CHAPTER VII

LINGUISTIC REVISION

This would appear to put at least part of the Theory of Demonstration in a category with the efforts of beginners in Geometry: To prove that A equals B: let A equal B; therefore A equals B. (22)   E. T. BELL

To what final conclusions are we then led respecting the nature and extent of the scholastic logic ? I think to the following: that it is not a science, but a collection of scientific truths, too incomplete to form a system of themselves, and not sufficiently fundamental to serve as the foundation upon which a perfect system may rest. (44)
GEORGE BOOLE

. . . the subject-predicate habits of thought. . . had been impressed on the European mind by the overemphasis on Aristotle's logic during the long mediaeval period. In reference to this twist of mind, probably Aristotle was not an Aristotelian. (578)A. N. WHITEHEAD

The Euclidean space alone is one which at the same time is free of electricity and of gravitation. (551)   HERMANN WEYL

To imagine that Newton's great scientific reputation is tossing up and down in these latter-day revolutions is to confuse science with omniscience. (149)
A. S. EDDINGTON

This latter objection was sanctioned by Newton, who was not a strict Newtonian. (457)   BERTRAND RUSSELL

The evil produced by the Aristotelian 'primary substance' is exactly this habit of metaphysical emphasis upon the 'subject-predicate' form of proposition. (570)
A. N. WHITEHEAD

The belief or unconscious conviction that all propositions are of the subject-predicate form—in other words, that every fact consists in some thing having some quality—has rendered most philosophers incapable of giving any account of the world of science and daily life. (453)   BERTRAND RUSSELL

The alternative philosophic position must commence with denouncing the whole idea of 'Subject qualified by predicate' as a trap set for philosophers by the syntax of language. (574)   A. N. WHITEHEAD

And a well-made language is no indifferent thing; not to go beyond physics, the unknown man who invented the word *heat* devoted many generations to error. Heat has been treated as a substance, simply because it was designated by a substantive, and it has been thought indestructible. (417)   H. POINCARÉ

Aristotle was almost entirely concerned with establishing what had been conceived already or of refuting error, but not with solving the problem of the discovery of truth. Now and then, in reading his organon, one feels that he has almost sensed the nature of this problem, only to find that he lapses immediately into a discussion of the logic of demonstration. He thinks of confirming truth rather than of finding it. (82)   R. D. CARMICHAEL

It is necessary here to give a short account of the great scientific revolution which started some years ago, but which is still going on with very beneficial results. This scientific revolution started in geometry, and, in a deeper sense, is carried on by geometry. Until the work of Gauss, Lobatchevski, Bolyai, Riemann. , the *E* geometry, being *unique,* was believed to be t*he* geometry of *the* 'space'. The moment a second geometry was produced, just as good, self-consistent, yet contradictory to the old one, *the* geometry became a geometry. None was unique. One absolute was dead. Until Einstein (roughly), *the* universe of Newton was, for us, *the* universe. With Einstein, it became a universe. Something similar happened to man.[*] A new 'man' was produced, just as good, certainly contradictory to the old one. *The* man became a man, otherwise a 'conceptual construction', one among the infinity of possible ones.

It is not difficult to see that in all these advances there is a common characteristic, which can be put simply in that it consists in a little change from a 'the' into an 'a'. Some people insist upon sentences in one-syllable words; here we could indeed satisfy them ! The change, no doubt, can be expressed by the exchange of one syllable for another. But the problems, in spite of this apparent simplicity, are quite important; and the rest of this volume will be devoted to the examination of this change and of what it structurally involves.

In mentioning the above names, a very important one was omitted, that of Aristotle. I merely mentioned these names as representative of certain trends. Otherwise, of course, it would have been necessary to mention additional names, including sometimes those of their predecessors and the followers who have carried their work further. It would have been particularly necessary in the case of Aristotle, who was not only a most gifted man, but who, also, because of the character of his work, has semantically affected perhaps the largest number of people ever influenced by a single man; and so his work has undergone a most marked elaboration. Because of this, his name, in this book, will usually stand for the body of doctrines known as aristotelianism. It is important to keep this in consideration, because it is becoming more and more evident that the work of Aristotle and his followers has had an unprecedented influence upon the development of the Aryan race, and so the study of aristotelianism may help us to understand ourselves. In using the name of the founder of the school as a synonym for the school itself,

[*] See *my Manhood of Humanity, The Science and Art of Human Engineering,* E. P. Dutton & Co., N. Y. C.

we make our statements less cumbersome. Some of the statements may not be true about the founder of the school; yet they remain true about the school.

Aristotle (384-322 B.C.) was born in Stagira, Greece. He was the son of a physician and had marked predilection for natural history and a distinct dislike for mathematics. Plato, who is considered the 'father of mathematicians', was his teacher. Early in his career Aristotle reacted strongly against the mathematical philosophy of his teacher, and began to build up his own system, which had a strongly biological bias and character. Psycho-logically, Aristotle was a typical extrovert, who projects all his internal processes on the outside world and objectifies them: so his reaction against Plato, the typical introvert, for whom 'reality' was all inside, was a natural and rather an inevitable consequence. The struggle between these two giants was typical of the two *extreme* tendencies which we find in practically all of us, as they represent two most diverse, and yet fundamental psycho-logical tendencies. In 1933 we know that either of these extremes in our make-up is undesirable and un-sound, in science as well as in life. In science, the extreme extroverts have introduced what might be called gross empiricism, which, as such, is a mere *el* fiction—practically a delusion. For no 'facts' are ever free from 'doctrine': so whoever fancies he can free himself from 'doctrines', as expressed in the structure of the language he uses. , simply cherishes a delusion, usually with strong affective components. The extreme introverts, on the other hand, originated what might be called the 'idealistic philosophies', which in their turn become *el* delusions. We should not overlook the fact that both these tendencies are *el* and structurally fallacious. Belief in the separate existence of *el,* and, therefore, fictitious, entities must be considered as a structurally un-sound *s.r* and accounts in a large degree for many bitter fights in science and life.

In asylums, these two tendencies are sometimes very obvious. The extreme extrovert is found mostly among the paranoiacs; the extreme introvert among cases of schizophrenia (dementia praecox). Between the two extremes we find all possible shades and degrees represented in daily life as well as in asylums. Both extreme tendencies involve harmful *s.r,* because both produce delusions of some elementalism which, as such, is always *fictitious* and *impossible.* 'Mentally' ill are often characterized by *s.r* involving this capacity for building for themselves fictitious worlds in which they can find refuge from actual life. If we, who live outside of asylums, *act* as if we lived in a fictitious world—that is to say, if we are consistent with our beliefs—we cannot adjust ourselves to actual conditions, and so fall into many *avoidable* semantic difficulties.

But the so-called normal person practically never abides by his beliefs, and when his beliefs are building for him a fictitious world, he saves his neck by not abiding by them. A so-called 'insane' person *acts* upon his beliefs, and so cannot adjust himself to a world which is quite different from his fancy.

Let me repeat that the nervous system of the human child is not physically finished at birth: and, therefore, it is easy to give it quite harmful semantic twists, by wrong doctrines. To eliminate the vicious and fictitious *el* outlook and *s.r*, it is of paramount importance to try to educate a child to be neither an extreme extrovert nor an extreme introvert, but a balanced extroverted-introvert.

In psychotherapy, the attempt is often made to re-educate these tendencies. The physician usually tries to make an extrovert more introverted, and an introvert more extroverted. In case of success, the patient either recovers altogether or improves considerably.

In practice there is a considerable difference between the re-education of an extrovert to an introvert and that of an introvert to an extrovert. We have already seen that the balanced person should be both. In daily *el* language, the introvert is 'all thought' and has not much use for the external world, while the extrovert is 'all senses' and has little use for 'thought'. It often happens that it is easier to re-educate an introvert, because at least he 'thinks', but difficult to re-educate an extrovert, as he has not cultivated his capacity to 'think'. He may be a remarkable player on words, but all his verbal plays, though clever, are shallow.

Now we shall be able to understand why Aristotle, the extrovert, and his doctrines have appealed, and still appeal, to those who can 'think' but feebly. The fact that the fuller linguistic system of the extrovert Aristotle was accepted in preference to the work of the introvert, Plato, is of serious semantic consequence to us. It is evident that mankind, in its evolution, had to pass through a low period of development; but this fact is not the only reason why the *A* doctrines have had such a tremendous influence upon the Aryan race. The reason is much more deeply rooted and pernicious. In his day, over two thousand years ago, Aristotle inherited a structurally primitive-made *language.* He, as well as the enormous majority of us at present, never realized that what is going on outside of our skins is certainly *not* words. We never 'think' about this distinction, but we all take over semantically from our parents and associates their habitual forms of representation involving structure as *the* language in which to talk about this world, not knowing, or else forgetting, that a language to be fit to represent this world should at least have the *structure of* this world.

Let me illustrate this by a structural example: let us take a man-made green leaf. We see that in it *green colour was added. Now* let us take a natural green leaf. We see that the green colour was *not added* to it, but that the natural green leaf must be considered a process, a *functional* affair which *became* green without anybody's adding green colour. In the old savage mythologies, there were always demons in *human* shape, who actually made everything with *their hands.* This primitive mythology built up a 'plus' or additive language which attributed to the world an anthropomorphic structure. This false notion of the world's structure was, in turn, reflected in the language. It was a subject-predicate, 'plus' language, and not as it should be, to fit the structure of the world, a *functional* language.

Here we come across a tremendous fact; namely, that a language, any language, has at its bottom certain metaphysics, which ascribe, consciously or unconsciously, some sort of structure to this world. Our old mythologies ascribed an anthropomorphic structure to the world, and, of course, under such a delusion, the primitives built up a language to picture such a world and gave it a subject-predicate form. This subject-predicate form also was closely related to our 'senses', taken in a very *el* primitive form.

This 'plus' tendency not only shaped our language, but even in mathematics and in physics we are still much more at home with linear ('plus') equations. Only since Einstein have we begun to work seriously at new forms of representation which are no longer expressed by linear (or 'plus') equations. At present, we have serious difficulties in this field. It must be admitted that linear equations are much simpler than nonlinear equations. I will explain later that the notion of two-valued causality is strictly connected with this linearity or *additivity.*

Neither Aristotle nor his immediate followers realized or could realize what has been said here. They took the structure of the primitive-made language for granted, and went ahead formulating a philosophical grammar of this primitive language, which grammar—to our great semantic detriment—they called 'logic', defining it as the 'laws of thought'. Because of this formulation in a general theory, we are accustomed even today to inflict this 'philosophical grammar' of primitive language upon our children, and so from childhood up imprison them unconsciously by *the structure* of the language and the so-called 'logic', in an anthropomorphic, structurally primitive universe.

Investigation shows that three great names in our history have been very closely interconnected: Aristotle, who formulated a general theory of a primitive language, a kind of 'philosophical grammar' of this lan-

guage, and called it 'logic'; Euclid, who built the first nearly autonomous 'logical' system, which we call 'geometry'; and, finally, Newton, who rounded up these structural systems by formulating the foundations of macroscopic mechanics. These three systems happen to have one underlying structural metaphysics, in spite of the fact that Newton corrected some of the most glaring errors of Aristotle. Such first systems are never structurally satisfactory, and, in time, it was found that these systems contained unjustified structural assumptions which their followers tried to evade. It was natural that the innovators should meet with a strong resistance, as these old systems had become so elaborated as to impress the 'thoughtless' with their finality. So the revisions went very slowly and very shyly. In the case of Aristotle, revision was still more difficult because the current religious 'philosophies' of the Western world were inextricably bound up with the *A*-system. The religious leaders took a strong stand, and as late as the seventeenth century threatened death to the critics of Aristotle.

Even today a revision of Aristotle is extremely difficult, for these three systems have a tremendous semantic hold upon us. Many semantic factors have contributed to this hold. First, they were established by men who were really very gifted. Second, they were not wise epigrams but were genuine systems with definite structure, and, as such, extremely difficult to replace. Obviously, it was not enough to pick some weak spot in one of these systems; the new system-builder would have to replace the old structure by an equally full-fledged structure, and this was a very laborious and difficult task. Third, these systems were strictly united by one structural metaphysics and *s.r*; they collaborated with each other, and gave each other assistance. Finally, the interdependence of these systems rested to a large degree on the structure of the primitive language, upon which Aristotle had legislated, and which was accepted by practically all Aryans, and so was inherently bound up with our daily habits of speech and *s.r*. Together, these four factors constituted a tremendous power, working against any attempts at revision.

We do not realize what tremendous power the structure of an habitual language has. It is not an exaggeration to say that it enslaves us through the mechanism of *s.r* and that the structure which a language exhibits, and impresses upon us unconsciously, is *automatically projected* upon the world around us. This semantic power is indeed so unbelievable that I do not know any one, even among well-trained scientists, who, after having admitted some argument as correct, does not the next minute deny or disregard (usually unconsciously) practically every word he

had being carried away again by the structural implications of the old language and his *s.r.*

This linguistic slavery makes criticism very difficult, for the majority of critics with their *s.r* defend unconsciously structural and linguistic implications, instead of analysing open-mindedly the structure of the facts at hand. All our advances are going very slowly, very painfully and haltingly, because the new work in science, the Einstein and the new quantum theories included, is all of a *non-el* structure, while our daily languages are *el* and absolutistic and twist pathologically our habits of 'thought' and *s.r.* No help is forthcoming from the so-called 'psychologists'. Not to keep the reader guessing too long, let me say here— although this will be explained at length later on—that the main achievement of Einstein was precisely in the fact that he refused to divide *verbally* 'space' *and* 'time', which experimentally cannot be so divided. This was accomplished by the help of the mathematician Minkowski, who invented a language of *new* structure; namely, the four-dimensional 'space-time', in which to talk about events. This device made the Einstein General Theory possible, and affected the new quantum theories. In the present work, in order to be able to talk about the organism-as-a-whole, we must introduce this *non-el* principle as fundamental and apply it.

The first science to break the traditional structural ring was geometry. Full-fledged $\overline{E}$ systems were built. Following these $\overline{E}$ systems, $\overline{N}$ systems were built (Einstein, quantum) , and the 'time' is ripe to build a $\overline{A}$-system, which the present writer originated in his *Manhood of Humanity,* and which is formulated as a structural outline of a general theory in the present volume.

As soon as this new $\overline{A}$-system was definitely formulated, a most curious, natural, and yet unexpected result became apparent; namely, that the three new systems, the $\overline{A}$, $\overline{E}$, and the $\overline{N}$ have *also* one underlying structure and metaphysics. This fact adds to the importance of the situation. All these three new systems have been produced independently. They express between them the structural and semantic urge and longing of all modern science. Their mutual interdependence, mutual structure, mutual metaphysics, mutual method are helpful, for when the vital nature of the issues at hand is clearly seen, it will be found expedient to *start* from this interdependence as a basis, although, historically speaking, it was not a factor in the production of these systems.

This does not seem to be clearly understood by all scientists. I have read, for instance, scientific papers in which Einstein is reproached that he did not *start* with *E* geometries, but only at a later stage incorporated them into his system. This argument, of course, is not against

Einstein but for Einstein. Similar remarks could be made about this present work; and again this would not be an argument against this work, but for it. All these new systems represent methodological and structural advances, and will have played their semantic roles even if some day they should be dismissed and systems of different structure take their place.

Historically, attempts in the direction of a $\overline{A}$ discipline have been very numerous. Indeed, the invention of any new important term of a non-subject-predicate character, or of a functional character, was, in itself, an attempt in the $\overline{A}$ direction. All sciences have had to abandon the common vocabularies and build their own terminologies, many of which are also A. Although all these attempts have been made, and have quite often been successful in their fields, to the best of my knowledge, they were not made consciously. The term accepted here; namely, 'non-aristotelian' is very useful, not only because it is appropriate and illustrates very well what we have to contend with, but also because it places the emphasis properly and makes us conscious of the structural issues. The fact that the three new non-systems have as much in common as the older three had, recommends and justifies the use of the term. The new problem which looms up; namely, the validity or non-validity of the A law of the excluded third, leads automatically to the non-chrysippian and $\overline{A}$ ∞-valued 'logics', which merge with the theory of probability.[1] According to the accepted use, it is enough to build a system differing from an older system by *one single postulate,* to justify (for instance) the name 'non-euclidean'.

The scope of this particular chapter does not permit me to enlarge upon this difficult and important problem as to the differences between the A and $\overline{A}$ systems, but for orientation, a short list of structural differences is given here; all of which involves new semantic factors.

The primitive form of representation which Aristotle inherited, together with its structural implications and his 'philosophical grammar', which was called 'logic', are strictly interconnected, so much so that one leads to the other.

In the present $\overline{A}$-system, I reject Aristotle's assumed structure, usually called 'metaphysics' *(circa* 350 B.C.), and accept modern science (1933) as my 'metaphysics'.

I reject the following structurally and semantically important aspects of the A-system, which I shall call postulates, and which underlie the A-system-function:

1) The postulate of uniqueness of subject-predicate representation.

2) The two-valued *el* 'logic', as expressed in the law of 'excluded third'.

3) The necessary confusion through the lack of discrimination between the 'is' of identity, which I reject completely, and the 'is' of predication, the 'is' of existence, and the 'is' used as an auxiliary verb.

4) The elementalism, as exemplified by the assumed sharp division of 'senses' *and* 'mind', 'percept' *and* 'concept', 'emotions' *and* 'intellect', .

5) The el theory of 'meaning'.

6) The *el* postulate of two-valued 'cause-effect'.

7) The *el* theory of definitions, which disregards the undefined terms.

8) The three-dimensional theory of propositions and language.

9) The assumption of the cosmic validity of grammar.

10) The preference for intensional methods.

11) The additive and *el* definition of 'man'.

This list is not complete but sufficient for my purpose and for orientation.

I reject the use of the 'is' of identity entirely, because identity is never found in this world, and devise methods to make such a rejection possible.

I base the $\overline{A}$ system-function and system all through on negative *'is not'*, premises which cannot be denied without the production of impossible data, and so accept 'difference', 'differentiation'. , as fundamental.

I accept relations, structure, and order as fundamental.

I accept the many-valued, more general, structurally more correct 'logic of probability' of Lukasiewicz and Tarski, which in my *non-el* system becomes infinite-valued (∞-valued) semantics.[*]

I accept functional representation whenever possible.

I introduce the *principle of non-elementalism* and apply it all through, which leads to: (*a*) A *non-el* theory of *meanings;* (*b*) A *non-el* theory of *definitions* based on *undefined terms;* (*c*) A *psychophysiological* theory of *semantic reactions.*

I accept the absolute individuality of events on the un-speakable objective levels, which necessitates the conclusion that *all statements* about them are only probable in various degrees, introducing a *general principle of uncertainty* in *all statements.*

I accept 'logical existence' as fundamental.

I introduce differential and four-dimensional methods.

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[*] I use the term infinite-, or ∞-valued in the sense of Cantor as a *variable finite*.

I accept the propositional function of Russell.

I accept the doctrinal function of Keyser, and generalize the system function of Sheffer.

I introduce the four dimensional theory of propositions and language.

I establish the *multiordinality* of terms.

I introduce and apply psychophysiological considerations of *non-el* orders of abstractions.

I expand the two-term 'cause-effect' relation into an ∞-valued causality.

I accept the ∞-valued determinism of maximum probability instead of the less general two-valued one.

I base the $\overline{A}$-system on extensional methods, which necessitates the introduction of a new punctuation indicating the 'etc.' in a great many statements.

I define 'man' in *non-el* and functional terms.

This list is also not complete and is given for orientation and justification of the name of a *non-aristotelian system.*

In the rough, all science is developing in the $\overline{A}$ direction. The more it succeeds in overcoming the old structural implications of speech, and the more successful it is in building new vocabularies, the further and more rapidly it will progress.

Our human relations at present are still mostly based on the *A*-system-function. The issues are definite. Either we shall have a science of man, and, therefore, have to part company with the structural implications of our old language and corresponding *s.r*—and this means we shall have to build up a new terminology, which is $\overline{A}$ in structure, and use different methods;—or we shall remain in *A* semantic clutches, use *A* language and methods, involving older *s.r,* and have no science of man. As I am engaged in building up a science of man, all departures I am forced to make from accepted methods are necessary semantic preliminaries to the building of my system and need no apology.

It is no exaggeration to say that the *A*, *E* and *N* systems have one most interesting structural and semantic characteristic in common; namely, that they have a few unjustified 'infinities' too many. The modern $\overline{E}$, $\overline{N}$ and, finally, $\overline{A}$ systems, after analysis, eliminate these unjustified notions. New systems arise, quite different from the old ones, which again have this structural characteristic in common, that they have a few 'infinities' less—an important semantic factor, especially in the $\overline{A}$-system, as it helps to eliminate our older delusional mythologies. In the mathematical reconstruction of Brouwer, Weyl, and the Polish School, a similar

tendency is apparent, leading to revision of the mathematical notions of infinity. For instance, the *E*-system involves several structural 'infinity' assumptions. In it, a line has infinite length; the space constant is infinite; and the natural unit of length is also infinite. In the *N*-system, the velocity of light is assumed unconsciously to be infinite, a structural assumption false to facts. The *A*-system involves also false to facts infinity assumptions, explained later. It is extremely interesting to note that in any system a similar result follows from the introduction of these different 'infinities'; namely, when such an 'infinity' is introduced in the denominator, it makes the whole expression vanish. When, in the observation of actual facts, we *miss* some characteristic entirely; for instance, order, it leads to the introduction of some 'infinity' somewhere. In other words, faulty, insufficient observation leads to the introduction somewhere in our systems of some fanciful 'infinities'.

I must emphasize again the semantic difficulties which beset us, in the formation of a new and $\bar{A}$-system, mainly because of the lack of scientific *non-el* psycho-logics and general semantics. Having no general theories to guide us in our researches, we must select some other devices. We can survey those achievements of mankind which have proved to be the most beneficial and of most lasting value, *study* their structure and try to train ourselves, and our *s.r,* in repeating the psycho-logical processes and methods which have made them. In this way, we are led to the study of the structure of mathematics and science, and acquire the habit of rigorous and critical 'thought' and acquire new *s.r.* Naturally, such a method is wasteful; it would be simpler to have general *non-el* theories, which I have proposed to call general semantics and psycho-logics, replacing the older *el* 'logic' and 'psychology', and study these short, structurally correct, ready-made formulations to train our *s.r* rather than to study the actual performance of scientists and mathematicians, and formulate these generalizations for ourselves. But, until the present work, this could not be done.

For these reasons, we shall have to make, in the following chapters, a short survey of different scientific achievements without going into technical details, but giving enough of these details to indicate structure and its bearing on *s.r.* Every thing given will be strictly of an elementary character, and the intelligent reader will find no special difficulties in following the survey.

The selection of suitable material presented a very serious problem. I consulted with many friends and used my best judgement, backed by some experience. An important factor was the class of readers for whom this book is written. Sooner or later a new branch of science must be—

and will be—established for the pursuit of this $\overline{A}$ enquiry; so the future student and teacher must have at least an outline of the main problems. It seemed more advisable to outline main issues relevant to the subject, than to work out some of them in more detail. A great deal of new scientific literature on structure and *s.r* must be produced by mathematicians, psychiatrists, linguists, psychophysiologists, . In this field, experience has taught me that very little has been done and that much of what has been done cannot be accepted without a *non-el* revision. It seems to be more convenient that the reader shall not be referred to too many books, and more expedient that the writer should not take too much for granted; so most of the structural and semantic informations which are necessary for an intelligent reading are given, together with additional references for students who wish to go deeper into the subject.

The reader will find that the *non-el* principle has been emphasized. In the meantime, in the writing I have had to use some *el* terms. In such cases, I used the old terms in quotation marks. The reason for this is that before the full general theory is developed, it is impossible to do otherwise. Besides, even if organism-as-a-whole terms were used from the beginning, this also would not be entirely adequate; for the organism-as-as-a-whole cannot and should not be structurally separated from its environment; and so the terms should be enlarged to cover, by implication, the environment.

Later we shall see that all languages have some characteristics similar to mathematical languages. For instance, the *A* word, 'apple', as it has no individual subscripts or date, is *not* a name for a definite object or stage of a process *which are all different,* but a name *for a definition,* which, in principle, is one-valued, while the objective processes are ∞-valued. If this mechanism is not clearly understood, we are bound in dealing with actual ∞-valued stages of processes, to identify the ∞ values into one or a few values. The above considerations necessitate a *non-el* new theory of meanings in accordance with the structure of the world and our nervous system.

The distinction between mathematical and physical languages is structurally most important, although once identification is entirely eliminated, we discover that all possible characteristics found in this world are due to *structure,* and so can be expressed in terms of structure, relations, and multi-dimensional order.

Several similar difficulties will appear later on, all having a similar general characteristic; namely, that we seem to reach an impasse, from which there is no way out. Yet escape can be found, not by solution in the old way, but by reformulating the problem so as to make a solution

possible. This method is of extreme usefulness in mathematics, and seemingly can be applied to life also.

If we compare the three systems of Aristotle, Euclid, and Newton, designated, *A, E, N* respectively, in Fig. 1, with the non-aristotelian, non-euclidean and non-newtonian systems, designated $\overline{A}$, $\overline{E}$, $\overline{N}$, a very important fact should be noticed; namely, that the $\overline{A}\ \overline{E}\ \overline{N}$ trilogy is *more general* than *AEN*. This fact has far-reaching semantic and practical consequences and perhaps can be best explained by the aid of a diagram. We see that the $\overline{A}\ \overline{E}\ \overline{N}$ trilogy includes the *AEN* trilogy as a particular case, from which it follows that all those readers who are already re-educated to the new $\overline{A}\ \overline{E}\ \overline{N}$ *s.r,* have less difficulty in understanding the older *AEN,* simply because the older systems are only particular cases of the new $\overline{A}\ \overline{E}\ \overline{N}$. But this is not so with those readers who still have the old *AEN s.r*; they have to enlarge their limited

FIG. 1

point of view, grasp more than they knew before, and so will have serious semantic difficulties for a while, and, perhaps, become impatient or even angry. With the understanding of this larger generality of the new $\overline{A}\ \overline{E}\ \overline{N}$, perhaps a great deal of this semantic futile unpleasantness can be eliminated.
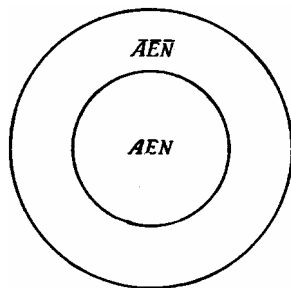
I know of no better example to illustrate this than to refer the reader to a little elementary book, *Debate on the Theory of Relativity,* published by the Open Court Co., Chicago.[2] It is really interesting to watch how good-natured the einsteinists are as compared with the newtonians. This book is suggested because it is elementary, extremely instructive, and very well worth reading. But the whole literature of euclideanism, non-euclideanism, newtonianism and non-newtonianism gives ample proof of the above statements. What kind of verbal flowers the aristotelians will throw to the non-aristotelians remains to be seen; but some verbal and semantic uproar can be expected.

It should be expected that this widening of horizons can only be attained, after all, with difficulty, because it requires an alteration of habitual reactions, from one-, two-, and three-valued to ∞-valued new *s.r*—usually not easy to achieve. But there seems little doubt that the future depends on it, and so we shall not be able to escape it indefinitely.

As we usually fail to make allowances for the 'emotional' aspects of 'intellectual' pursuits, let me once more point to the fact that even purely 'intellectual' achievements have their 'emotional' components and these

are included in the *non-el s.r.* It seems that broader ∞-valued understanding has beneficial effect on our *s.r,* a result which should be expected, if, as at present, we have no reason to doubt that the organism-as-a-whole is a dependable structural *non-el* generalization.