted that both men utilize some sort of "form" which affects the quasi-material constructs.
2. Tractatus (6.4)
sentential relationship between rules and Forms of life.

Rules are normally viewed in Wittgenstein not only in terms of games, however, but also in terms of grammar. "Grammar, in Wittgenstein's sense, is the structure of language, or seen differently, its system of rules". 1 It is easy to see why rules can be equated with grammar, of course, since the analogy of games is after all merely a device in the investigation of language. Thus, in language, grammar can be viewed as a set of rules which regulates the use of various combinations of words. 2 Grammar on this account arises and is formulated in much the same manner as other rules of games, that is, out of accepted usage. Grammar thus construed is arbitrary, being based on agreement - an agreement which Wittgenstein tells us has the pragmatic consequence of guiding our choice of words. 3

Of course, this "guiding" feature of grammar cannot itself be arbitrary because of the fact that grammar, like other sorts of rules, is affected by Forms of life. Nevertheless, many who have recognized this arbitrary aspect of grammar in Wittgenstein have not been content with it and have sought to ground it on

1. Pole, op. cit., p. 31
2. G. Hallett, Wittgenstein's Definition of Meaning as Use, p. 189
3. See paragraph 178 (P1)
a more substantial foundation. Their efforts have most often led to the assumption that our grammar is actually not as arbitrary as we may think, and that in fact its foundation can be found in logic.

They explain, for example, that the reason why we find it wrong to say "I remember what happened tomorrow" is not because we have merely agreed to call such a use of words wrong but because a logical, or conceptual, necessity dictates that certain combinations of words (here "remember" and "tomorrow") cannot be properly used. Also, grammar can be used to dictate the manner in which individual words are to be used (as nouns, adverbs, etc.). For example, in a passage from *Through the Looking Glass* Lewis Carroll notes the following violation:

"Just look along the road, and tell me if you see either of them."

"I see nobody on the road", said Alice.

"I only wish I had such eyes", the king remarked in a fretful tone. "To be able to see Nobody! And at that distance too! Why, it's as much as I can do to see real people, by this light!"

The more serious objection, however, comes from those who hold that Logic represents our prime example

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1. An amusing example of this is given in "Wittgenstein, Nonsense, and Lewis Carroll" by Pitcher in Fann, p.332
2. Ibid, p.333-4
of exactitude and that whenever we call (challenge) a move in a language-game, our ultimate appeal can only be to the principles of Logic. In answer, however, Wittgenstein merely notes that logical laws (such as the law of excluded middle) serve merely as standards or rules themselves and that it is always possible to imagine that we should cease to accept these rules and to adopt others.

In this regard I do not believe that Wittgenstein has effectively blocked the objection in favor of viewing Logic as a preferred language. He has not done so because while it is clear that he now (in the Philosophical Investigations) attempts to destroy any hierarchy of languages he nevertheless is forced to locate necessity in the logical structuring of grammar. Thus he has merely shifted his perspective from Logic as language to Logic as grammar.

Now the only basis that we are given in Wittgenstein for the assessment of either language-games or the rules of language-games is the concept of "usefulness".1 Unfortunately, he says little about "usefulness" in the Investigations and so we are still left with the question "Useful for what?" It is much the same case

1. Specht, op.cit., p.171
as with those who would espouse an ethic of efficiency. We can always point out that it really makes no sense to say that something is merely "useful" or "efficient" for these words are used in our grammar in a transitive sense, thus implying that there is something for which a given rule or action is useful or efficient. Commonly held ends include, for example, such things as order, self-interest, etc.

In Wittgenstein we appear to have this transitive usage but no objective. We are told that we play language-games but are not told why we play them. Now, it should be pointed out that this is not necessarily entailed by his analogy of games. In Psychology, for example, there are those¹ who, like Wittgenstein, argue that insight can effectively be gained through an appeal to the analogy of games. In both Wittgenstein and Berne we can find varieties of games, all of which are in some sense defined by rules. However, on Berne's account:

Games are clearly differentiated from procedures, rituals, and pastimes by two chief characteristics: (1) their ulterior quality and (2) the payoff. Procedures may be successful, rituals effective (Wittgenstein's "usefulness").

¹ Eric Berne, for one; see his Games People Play, Grove Press, 1964
and pastimes profitable, but all of them are by definition candid; they may involve contest, but not conflict, and the ending may be sensational, but it is not dramatic.¹

Turning to a typical analysis of a game² one immediately becomes aware of the inclusion of a category labeled "Aim" which is precisely what is left out of Wittgenstein's concept of games!

Even if "Aim" can be translated into "motive" or even into "value", this thesis (observation) does not appear to be diluted in the least. A textual reading reveals that Wittgenstein rarely uses the words "motive" or "value" in his writing; and, of course, he would have no reason to if he remains consistent with a behavioristic philosophic account, a radical behavioristic account.

This then leads us to observe that there is no room here for spontaneity and novelty. Wittgenstein's story of games thus becomes a somber picture in which human life is merely a series of games, "a process of filling in time until the arrival of death, or Santa Claus, with very little choice, if any, of what kind of business one is going to transact during the long wait".³

1. Ibid, p.48
2. Ibid, p.86, for example
3. Ibid, p.184
What this slight digression has to do with logical necessity is simply this - in Wittgenstein we can look for its basis in only two places: in language-games or in Forms of life. But the vagueness which I have ascribed to Wittgenstein becomes most apparent here. On the one hand, it appears that the source of necessity lies solely within language inasmuch as Forms of life are essentially linguistic configurations. However, on the other hand, since he does not explicitly equate Language and Forms of life, the option is apparently left open (even though only as a mere crack in the door) to hold that the source of necessity is not really in language at all, that after all is said and done this view is merely an illusion and that actually its source is in our Forms of life. This, of course, is safe to say only because Forms of life are only susceptible to a vague probabilistic analogous interpretation (as opposed to being direct "objects" of knowledge. In conclusion, then, I shall hold that Wittgenstein has not really "explained" necessity at all but has merely given us a somewhat interesting metaphor with which to play.

This point is especially vital to his philosophy. Some comments related to this position can be found in Specht, especially see p.159.
of science and so I will return to it in Chapter III. At the moment, however, I wish to inquire into another ramification of the language-game thesis - the constitution of objects. The need to review this topic should be especially obvious in light of the claim of science that it does not deal with the "mystical" but with "good old-fashioned objects".

We may begin our discussion of objects by saying that what Wittgenstein does is to totally revoke the possibility of talking about "good old-fashioned objects". Now in talking about objects we appear to have two definite options open to us: we may assert with the Realist that objects exist in an independent state, so to speak, or we may assert that they do not. In the *Investigations* we find an exposition affirming the latter alternative, something which must follow in view of what has been said concerning language-games. Quite explicitly as a matter of fact Wittgenstein tells us that the constitution of objects is intimately bound to grammar, that "essence is expressed by grammar" (371), that "grammar tells us what kind of object anything is" (373).

It should be remembered in this regard that grammar does not exist as some independent entity but rather is to be characterized as a function of a
language-game. Thus, we may say that objects are second-generation functions of language-games and as such can only exist within a language-game.

Looking further, we find that the activity whereby objects are constituted is best described as "organization". The concept of organization, however, requires that we allow several things as given:

1 - As was noted in discussing language-games we must assume an already existing stock of language-games, and thus an already existing supply of objects.

2 - We must assume that these existing objects are essentially linguistic in character, formulated in accordance with the rules of the games in which they occur.

Granted these two requirements, Wittgenstein's "constitution" theory can then tell us how further objects are formulated. Essentially, it amounts to the argument that we apprehend the "reserve" of given objects and in constructing new language-games we sort (separate, differentiate, organize) these existing objects in light of the requirements imposed by the grammar of our new games. ¹ Concerning the objects which already exist, we must assume that the same process was used in their constitution when the language-games

¹. See Specht, p.155, for an example of this.
in which they presently occur were first articulated.

A distinction between strictly grammatical objects and empirical objects is not to be overlooked, of course. The manner in which this distinction is presented to us is through an examination of propositions which can properly be said to reflect the "nature" of the objects which they contain. Thus we are found to have grammatical propositions and empirical propositions.

A grammatical proposition is one whose truth value is exclusively dependent upon specific grammatical rules. (Example: A bicycle has two wheels or Every body has extension)\(^1\)

An empirical proposition, on the other hand, depends for its truth value partly on the rules of usage of the words occurring in them (grammar), and partly on the empirical data.

Now this distinction is quite similar to that given to us by A.J. Ayer with regard to analytic and synthetic propositions. However, I believe that the similarity between the two men on this point is misleading. Ayer is essentially sympathetic with Positivist doctrine\(^2\), and as such the ultimate appeal with

\(^1\) Pp.251-2, (PI)
\(^2\) Especially with his Language, Truth, and Logic
regard to empirical propositions is to their verification, and the Verification Principle itself ultimately assumed a Realist's world. The limits of the empirical are taken on this account to be the world itself.

Needless to say, Wittgenstein would not accept such a picture. For him, "The limit of the empirical - is concept-formation" (RFM, III-29). This blunt statement summarizes a host of observations, all of which undermine the purity of the Positivist's verification.

The most general observation perhaps is that any experimental activity is conditioned by the terms which underlie that activity. On this point one will find many examples given by Kuhn, who in his *The Structure of Scientific Revolutions* states precisely the same thing saying "Scientific fact and theory are not categorically separable" and that "The existence of the paradigm sets the problem to be solved". 1, 2

Thus one's activity can be found to be governed by the paradigm and "to desert the paradigm is to cease practicing the science it defines". Wittgenstein similarly would say that we have ceased to play the same game. To give an example of this thesis, one need only point out that the empirical facts which

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2. Ibid, p.27. A paradigm for Kuhn it should be noted is like a model or pattern, "an object for further articulation and specification".
are "found" under the Phlogiston theory or paradigm are not at all the same ones which are found under current theories. Under the former paradigm the weight differential found to exist between a given metal in its "normal" state and in a heated state was found to be caused by a change in the amount of phlogiston, while in the latter paradigm the weight change is said to be caused by the effect of exidation on the metal's molecular structure and hence its molecular weight. The conclusion: there is no real distinction which can be drawn between concept and fact.

As Petrie notes, "If Wittgenstein rejects the possibility of drawing a line between the conceptual and the empirical, then this indeterminacy should be reflected in perception as well". And, it would seem that in Wittgenstein's doctrine of seeing as "aspect-seeing" we have a substantiation of this supposition.

In speaking about this Wittgenstein notes that there are two uses of the word "see":

The one: "What do you see there?" - "I see this" (and then a description, a drawing, a copy). The other: "I see a likeness between these two faces"  
(p.193, PI)

Following this remark Wittgenstein goes into a discussion of "noticing an aspect". This he further

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divides, saying "I must distinguish between the continuous seeing" of an aspect and the "dawning" of an aspect (p.194) (In this place appears his example of the duck-rabbit.) Now what he wants to show here is that we often perceive an object as another object. Exactly why this is so, what causes it, he wishes to leave, however, to psychologists (p.193). Petrie, nevertheless, suggests that perhaps "Seeing as" is "the ability (propensity might be better) to play more than one game with the object".¹

In reading Petrie one is strongly inclined to say that Wittgenstein can be found to reject the possibility of neutral seeing or perception based on his investigation of seeing as "seeing as". Now, if this is what Petrie wishes to hold, then I fear that he has been led astray. Of course Wittgenstein would hold that there is no possibility of neutral seeing, but this is not based on his analysis of aspect seeing.

Aspect seeing (seeing-as) is perhaps the most dramatic side of his account of perception as given in the Investigations and clearly it consumes the most space (number of pages), but neither is it his sole account of seeing nor is it the most basic. On p.193 he notes that there are two uses of the word

¹. Ibid, p.158
"seeing" and an account of "seeing as" only deals with one (explicitly).

Now whereas the "seeing as" account involves the multiplicity of language-games and of objects, his more basic account describes the perception that occurs within a single language-game and explains the perception of a single, as opposed to a multiplicity, of objects.

The key to Wittgenstein's theory of perception is to be found, I believe, in his comment that:

Here it is difficult to see that what is at issue is the fixing of concepts. A concept forces itself on one. (This is what you must not forget.) (p.204)

And also in his thought recorded on page 198:

The concept of a representation of what is seen, like that of a copy, is very elastic, and so together with it is the concept of what is seen. The two are intimately connected. (Which is not to say that they are alike.)

What he is saying here, it should be pointed out, is that it is the concept which is essential, and by implication not the formulation of similies. The use of the words "like" or "as" can only be possible when an object of comparison already exists, and clearly our problem here is to articulate the basis for any object of perception, including the single "uncomparable" ones.
The evidence which I use to support this case rests on two points:

1 - Wittgenstein notes that there can well be human beings who lack the capacity to see something as something (p.213). This lack he terms "aspect-blindness" and states that it is akin to the lack of a "musical ear" (p.214). This can be taken to indicate that the theory of aspect-seeing is not intended to cover all situations and therefore cannot be the foundation of a general theory of perception. Rather, it should be viewed as Wittgenstein's "special" theory of perception.

2 - Wittgenstein actually provides us with an example of a situation in which his "special" theory of "seeing as" does not apply in noting on page 195:

It would have made as little sense for me to say "Now I am seeing it as..." as to say at the sight of a knife and fork "Now I am seeing this as a knife and fork". This expression would not be understood. - Anymore than: "Now it's a fork" or "It can be a fork too".

Ordinarily then, we do not, can not sensibly, appeal to other objects through the device of similes. Now perhaps it is because such objects simply do not have a propensity to interpretation in more than one language-game, but I think that the central phenomenon is much more basic than this.
Essentially I want to argue that "Our problem is not a causal but a conceptual one" (p.203). Insofar as this is true, every act of perception is based on the concepts which we possess. Thus, for example, a South Sea native will see something when he views for the first time a shiny asphalt tile floor, and to a certain extent what he sees will be the same as what I see—assuming that there are, of course, certain basic language-games which we have in common. These language-games which we have in common as physical beings will contain rules referring to solid objects, straight as opposed to crooked lines, transparent as opposed to opaque surfaces, etc. What we will not have in common are the similes (aspects) generated by dissimilar language-games. Hence, while I view the floor as asphalt which is "like rubber", he will perhaps view the same floor as "like tree bark only smoother".

In conclusion, then, all objects will be "seen" through concepts generated within language-games, which I shall call first level perception; then, certain objects will be viewed through a further articulation of various aspects which a given object has in common with other objects. This is second level perception. Concerning the question "Which objects are susceptible to second level perception, and why?" I will decline an
answer, siding with Wittgenstein in suggesting that such a question is the problem of psychologists.

Now, I hope that I have shown with some degree of clarity that Wittgenstein does not make a strict distinction between the grammatical and the empirical. However, in presenting his position I do not wish to imply that there are not any problems connected with it because in fact I feel that there are several rather disturbing points related to his view of perception.

The first objection which I have is that Wittgenstein is not at all clear on the relationship between the world and language. Does the world exist in some sense independent of language and merely become manifest through language? Or are we to assume that (borrowing Heidegger's terminology) the world and language are "equi-primordial"? The point is that we are only given the language-game analogy, and it simply is not directed toward the problem of beginnings. Hence it would seem that one could hold either position.

What Wittgenstein would like us to think about, of course, is that "the world confronts us only within language-games and is thus already articulated in detail and ordered according to the most diverse principles".¹ This I will let stand for now, until it be-

¹ Specht, op.cit., p.154
comes necessary to reconsider the topic in Chapter III.

The other problem which I find here regarding the relationship of the grammatical and the empirical centers around "object articulation" in Gestalt psychology. To point out the difficulty, we are told on the one hand that the constitution of objects is entirely within language-games and that more specifically it proceeds in accordance with the grammar under which we are operating. Furthermore, this grammar is not imposed but is more or less arbitrary, being arrived at by convention.

On the other hand, Gestalt psychology has established certain principles of "Form" and "Ground" articulation which surely seem to be inherent in a given figure (object). These articulations, moreover, are not apparently "choices" which we possess as possible views of an object, but rather are held to be rigid characteristics of the figures themselves, characteristics which force us to view them in a certain way. These articulations include:

1. Orientation - Essentially it is held that "there are main directions in space, the horizontal and the vertical, and that these directions exert an

2. Ibid
actual influence upon the processes of organization by making figural organization easier in the main than in the other directions. Also this implies that the ground is always "symmetrically distributed in all directions".

(2) Relative size also must be considered in many instances for "if the conditions are such as to produce segregation of a larger and a smaller unit, the smaller will...become the figure; the larger, the ground."

(3) Enclosing and Enclosed area: "...if two areas are so segregated that one encloses the other, the enclosing one will become the ground, the enclosed one the figure."

(4) Density of Energy: "Under certain conditions it is...plausible to assume that within a certain area the process energies of figure and ground are equal. Then if we have a small figure on a large ground it follows that the density of energy must be greater in the figure than in the ground, proportional to the ratio between the ground and the figure area."

(5) Internal Articulation: In figure-ground articulation, those parts "which have the greater internal articulation will...become figures."

(6) Simplicity of Resulting Organization: Symmetry:
Essentially, the figure-ground distribution will be as simple as possible. This is often noted through the resulting shapes which will tend toward symmetrical formation.

(7) Centre of Interest: Since it is figures which become the objects of one's interest, it must be conversely true that "where the centre of our interest lies, there...a figure is likely to arise."

Now the problem is that only #7 would seem to be "explained" through concept formation within specific language-games. Concerning the other six, it would appear that the phenomena are so general that if they are not "caused" by the objects themselves than we can only appeal to Forms of life. But did we not see that objects were constituted within individual language-games? And yet it seems that this constitution is so general that it invades all games and thus cannot really be based on language-games at all but is generated solely by Forms of life! If so, what are we to make of the so-called arbitrary nature of the grammar of such games?

With this question asked I will close my discussion of language and turn to an investigation of mathematics, an investigation which should prove quite essential in the quest for a philosophy of science.
III

MATHEMATICS

In this chapter Mathematics will be considered. In the last chapter it was argued that for Wittgenstein any linguistic activity could be considered to be a language-game. Here, it will be argued that Mathematics too may be considered to be a language-game. As such, this language-game of Mathematics occupies a rather unique position within the perspective of this essay because:
A) Historically Mathematics has always been viewed as being closely related to the scientific enterprise either as an essential component of it or as a most convenient tool with which to work. And, it is only on rare occasion that Mathematics is not so viewed. ¹

B) Mathematics is a topic which is most extensively discussed by Wittgenstein, and hence his treatment of it can reasonably be expected to reflect many fundamentally important points with regard to the character of his thought.

Now, in attempting to outline Wittgenstein's thought with regard to Mathematics, I will attempt to show that basically it parallels his view of language; and, remembering my contention noted in the introduction concerning the assumption of similarities between Mathematics and Science, I will hold as a working hypothesis that what is noted concerning Mathematics applies also to Science. Essentially this hypothesis is based on the assumption that Wittgenstein's views regarding two or more distinct subjects or disciplines will be similar insofar as the various subjects or disciplines may be shown to resemble one another. In this regard

¹ See, for instance, Alfred Schutz, 'Collected Papers', Martinus Nijhoff, 1962, as an example of this position. Schutz incidentally mirrors much of the thought of the Phenomenological School. This position, however, will not be investigated in this essay.
we note that Mathematics and Science have a rather exact internal structuring, each possesses its own special language, each is independent (more or less) of other disciplines or "fields of inquiry", etc. The differences which are often noted in contrasting Mathematics and Science will additionally be held to be less distinct than ordinarily is suggested. Thus, for example, the argument that Mathematics may be viewed as having a totally "analytic or rational" character while that of Science is "synthetic or empirical" is softened considerably by Wittgenstein in suggesting that Mathematics possesses a certain synthetic character and that Science, insofar as it operates within a language-game of its own making, may be viewed as somewhat analytic in character. This will be considered further, but here it is perhaps interesting to note that such "softening" of the differences between Mathematics and Science helps to strengthen our initial hypothesis. Of course, in Chapter IV I shall modify this picture somewhat, but such modifications are not essential at this point.

In the Investigations Wittgenstein emphasizes the character of language-games as a multiplicity of activities by giving us a somewhat random list of examples (23). Much later, he speaks of Mathematics as an activity (p.227). This I take to indicate that
Mathematics can validly be described as a language-game.

In further support of this position the following points are noted:

A - As was the case with language-games involving "ordinary language" so too here with Mathematics Wittgenstein stresses the concept of "following a rule". He notes, for example, that "The concept of the rule for the formation of an infinite decimal is - of course- not a specifically mathematical one".\(^1\) Further, he notes that "The concept of this rule is not more mathematical than that of: following the rule....For the expression of the rule and its sense is only a part of the language-game: following the rule".

B - For Wittgenstein "meaning" is related to "use" and "use", of course, occurs within specific language-games. This being the case, one may inquire into questions of meaning by asking, "What language-game is being played?" Likewise in his discussion of Russell's system\(^2\) of Mathematics, Wittgenstein indicates that the meaning of certain terms such as "provable" and even "true" must be referred to specific systems.

Just as we ask: "'provable' in what system?", so we must ask: "'true' in what system?"

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1. RFM, p.186
2. RFM, p.51
This would appear to be asking the same sort of question as "What language-game is being played?" insofar as both language-games and systems are intended to be final referents of meaning.

C - Related to the point just noted is the point that use not only establishes meaning within a given system of Mathematics but that it gives meaning to the entire system (taken as a whole).

"It is the use outside mathematics, and so the meaning of the signs, that makes the sign-game into mathematics."

(RFM, p.133)

Once again, the notions of meaning and use, which are referred to here, are basic characteristics of his language-game analogy.

As a language-game, Mathematics displays the characteristics of language-games, of course, and thus the activity which we term "Mathematics" should be liable to description in much the same terms used in discussing language. Accordingly in answer to the question "What is Mathematics about?", we would fall into error according to Wittgenstein if we answered that it described a system of mathematical entities (Plato's view) or that it represented what we could term "empirical generalizations" (Mill's view), or that it represented any attempt which was based outside of the
activity itself. For, as was the case with language, we must view this activity in terms of the concept of use. "If we wish not to be misled we shall do well to direct our attention away from the question as to what they are about to the use we make of them". 2

In affirming this position all extra-linguistic considerations have been excluded from an analysis of Mathematics and we are obliged to consider the language-game itself.

In defining a game we appeal to the rules of that game. In Mathematics we can divide this set of rules into two groups, those which refer to the application of Mathematics and those that are related to the activity itself.

With regard to the application of Mathematics, as for example in the proposition "3 cumquats + 2 cumquats = 5 cumquats", Wittgenstein tells us that the certainty of this proposition does not reflect some contingent truth about cumquats nor a necessary connection between concepts. Rather its "truth" is determined by the use we make of such a proposition. The use of this proposition is that we take such calculations to be definitions of a sort 4 which guide us

1. Mathematical terms & propositions
2. A. Ambrose, "Wittgenstein On Some Questions in Foundations of Mathematics", in Fann, p. 270
3. Ibid, p. 269
4. Ibid, p. 279
whenever we attempt to calculate. Further, the application of mathematical propositions must not be viewed as some type of experiment (p.218) because an experiment implies that the outcome of our activity (adding) may go one way or another, but this is precisely what we will not allow, this is not how we have decided (agreed) to use such propositions. Rather, through our agreement we have explicitly consented to hold that nothing should count as falsifying a correctly formed mathematical proposition, that nothing should be allowed as evidence which runs counter to the proposition that \( 2 + 3 = 5 \).

If in fact an experiment is conducted and the results do not point to the proper sum, then we naturally assume that either we have made a mistake in calculating or else that there has been some mutation of the objects to which our proposition was originally applied. This is to say that whenever we do not get \( 5 \) when we add \( 2 + 3 \) then we are said to have made a mistake, to have used the proposition incorrectly. \( 5 \) and \( 2 + 3 \) are thus construed as reflecting a certain identity - they are held to be "equal" to one another. And, because we take these two propositions to be in this sense the same, it becomes a rule, for "the use of the word "rule" and the use of the word "same" are
interwoven" (PI:224). It is because of this that we can substitute "5" whenever we see the expression "2 + 3" and vice versa (RFM V-3).

Now, the basis of this agreement (ultimately) is the same as in all language-games, namely Forms of life. What we have here, however, is not just another appeal to Forms of life but what perhaps may be the best example of the relationship which obtains between a given language-game and Forms of life.

An interesting point that has been overlooked by all investigators thus far is that in many of the instances in which Wittgenstein mentions Forms of life in the Investigations, he has just concluded, or is in the process of, talking about Mathematics. Thus, while we do not find a noticeable proximity of the notion of Forms of life to Mathematics at (19) or on page 174, we do find their mutual occurrence at (23), (241), and on page 226.

This leads me to believe that far from seeking to include the language-game of mathematics as merely another game among many, we may actually view it as an important model of the way all language-games function.

On page 226 he notes: "I have not said why mathe-
Mathematicians do not quarrel, but only that they do not"... and a little further on that: "What has to be accepted, the given, is - so one could say - forms of life". The rather amorphous agreement that we all find in accepting that "2 + 2 = 4", for example, is thus pointed out in perhaps its starkest form, an agreement so basic that he seemingly cannot really "explain" it but only feels capable of offering a prayer of thanksgiving, saying that we can only "give thanks to the Diety for our agreement" (234).

Mathematics may not on this account be an ideal language (or language-game) but it certainly does seem to be capable of best pointing to the extreme generality which is housed in the Forms of life, a generality so vast that it is not affected by the fact that we are operating in any one of a number of language-games such as French or German or Greek or "business". Linguistic relativism does not negate the possibility of a "best linguistic model", one may thus conclude. The application of mathematical propositions and terms is accordingly to be viewed as the acceptance of rules based on the most general sort of agreement in Forms of life.

There is, of course, another aspect of the language-game of Mathematics to be considered, that aspect which
involves the activity which occurs within the game itself. This is the work of the mathematician, and the label which is used in reference to this activity as it is viewed by Wittgenstein is "Constructivism".

At this point in order better to concern ourselves with Wittgenstein's constructivism, we must turn to his Remarks on the Foundations of Mathematics. However, this is only being done on the basis of the observation that the remarks presented by Wittgenstein in Remarks on the Foundations of Mathematics are of a piece with the thought of Philosophical Investigations.¹

Now in the Remarks Wittgenstein explores Mathematics by focusing his attention on the notion of mathematical proof. To begin, he notes that a proof is "a single pattern, at one end of which are written certain sentences and at the other end a sentence (which we call a "proved proposition") (RFM I-28). Thus we are given a finite proto-example through which the various activities of mathematics can be viewed and upon which the various notions that were used in describing language in the Philosophical Investigations can be here applied with reference to mathematics.

One of the first notions that we find here is

¹. RFM, p.vi (Editor's Preface)
that of rules. Rather than accepting the position that the propositions that go to make up a proof follow one another logically (logical inference), he holds that "when I say 'This proposition follows from that one', that is to accept a rule" (RFM I-36).

Mathematics like language is seen by Wittgenstein as rule-governed activity. In a proof, the rules actually can be called transformation rules and accordingly it can be seen that "when mathematics is divested of all content, it would remain that certain signs can be constructed from others according to certain rules" (RFM II-38). What we have is a mathematical machine, Wittgenstein tells us, "driven by the rules themselves", obeying "only mathematical laws and not physical ones" (RFM III-48).

A proof, then, provides us with the framework in which, or rather around which, the various language-games of mathematics are played. Viewed in this manner, we can easily see why Wittgenstein holds that "a mathematical proof moulds our language" (RFM II-71). It organizes our possible mathematical moves in the same manner that our moves are organized in other language-games.

But, one could ask, isn't there a certainty here in Mathematics that one fails to "explain" through an
appeal to rules? After all, rules are arbitrary and yet it most surely is not the case that all mathematical activity is arbitrary.

In reply to this Wittgenstein most assuredly would note that Mathematics is essential to our whole life (RFM III-52) and that we all depend on the certainty that is found in Mathematics. But it is a mistake to oppose certainty and the arbitrary nature of rules because they are essentially related to one another. First one must realize that although the rules which are first laid down may be completely arbitrary, the rules which are subsequently formulated are not arbitrary insofar as they must be in accord with already existing rules. To refer to Wittgenstein's analogy of the town in the Philosophical Investigations we might say that any construction of a new street must take into account the already existing pattern of streets. (See p.183, RFM)

Furthermore, he tells us that "to accept a proposition as unshakably certain - I want to say - means to use it as a grammatical rule" (RFM II-38), and that it is this which removes uncertainty from it. Mathematics must be viewed as normative (RFM V-40) but he is quick to say that "norm" does not mean the same thing as "ideal". Rather "norm" must be taken to
signify something closer to "what is accepted through general agreement". In this sense then, Mathematics is seen to be a "network of norms" (RFM V-46), which is to say that it is a network of concepts and rules based on agreement.

This agreement that he finds essential to Mathematics is, of course, the same sort of agreement which was found to be at the foundation of the use of language itself in the Investigations. Here he notes the exact same thing at RFM I-152:

> What does people's agreement about accepting a structure as a proof consist in? In the fact that they use words as language? As what we call "language".

He also tells us that when we "go through" a proof and accept its results, this merely reflects use and custom among us, or "a fact of our natural history" (RFM I-63). Further, any "laws" which may be viewed as an objective source of compulsion (such as the laws of inference) must actually be seen as being essentially no different than any other laws of human society (RFM I-116). The depth of our certainty is merely a reflection of the extent to which men are willing to go in accordance with what has been agreed upon, the depth of convention.

On the basis of this analysis, then, what can we
best say that the mathematician actually does in doing Mathematics? Well, Wittgenstein notes that he can be likened to a landscape gardener (RFM I-166). As such, the mathematician may construct various transformations (descriptions) on paper in the manner that a gardener may plan on paper a certain landscape. In both cases, Wittgenstein notes, the activity proceeds without the determination of actual use; it makes no difference whether or not people actually will "walk" on the paths they both describe. The intended considerations may be aesthetic, one could say, at this point rather than practical.

"The mathematician is an inventor", he tells us, "not a discoverer" (RFM I-167). The mathematician does not go out and look for his objects of concern, but rather he "makes them up", creating new forms of descriptions. But we would be short-sighted to assume that these were ordinary descriptions (poetic ones, experimental ones, or the like). Rather, because mathematical propositions (descriptions) have the dignity of rules, they are, once invented, deposited among the standard measures (RFM I-164) and can in turn be used later to invent still other descriptions - each description, each rule, following the rules which have already been laid down.
But the invention of description is not the mathematician's sole activity, for he also creates essence (RFM I-32). This we come to see when we observe that while the mathematician is an inventor and not a discoverer, discovery is an aspect of mathematical activity - an aspect which must be adequately described.

The description offered by Wittgenstein initially notes that before something can be "discovered" it must first be present; and, that since all other avenues have already been cut off (independent mathematical entities, etc.), the presence of discoverable "facts" can only be found to rest with the mathematician himself.

The reason why Wittgenstein wants to hold that the mathematician creates essence can be found to rest on the already noted relationship between concept formation and the constitution of objects in language (here, in mathematics). As was the case in the Investigations so too here we are informed that:

...the proof changes the grammar of our language, changes our concepts. It makes new connexions, and it creates the concept of these connexions. (It does not establish that they are there; they do not exist until it makes them.)

(RFM II-31)

A mathematical proof creates new concepts (RFM
II-41) which help us to comprehend things (RFM V-46), which guide us as we saw earlier to actually perceive things. It is in this regard that we can best understand when Wittgenstein tells us that "mathematics as such is always measure, not thing measured" (RFM II-75).

As was the case in the Investigations the limit of the empirical, which Wittgenstein maintains in his discussion of Mathematics, is concept-formation (RFM III-29). This is important to note because mathematical discovery is held to be an empirical activity. An example of this is given by Wittgenstein in a discussion concerning synthetic a priori propositions at RFM III-39 to 42. Here he relates that "the synthetic character of the propositions of mathematics appears most obvious in the unpredictable occurrence of the prime numbers." To explain, there is no formula by means of which one can derive a listing of primes. Rather, what one must do is to arm oneself with the concept of "prime number" and then experiment in an attempt to discover exactly what numbers are in fact prime and which are not. The proposition "There are prime numbers" is a priori insofar as we can determine prior to experience that it is in fact true based on the concept of "prime"; but, it is also synthetic "for
one can say that it is at any rate not discoverable by an analysis of the concept of a prime number" exactly what numbers they are. Hence the actual discovery of primes is held to be an empirical matter.

Now, what this account actually does is to reinforce the observation made in Chapter II in which it was maintained that the empirical and the conceptual are intimately related for Wittgenstein. Thus, as is plainly shown here, one cannot search for and discover primes unless one already has the concept of prime with which to work. Not only that, but it would appear that for Wittgenstein one cannot perceive any number as a number unless one possesses a concept of that number, for as he notes, a number in Mathematics is a mark of a mathematical concept (RFM V-35).

But of course the empirical aspect of Mathematics does not reside solely in this sort of discovery. There are other instances in which experimentation is conducted with reference to mathematical propositions. These instances tend, however, to overlap into other language-games which use mathematical propositions and proofs but which one would hesitate to call strictly mathematical.

A consideration of these instances, Wittgenstein tells us, must be based on an examination of the use
that is made of these mathematical propositions and proofs. In discussing the nature of calculating he often asks for the distinction between a calculation and an experiment. He of course notes that the connexions which we observe in calculating are connexions in grammar (RFM I-128), and that we must draw a line between calculating and experiment (RFM I-109), but it is ultimately how we use something that turns it into an experiment (RFM I-160).

On this view anything can validly be held to be an experiment. For example, one normally would not consider breathing to be an experiment, but there are times (say immediately after being hit hard in the ribs) when one could properly be said to experiment with breathing (to find if there is any pain, etc.). Likewise with calculating, Wittgenstein notes that we ordinarily do not consider it to be an experiment to add "7 + 5" but on the other hand elementary school teachers do send children to the blackboard to try and find the sum of "7 + 5" and other similar problems.

A further point which is made is that in calculating we do not allow just any result to be the correct one, while in an experiment any result which is obtained under the proper conditions (verification of experimental controls, etc.) is accepted. In calculat-
ing we do not accept a result because we arrive at it once, or even many times, but because we hold that it must be the result.

Likewise, a proof is not an experiment because unlike an experiment "a mathematical proof must be perspicuous" (RFM II-1). We must be able to reproduce it easily and exactly every time we so attempt. Now, this may appear to apply equally to so-called "refined" experiments, but a further condition serves to emphasize the distinction:

To repeat a proof means, not to reproduce the conditions under which a particular result was once obtained, but to repeat every step and the result. (RFM II-55)

To summarize this account of Mathematics we agree with Anderson¹ that most of the problems discussed (following a rule, etc.) may bear different details but nevertheless are one in spirit with the discussion presented in the Philosophical Investigations. Within the scope of this essay that is all that is of interest, for as was noted earlier the intent of introducing a discussion of Mathematics was merely to find if the subject was in fact handled by Wittgenstein in a manner analogous with the subject of language itself.

On this account we need not attempt to criticize Wittgenstein's handling of specifically mathematical topics such as Cantor's theorem and Gödel's theorem. What is of interest, based solely on a desire for a "complete" view of mathematical activity, is a clarification of the charge that Wittgenstein's notion of proof goes only so far as to include calculating and perhaps simple elementary proofs such as one finds in basic Algebra and Geometry but does not appear to include "higher level" proofs which appear to be more than mere "machine problems" and which actually require imagination and more often than not vast ingenuity. ¹

My concern is that if these "higher", more complex proofs are in fact essentially different (represent a different sort of activity) than simple proofs and calculations, then an examination of "what mathematicians do" is not yet complete. However, I wish to hold that Wittgenstein's analysis is essentially complete because:

1 - All proofs must be grounded upon element-calculations

2 - All proofs, as far as I know, exhibit transformations which run in accordance with,

not against, accepted transformation rules (grammar), and

3 - All proofs, unless specifically memorized (structurally), require some exercise of one's imagination. Thus not only does the professional mathematician exhibit ingenuity through his proofs but likewise so does the student who on his own effort "proves" the propositions of plane geometry.
IV

SCIENCE

Were Wittgenstein to have written a work entitled Remarks on the Foundations of Science, he would more than likely have discussed the thoughts he held regarding language, merely clothing them with new details as is the case with his Remarks on the Foundations of Mathematics. This, of course, is what must now be shown.
Early in the *Investigations* Wittgenstein presents us with a list of activities in order to give us some idea of the multiplicity of language-games (23). Among these few examples, it is significant to note that he has included many of the activities that one normally associates with Science. Here he has listed such things as:

- Describing the appearance of an object, or giving its measurements
- Reporting an event
- Forming and testing a hypothesis
- Presenting the results of an experiment in tables and diagrams

And, perhaps we may also include:

- Guessing riddles

Of course, these are activities which one finds within Science. And, on the basis of (23) alone we really cannot be sure that he intends for us to view the entire enterprise of science as a language-game. He never relates science and language-games anywhere in the *Investigations* (or in *RFM*). He does speak, however, of Mathematics as an activity (p.227), thereby indicating that we may speak of the many elementary activities which go to make up Mathematics in a collective sense. Ac-
Accordingly, it would appear that he is willing to consider the multiplicity of language-games not merely in terms of a unitary expansion but also in terms of some sort of collectivity as well. This would seem to indicate that although he does not explicitly say so, he is willing to view Science itself as a language-game. For Wittgenstein, it would thus seem to be the case that Science can and must be viewed as any other activity, generally speaking.

As a language-game Science must be liable to description in the same manner as other language-games, that is, through its rules.

Now, a general description of a science often suggests that it is a body of highly organized facts which have been gathered through the scientific method. These facts are further described as being objective, reflecting "what really is". Relating this account to Wittgenstein, I believe that he would most definitely concede that "organization" is a distinguishing mark of a science. His feeling about this was strong in the Tractatus where he likened the activity of science to the application of a mesh or net\(^1\) and he says nothing in the Investigations or Remarks which

\(^1\) See McGuinness, "Philosophy of Science in the Tractatus", International Revue of Philosophy, 1969, 155-66, for a detailed discussion of this point.
would indicate that he has changed his mind about this. However, while he does not contest the view that Science is a highly organized activity, he does object to our viewing scientific activity as somehow concerned with the collection of objective facts which are obtained through "neutral" experimentation. The key here, of course, is Wittgenstein's view concerning concept formation both with regard to language in general and Mathematics. If we focus on what he has said already about concept-formation, we will see that the classical notion of scientific activity as being neutral or "objective" is compromised several times over. (Here, I wish to hold that his view of this situation would bear a marked resemblance to his discussion of the "discovery" of primes and the construction of proofs, of descriptions, in Mathematics.)

Thus it is noted that there are no scientific objects prior to our conception of them; and, furthermore there cannot be any investigation of these objects until we are equipped with rules by which to order our investigation.

For example, he tells us that "science would not function if we did not agree regarding the idea of agreement" (RFM II-72). This infers that prior to any investigation there must already be agreement concern-
ing the nature of what will be found. To determine what will and what will not count as evidence is already to determine what will be "discovered" and what will not be. We can only see what the concepts which we possess allow us to see. This is the limit of Science because it is the limit of the empirical.

In turn, if we are asked to give the ground on which concept-formation rests, we can only answer that it is language (RFM II-71) itself which in turn is ultimately grounded in Forms of life.

The limits of empiricism are not assumptions unguaranteed, or intuitively known to be correct: they are ways in which we make comparisons and in which we act.

(RFM V-18)

It is, then, Wittgenstein's remarks on the limits of empiricism which must be seen to reflect his philosophy, his critique, of Science. To further establish this point, I should like to offer the following observations concerning scientific laws, method, and "truth".

**Scientific Laws:** Scientific laws are mentioned in several places, either directly or indirectly, in the **Philosophical Investigations**. At (54) Wittgenstein states that a rule is like a natural law governing the
play in a language-game.¹ Now, without concerning ourselves at the moment with the distinction between natural laws and scientific laws, it is noted that a conceptual association has been drawn between rules and laws. Having accepted this analogy, it then becomes most profitable to make the distinction between natural laws and scientific laws, because in so doing one can then reasonably ask for the distinction which is manifest in the opposing foundations of these two categories of laws.

Natural laws, of course, must be assumed to be the more basic of the two², and as such they can only be based on Forms of life. One can easily see the relative inflexibility of such laws by recalling the examples previously given concerning the height of basketball rims. If, however, scientific laws are considered to be different than natural laws, then their foundation must surely be different. At paragraph 79 it is noted: "The fluctuation of scientific definitions: what today counts as an observed concomitant of a phenomenon will tomorrow be used to define it." In light of this it would appear that the distinction which can be formulated as a hypothesis is

1. The same is held with regard to Mathematics, See RFM, III-21.
2. On the basis of scope this would appear to be the case. For example, while E MC appears to find a limit to its applicability in small-particle Physics, "All men must die" does not appear subject to
that scientific laws are **arbitrary**.

Of course, one could ask whether such laws are completely arbitrary; and if they are not, then what prevents them from so being.

In attempting to answer this sort of question, it should be pointed out that there are still other types of laws - traffic laws, laws of social conduct, etc. - and that these laws too must be distinguished from natural and scientific laws. Paragraph 54 does precisely this, Wittgenstein pointing out here that there are many types of rules (here laws), each distinguished by the use which is associated with them.

Concerning these latter types of laws, Wittgenstein would hold that they are the closest things to purely arbitrary propositions which we could imagine. But if this is actually the case, then scientific laws are not completely arbitrary, or rather they are less arbitrary than laws formulated through convention. As such, the following continuum could be visualized:

- Natural laws
- Scientific laws
- Other laws (social, traffic, etc.)
- Absolute free action (No laws)

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1. I do not say that they are absolutely arbitrary in nature because the concept of Forms of life must affect all activity if it (Forms of life) is to have anything but a tautological significance.
Noting this situation, one can only offer the suggestion that perhaps the above construction reflects a certain relative proximity or engagement with Wittgenstein's Forms of life. If this is the case, then a new meaning can be attached to his analogy at (136) where he speaks of engagement with the concept of truth (as with a cogwheel).

Of course, it would be wrong to hold that all of our activity is geared toward reaching Forms of life as if it were some sort of ideal entity (recalling Plato's analogy of the line in the Republic.) For if we were to do this, we would be in violation of the limit imposed by language as the "limit of the world". Nevertheless, if there is a definite gradation by means of which one can distinguish the various types of laws, then we must be prepared to assume some sort of "essence" or entity toward which they are inclined (realizing that such a goal need not be referred to as an "ideal" but merely as some "most fundamental aspect" of reality).

Once again, our problem is with a proper interpretation of "Forms of life". The one which begins to gain some plausibility is that "Forms of life" is

1. It has been suggested that instead of presenting a vertically-oriented line, an alternative might be to present a horizontally-oriented, sloped line, placing "Forms of life" above it.
perhaps closest to being a sociological concept. This is based on the observation that if "Forms of life" is merely a linguistic construct, then it would appear necessary to adopt a circular rather than a linear "scale" of laws, language being the hub of them all. But if we hold to differentiation based on degrees of "arbitrariness", then we are forced to point toward the source of arbitrary decision - society. The effect that this would have if accepted is to ground Wittgenstein's philosophy of language in the social. Regardless of how far one must go before he feels satisfied, whether one merely stops with the mere mention of Forms of life or whether one suspects the need for further analysis and consequent elucidation, it should be clear that one cannot observe Wittgenstein clearly until some attempt is made to look directly into the sun, that is, for origins or ultimate foundations.

Scientific Truth: There is no distinction which can be found in the Investigations (or BFM) between scientific truth and "non-scientific" truth. Thus, if one is to talk about scientific truth, it must only be through a discussion of truth in general.

In the Investigations there are several places

1. This admittedly is a radical interpretation of Wittgenstein, but one which would not make him a Sociologist as much as a Sociologist of knowledge.
where the word "truth" is used; these are the following: paragraph 22, 136-7, 225, 544, and pages 222-3. Also, the following passages can be cited: paragraphs 433-7, 443-9, and 461-5.

From all of these, the most helpful to this project are 136 and 461-5. Taken together they say about truth that:

A - It is essentially related to language, and

B - It is reflected in a "proper fit" of all the facts.

At 461-5 Wittgenstein asks whether an order anticipates its execution and whether a wish can be said to determine what is going to be the case. Both of these, of course, reflect similar situations insofar as they can be put into the form of a more abstract question of whether any linguistic activity determines what will or will not be found to be the case. In answer to this it is noted at (465):

Suppose you now ask: then are facts defined one way or the other by an expectation - that is, is it defined for whatever event may occur whether it fulfills the expectation or not? The answer has to be: "Yes, unless the expression of the expectation is indefinite; for example, contains a disjunction of different possibilities."

A similar answer is given by J.R. Lucas in his
article "On Not Worshipping Facts". From his point of view (which is here sketched because of its resemblance with Wittgenstein's position) facts are not "good, simple souls"; they are not the "simple solid elements out of which the whole fabric of our knowledge is constructed." As a matter of fact, the word "fact" is systematically ambiguous, its meaning varying with its context. Thus we can speak of fact vs value, fact vs interpretation, fact vs fiction, fact vs theory, etc.

In spite of this, one can in general say that facts represent points of agreement, and that when they are construed in terms of the word "true" this agreement is qualified as "unquestioned" or "established", or "accepted".

This qualification, of course, is grounded in what a reasonable man living at a given time would concede as true. Thus, Lucas concludes that "Facts do not make the reasonable man, the reasonable man makes the facts". And, those things which he would not call a fact (in Science) would instead be called a theory or a hypothesis or perhaps a mere speculation.

Now, what Lucas says about facts and what Wittgen-
stein says about laws are closely related, specifically insofar as both men demand a foundation which consists of agreement. Truth is then viewed in terms of a qualification which is imposed on this agreement. For Lucas it is that this agreement must be made by all "reasonable men of a given era". For Wittgenstein it is in Forms of life. At (224) he stresses the vital role of agreement with regard to language-games saying:

The word "agreement" and the word "rule" are related to one another, they are cousins. If I teach anyone the use of the one word, he learns the use of the other with it.

But still, agreement in itself cannot be the only ground for determining truth. One must, as it were, stress even more strongly the concepts of "reasonable men" and "Forms of life"¹, otherwise everything can be allowed as true.

On page 149 Lucas notes that "Agreement is not enough to establish truth." And, that "Whenever we say of anything that it is a fact it is always logically possible that it might not be true and therefore not a fact; though we are not on that account unjustified in believing to be true what we believe to be true. We can no other."

¹. Which, of course, are not at all the same things but which share a similar role for the respective authors as they are held to be ultimate "backdrops".
Here for Wittgenstein enters the second consideration with regard to truth: there must be a "proper fit" of all the facts. Once again we are led to (136) and the image of a fact (proposition) engaging with the concept of truth (as with a cogwheel).

The procedure appears to be clear - one should strive for unity, allowing what fits and discarding what does not by comparing each new fact, each new proposition, with the overall game as it is being played. The problem with this has already been presented, of course.¹

**Scientific Method**: What Wittgenstein has to say about "method" in general can be summarized as follows:

1 - There is not a method, but many methods, each of which lies on a somewhat arbitrary basis, and

2 - Each method must be viewed within a particular context.

At (133) Wittgenstein notes that the philosophical method is not a method, though there are indeed methods, like different therapies. This passage is directed most obviously toward an account of "what philosophers do" and contains the rather common observation that not only do different "schools" of philosophy tend towards different subjects of interest

¹. See pp.15-17
but that they employ different methods as well. The conclusion here is that there are a variety of language-games, each played according to its own rules, within Philosophy; and, the implication is that each method must be judged solely in terms of the philosophical language-game in which it is being used. Hence one cannot say that one method is better or worse than another because there simply is no absolute standard by which all methods can be judged.

But of course if there is no absolute standard then we are pretty much free to choose whichever method best suits our purpose. On this account it should not be surprising at all to find a linguistic method, a transcendental method, a pseudo-psychological method, etc. all living within the same philosophical house.¹

Now this absolute standard, if it did exist, would of necessity be presented in terms of some absolute "truth". Quite clearly then it is this lack of such an absolute "truth", which has already been noted, which not only allows but in a certain sense necessitates the use of a variety of methods.

1. It should be noted that this possibility of various methods in no way runs counter to the linear representation of laws which I have already presented. Analogously, one might compare the affect of natural laws to the laws of Chess,
Recalling Wittgenstein's notions concerning the concept of truth, it can be agreed that not only is there a lack of an absolute standard in Philosophy but in all linguistic activities, and since Science is for Wittgenstein an essentially linguistic activity there can be no absolute standard of truth within it either.

Can what is stated explicitly at (133) with regard to Philosophy be extended to include Science (or any other language-game)? If it can be, then there is not and cannot be a scientific method but instead one must speak of scientific methods. One need only consider the varied approaches taken in the sciences to confirm this view, the dissimilar approaches taken in Physics, Biology, and Anthropology, for example.

However, there are those who hold that the various methods of Science can in fact be viewed as one because they all operate within a framework of verification. (It is on this ground that the Positivists had strived for a "unified science.)

Verificationism becomes meaningless as a unique characteristic of Science, however, in light of Wittgenstein noting that as the laws of Chess do not dictate an absolute procedure towards checkmate, neither do the laws of nature dictate the various approaches that may be followed in Science or Philosophy or any other field.
genstein's thoughts on concept-formation. Essentially this is so because verification as we have seen merely deals with the empirical and Wittgenstein has shown that we cannot stop with the empirical but must also deal with the conceptual, the linguistic. An example given by Anscombe\(^1\) suggests the distinction:

Wittgenstein asks: "Why do people say that it was natural to think that the sun went round the earth rather than that the earth turned on its axis?"

Anscombe replies: "I suppose, because it looked as if the sun went round the earth."

"Well", he asked, "what would it have looked like if it had looked as if the earth turned on its axis?"

What Wittgenstein wants to do here is to point out the grammatical significance attached to the phrase "it looked as if". At (353) he notes:

Asking whether and how a proposition can be verified is only a particular way of asking "Wie meinst du das?"
The answer is a contribution to the grammar of the proposition.

Also, it should be noted that verificationism only makes sense if there is an unquestioned standard, the empirical, through which a given operation can be discerned from another. Wittgenstein, as we have seen, denies us this standard and hence can only allow a

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1. From Anscombe, An Introduction to Wittgenstein's Tractatus, p.151
certain sort of conceptual verification which, as was the case with the mathematical primes, can only amount to an affirmation of the concepts which are already displayed. Thus, we can "verify" new concepts which we create only through concepts that we already hold, in this way continuing and correcting the description, the gardener's pathway, which is continually being constructed.

In summary, then Wittgenstein would point to Science as a language-game. Within this language-game the most prominent feature, of course, is that it is rule-governed activity\(^1\), the specific rules of this language-game forming what Wittgenstein refers to as its grammar.\(^2\) This grammar, furthermore, reflects a certain agreement among those who use it, but this agreement is not based on the purely arbitrary decisions of those involved with it but rather is based on the Form of life in which the participants of a specific language-game find themselves.

The notion of empirical verification, which may hold to be the vital point in favor of scientific knowledge as the only knowledge worth considering, is

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1. This position, incidentally, is taken up by P. Winch in his The Idea of a Social Science, though not without modification. Cf. bibliography.
2. Consequently following a rule in Science is exactly the same as was noted with regard to language and to Mathematics. See pp.49-50.
shown to be at best "misleading" because the notion of "empirical" is not actually a valid (final) point in a critical episemological inquiry. Rather, as Wittgenstein points out, we must realize that there is something which can be seen to ground the empirical - concept-formation.

The idea behind all of his discussions concerning concept-formation is that anything which we call "empirical" can only be known (or seen in the case of perception) through the concepts which we possess, which are in a sense "prior" to the empirical. It is here that we come to appreciate the importance of language in its role for Wittgenstein as the limit of the world.

Language here is more than the vehicle of communication; it is held to be the essential tool required for concept-formation, and as such is the actual basis of the empirical. It is with regard to this point that Science is held to be an essentially linguistic activity.

This view is not complete, however, until the inclusion of the notion of Forms of life. As I have argued, this notion is one of the most ambiguous and definitely the least discussed (by Wittgenstein) concept in the
Philosophical Investigations. Yet, this concept is perhaps the most important aspect of his later philosophy, especially with regard to Science, because without it Wittgenstein becomes merely another exponent of the conventionalist point of view.

Its presence, however, entails an abandonment of the position that men can fashion language and language-games on an absolutely arbitrary basis. As Wittgenstein notes, "We do not agree in the language we use but in Forms of life". Quite obviously, then, the language-game of Science must include the notion of Forms of life. I have tried to include it by suggesting that Forms of life affect, to a greater or lesser degree, all of the "laws" which are formulated by men and consequently that the laws of Science are themselves affected by Forms of life. It should be noted in this regard that I do not use the words "determine" or "directed" but rather "affected" because while it appears that there is some sort of relationship between Forms of life and the products of agreement reflected in various language-games, Wittgenstein affords us no specific insight into the actual nature of this relationship. Furthermore, an "affected" relationship does not appear to run counter to the notions of degrees of arbitrary decision
on the part of language-game participants.

The concluding view of Science is thus one of an essentially linguistic activity based on Forms of life in which an essentially "dependent" operation of verification is continually being performed. The operation, of verification, of course, is recognized as the most prominent characteristic of the language-game of Science.
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The thesis/dissertation submitted by J. Michael Buday has been read and approved by members of the Department of Philosophy.

The final copies have been examined by the director of the thesis/dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis/dissertation is now given final approval with reference to content and form.

The thesis/dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Master.

January 15, 1973

Edward A. Majewski

Advisor's Signature