CHAPTER XXVII

HIGHER ORDER ABSTRACTIONS

The characters which science discerns in nature are subtle characters, not obvious at first sight. They are relations of relations and characters of characters. (573) A.N. WHITEHEAD

In this connection one should particularly remember that the human language permits the construction of sentences which do not involve any consequences and which therefore have no content at all⸺in spite of the fact that these sentences produce some kind of picture in our imagination; e.g., the statement that besides our world there exists another world, with which any connection is impossible in principle, does not lead to any experimental consequence, but does produce a kind of picture in the mind. Obviously such a statement can neither be proved nor disproved. One should be especially careful in using the words "reality," "actually," etc., since these words very often lead to statements of the type just mentioned. (215)   W. HEISENBERG

Section A. General.

In the previous chapters I demonstrated that there is a short cut which enables us to grasp, acquire, and apply what has been advanced in the present work. This semantic short cut is 'consciousness of abstracting'. It is a psycho-logical attitude toward all our abstracting on all levels, and so involves the co-ordinated working of the organism-as-a-whole.

The use of the Structural Differential is necessary, because some levels are un-speakable. We can see them, handle them, feel them. , but under *no* circumstances can we reach those levels by speech alone. We must, therefore, have a diagram, by preference in relief form, which represents the empirical structural conditions, and which indicates the un-speakable level by some other means than speech. We must, in the simplest case, either point our finger to the object, insisting upon silence, or must perform some bodily activity and similarly insist upon silence, as the performing and feelings are also *not* words.

In such semantic training it is enough to insist upon the non-identity or the difference between the objective, *un-speakable* levels of lower order abstractions, (O_h), and the verbal or higher order abstractions, (L_n). When this habit and feeling are acquired, no one should have difficulties in extending the non-identity method to daily-life occurrences. To achieve these semantic aims, we must first emphasize the common-sense fact that an object *is not* the event. To do this, we start with the 1933 scientific structural 'metaphysics' about the event and

stress the fact that the object, being a nervous abstraction of lower order, has fewer and different *m.o* characteristics than the event has. This is best accomplished by stressing the fact that in abstracting from the event to the object we left out some characteristics. We did not *abstract* '*all*' characteristics; this would be a self-contradiction in terms, an impossibility.

We do not even need to stress a full understanding of the event. Common-sense examples, showing that what we recognize as a 'pencil' is not 'all', often suffice. No one will have difficulties, provided he trains himself in this direction, in *remembering* continually and instinctively the free hanging strings (B'), (B''), which indicate the non-abstracted or left-out characteristics and which help to train in *non-identity.* With the relief diagram, the *s.r* of the student are trained *through all nervous centres.* He sees, he handles. , the hanging strings, and

FIG. 1
THE STRUCTURAL DIFFERENTIAL

he also hears about them. This gives the *maximum probability* that the organism-as-a-whole will be affected. In this way an 'intellectual' theory engages the 'senses', feelings, and reflex mechanisms. To affect the organism-as-a-whole, organism-as-a-whole methods must be employed.

A similar structural situation is found when we deal with higher order abstractions. A word, or a name, or a statement is conveyed in spoken form or by writing, and affects first the lower centres and then is abstracted, and again transformed, by the higher centres. The order
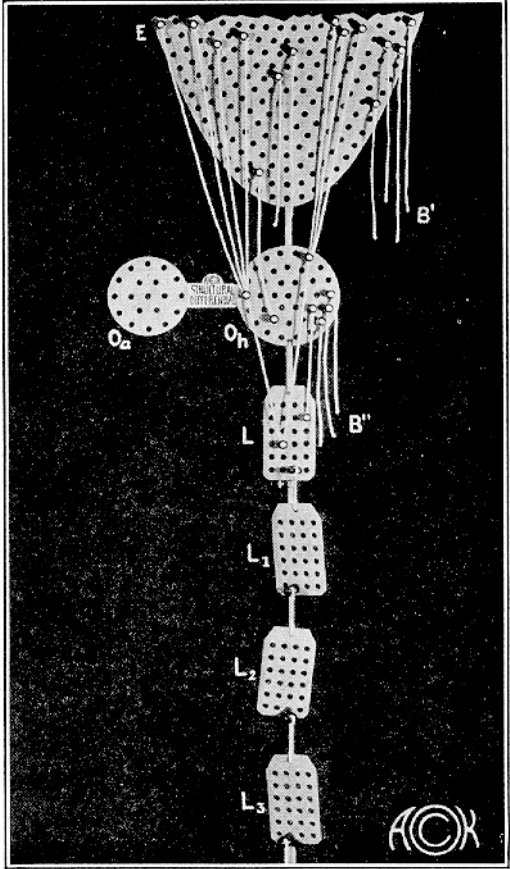
is generally not changed when the verbal issues are neither seen nor heard but originate in ourselves. Most 'impulses', 'interests', 'meanings', 'evaluations'. , originate in lower centres and follow the usual course, from lower centres to higher. When 'experience' (reaction of lower centres) is transformed into 'memories' (higher centres). , the order is similar. Difficulties begin when the order is pathologically *reversed* and 'ideas' are evaluated as experience, words as objects, . In the building of language a similar process can be observed. We observe the absolute individuals with which we actually deal, we label them with individual names, say, A_1, A_2, . . . , A_{11}, A_{12}, . . . , A_{21}, A_{22}, . . . , A_{31}, A_{32}, . . . , . By a process of abstracting and *disregarding,* for instance, the characteristic subscripts '1', we would have only the ones which have the characteristic subscripts 2, 3, . . . , 9, 22, 23, . . . , 29, . *Disregarding* the characteristic subscripts '2', we would have the ones with the characteristics 3, 4, ... 9, 33, 34 . . . . , 39, . Finally, if we should eliminate all *individual* characteristic subscripts, we would have a 'general' name A for the whole group without singling out individual characteristics.

All words of the type of 'man', 'animal', 'house', 'chair', 'pencil'. , have been built by a similar process of abstraction, or *disregard* for individual differences. In each case of disregard of individual characteristics a *new* neurological process was involved.

Similarly, with 'statements about a statement'. When we hear a statement, or see it in a written form, such a statement becomes a stimulus entering through the lower centres, and a statement about it represents, in general, a new process of abstraction, or an abstraction of higher order.

It becomes obvious that the introduction of a language of 'different order of abstractions', although it is not familiar, yet structurally it represents very closely, in terms of *order,* most fundamental neurological processes going on in us. As we already know, a natural order has been established by evolution; namely, lower order abstractions first, higher next; the identifications of orders or the reversal of orders appears pathological for man and appears as a confusion of orders of abstractions, resulting in *false evaluation:* identification, illusions, delusions, and hallucinations.

Historically, the first to pay serious attention to the above problems in a consistent, yet very limited, way were mathematicians. In the investigation of the problems of the foundation of mathematics, mathematical 'logic', and the theory of aggregates, we came across self-contradictions which would make mathematics impossible. To avoid such a disaster, Russell invented what is called the 'theory of mathematical

types'. The status of this theory is a very interesting and instructive one. The theory solves the mathematical difficulties, thus saving mathematics, but has *no* application to life. Practically all mathematicians, if I am not mistaken, the author of the theory included, somehow 'dislike' the theory and make efforts to solve the problems in a different way and possibly to abandon the theory altogether.

We have already shown that the introduction of a language of 'different orders of abstractions' is structurally entirely justified and physiologically natural, as it describes, in terms of order, the activities of the nervous system. Such facts are important; but if, in addition, the introduction of a language of a new $\overline{A}$ structure would give us further demonstrable advantages, then the introduction of such a language would become increasingly desirable.

Although the majority of mathematicians 'dislike' the theory of types, yet, at present, this theory is unconditionally necessary for non-self-contradictory mathematics. The author was pleasantly surprised to find that after his $\overline{A}$-system was formulated, this simple and natural, actional, functional, operational, *non-el* theory covers the theory of mathematical types and generalizes it, making the theory applicable not only to the solution of mathematical paradoxes but to the solution of the majority of purely human and scientific difficulties. One general rule of 'non-confusion of orders of abstractions', and the acquiring of the simple and workable 'consciousness of abstracting' based on the denial of the 'is' of identity, offers a *full* structural and semantic solution. The disregard of the issues involved leads fatalistically to the manufacture of endless and unnecessary human sufferings and unhappiness, the elimination of which is one of the main points in a theory of sanity. There is no mystery in 1933 that continuous small painful shocks may lead to serious semantic and physical disturbances. Psycho-logicians and psychiatrists will find it increasingly difficult to work at their problems if they disregard these semantic issues. Parents and teachers will find simple yet effective structural means for training the reactions of children in *sanity,* with all the ensuing semantic benefits to the individuals and to society.

When Whitehead and Russell were working at the foundations of mathematics, they came across endless paradoxes and self-contradictions, which, of course, would make mathematics impossible. After many efforts they found that all these paradoxes had one general source, in the rough, in the expressions which involve the word 'all', and the solution was found by introducing 'non-allness', a semantic forerunner of non-identity. Consider, for example, 'a proposition about *all* proposi-

tions'. They found that such totalities, or such 'all' statements, were not legitimate, as they involved a self-contradiction to start with. A proposition cannot be made legitimately about 'all' propositions without some restriction, since it would have to include the new proposition which is being made. If we consider a *m.o* term like 'propositions', which we can manufacture without known limits, and remember that any statement *about* propositions takes the form of a proposition, then obviously we cannot make statements about *all* propositions. In such a case the statement must be limited; such a set has *no total,* and a statement about 'all its members' cannot be made legitimately. Similarly, we cannot speak about *all* numbers.

Statements such as 'a proposition about *all* propositions' have been called by Russell 'illegitimate totalities'. In such cases, it is necessary to break up the set into smaller sets, each of which is capable of having a totality. This represents, in the main, what the theory of types aims to accomplish. In the language of the *Principia Mathematica,* the principle which enables us to avoid the illegitimate totalities may be expressed as follows: 'Whatever involves *all* of a collection must not be one of the collection', or, 'If, provided a certain collection had a total, it would have members only definable in terms of that total, then the said collection has no total'.[1] The above principle is called the 'vicious-circle principle', because it allows us to evade the vicious circles which the introduction of illegitimate totalities involve. Russell calls the arguments which involve the vicious-circle principle, 'vicious-circle fallacies'.

As an example, Russell gives the two-valued law of 'excluded third', formulated in the form that 'all propositions are true or false'. We involve a vicious-circle fallacy if we argue that the law of excluded third takes the form of a proposition, and, therefore, may be evaluated as true or false. Before we can make any statement about 'all propositions' legitimate, we must limit it in some way so that a statement about this totality must fall outside this totality.

Another example of a vicious-circle fallacy may be given as that of the imaginary sceptic who asserts that he knows nothing, but is refuted by the question——does he *know* that he *knows* nothing? Before the statement of the sceptic becomes significant, he must limit, somehow, the number of facts concerning which he asserts his ignorance, which represent an illegitimate totality. When such a limitation is imposed, and he asserts that he is ignorant of an extensional series of propositions, of which the proposition about his ignorance is not a member, then such scepticism cannot be refuted in the above way.

We do not need to enter into further details concerning the elaborate and difficult theory of types. In my $\overline{A}$ psychophysiological formulation, the theory becomes structurally extremely simple and natural, and applies to mathematics as well as to a very large number of daily experiences, eliminating an unbelievably large number of misunderstandings, vicious circles, and other semantic sources of human disagreements and unhappiness.

It should be noticed that, in the given examples, we always made a statement *about* another statement, and that the vicious circle arose from identifying or from the confusion of the orders of statements. The way out is found in the consciousness of abstracting, which leads to the semantic discrimination between *orders of abstractions*. If we have certain propositions, p_1, p_2, p_3, . . . p_n, and make a new proposition about these propositions, say P, then, according to the present theory, the statement P about the statements $p1$, $p2$. , must be considered as an abstraction of higher order, and so different, and must not be identified as to order with the propositions $p_1, p_2, \ldots p_n$.

The above psychophysiological formulation is entirely general, yet simple and natural in a $\overline{A}$-system. To make this clearer, I shall take several statements concerning the theory of types from the *Principia Mathematica,* shall designate them by (Pr.), shall reformulate them in my language of *orders of abstractions,* and shall designate them as general semantics (G. S.).

Thus, 'The vicious circles in question arise from supposing that a collection of objects may contain members which can only be defined by means of the collection as a whole' (Pr.). Objects as individuals and 'collections of objects' obviously belong to different orders of abstractions and should not be confused (G.S.). A 'Proposition about *all* propositions' (Pr.). This involves a confusion of orders of abstractions, for if we posit propositions p_1, p_2, . . . p_n, then a proposition P *about* these propositions represents a higher order abstraction and should not be identified with them (G.S.). 'More generally, given any set of objects such that, if we suppose the set to have a total, it will contain members which presuppose this total, then such a set cannot have a total. By saying that a set has "no total", we mean, primarily, that no significant statement can be made about "all its members" ' (Pr.). A set of statements or objects or elements, or the like, and a statement *about* them belong to different orders of abstractions and should not be confused (G.S.). In the language of Wittgenstein: 'No proposition can say anything about itself, because the propositional sign cannot be contained in itself (that is the "whole theory of types").'[2]

In the language of the present general semantics a statement about a statement is not the 'same' statement, but represents, by structural and neurological necessity, a higher order of abstraction. and should not be confused with the original statement.

Similar reformulations apply to all cases given in the *Principia Mathematica,* and so it becomes evident that the present theory covers a similar ground as the theory of types, and also covers an endless list of daily-life applications which are of crucial semantic importance in a theory of sanity. We must stress here a simple, natural, and *single semantic law of non-identity which covers all confusions of orders of abstraction.* This one rule and training teach us not to confuse the higher orders with the lower, not to identify words with objects (not to objectify), as well as not to confuse higher abstractions of different orders. This generality and structural simplicity constitute an argument in favor of the present $\underline{A}$-system. It is easier to teach a single, simple, and natural rule which covers a vast field of semantic sources of human difficulties. For when the rule is explained, and the learner is trained with the Structural Differential, the semantic problem resolves itself simply into the showing with one's finger 'different orders of abstractions, and insisting that 'this *is not* this'.

If we consider the natural, structural, and *empirical* fact that our lives are lived in a world of non-identical abstractions of different orders, the discrimination between different orders becomes of paramount semantic importance for evaluation. Under such conditions we should become thoroughly acquainted with the mechanism of these different orders of abstractions. We should notice, first, that the language of the *Principia Mathematica* is A, and involves the 'is' of identity, . Such a language leads to identifications and to confusions, and makes simple issues difficult and perplexing. The term 'class' is very confusing. What do we mean by this term ? In life we have, and deal with, *individuals* on *objective, un-speakable* levels. If we take a number of individuals, we have a number of them, yet they all remain individual. If we produce an abstraction of higher order, so that the individuality of each member is lost, then we have an abstraction of a higher order ('idea' in the old language), but no more the absolute individuals of our collection. The term 'class' in this respect is seriously confusing, as it tends to conceal a simple experimental fact, and leads to confusion of the orders of abstractions if the *multiordinality* of the term 'class' is not formulated.

Many critics and reviewers of the *Principia Mathematica* somehow feel this to be so, but their criticisms are not bold enough, and do not

go to the roots of the *A* semantic difficulty. They do not pay attention to the *A*, 'logical', 'philosophical', and 'psychological' *elementalistic* method and language involving the 'is' of identity, in which the Introduction of the *Principia* is written. Doctor Alonzo Church is the first, as far as my knowledge goes, to suggest that, following Peano, numbers should be defined in the language of abstractions. He does not carry his analysis further, however, and does not state that it involves a language of entirely different $\overline{A}$ structure.[3] If we abandon the term 'class' and accept the language of 'abstractions of *different* orders', then we are led to the rejection of the 'is' of identity and to the present system, of which the theory of mathematical types becomes a necessary part. The problems of 'class' cease to be an 'assumption', as the different orders of abstractions are descriptions of experimental facts; and so the 'axiom of reducibility' becomes unnecessary. In my language, this axiom is also an *aristotelian description* of the experimental fact that we can abstract in different orders.

Section B. Multiordinal terms.

In the examples given in Section A, we used words such as 'proposition', which were applied to all higher order abstractions. We have already seen that such terms may have different uses or meanings if applied to different orders of abstractions. Thus originates what I call the *multiordinality* of terms. The words 'yes', 'no', 'true', 'false', 'function', 'property', 'relation', 'number', 'difference', 'name', 'definition', 'abstraction', 'proposition', 'fact', 'reality', 'structure', 'characteristic', 'problem', 'to know', 'to think', 'to speak', 'to hate', 'to love', 'to doubt', 'cause', 'effect', 'meaning', 'evaluation', and an endless array of the most important terms we have, must be considered as *multiordinal terms.* There is a most important semantic characteristic of these *m.o* terms: namely, that they are ambiguous, or ∞-valued, in general, and that each has a definite meaning, or one value, only and exclusively in a given context, when the order of abstraction can be definitely indicated.

These issues appear extremely simple and general, a part and parcel of the structure of 'human knowledge' and of our language. We cannot avoid these semantic issues, and, therefore, the only way left is to face them explicitly. The test for the multiordinality of a term is simple. Let us make any statement and see if a given term applies to it ('true', 'false', 'yes', 'no', 'fact', 'reality', 'to think', 'to love', .). If it does, let us deliberately make another statement *about* the former statement and test if the given term may be used again. If so, it is a safe assertion that this term should be considered as *m.o.* Any one can test such a *m.o*

term by himself without any difficulty. The main point about all such *m.o* terms is that, *in general,* they are *ambiguous,* and that all arguments about them, 'in general', lead only to *identification of orders of abstractions and semantic disturbances, and nowhere else.* Multiordinal terms have only definite meanings on a given level and in a given context. Before we can argue about them, we must fix their orders, whereupon the issues become simple and lead to agreement. As to 'orders of abstraction', we have no possibility of ascertaining the 'absolute' order of an abstraction; besides, we *never* need it. In human semantic difficulties, in science, as well as in private life, usually no more than three, perhaps even two, neighbouring levels require consideration. When it comes to a serious discussion of some problem, errors, ambiguity, confusion, and disagreement follow from confusing or identifying the neighbouring levels. In practice, it becomes *extremely simple* to settle these three (or two) levels and to keep them separated, *provided we are conscious of abstracting, but not otherwise.*

For a theory of sanity, these issues seem important and structurally essential. In identifications, delusions, illusions, and hallucinations, we have found a *confusion* between the orders of abstractions or a false evaluation expressed as a reversal of the natural order.

One of the symptoms of this confusion manifests itself as 'false beliefs', which again imply comparison of statements about 'facts' and 'reality', and involve such terms as 'yes', 'no', 'true', 'false', . As all these terms are multiordinal, and, therefore, ambiguous, 'general' 'philosophical' rigmaroles should be avoided. With the consciousness of abstracting, and, therefore, with a *feel* for this peculiar stratification of 'human knowledge', all semantic problems involved can be settled simply.

The avoidance of *m.o* terms is impossible and undesirable. Systematic ambiguity of the most important terms follows systematic analogy. They appear as a direct result and condition of our powers of abstracting in different orders, and allow us to apply one chain of ∞-valued reasoning to an endless array of different one-valued facts, all of which are different and become manageable only through our abstracting powers.

For further details about the theory of types, the reader is referred to the literature on the subject and Supplement II[4]; here I shall give only a few examples of the complexities and difficulties inherent in language, and show how simply they become solved by the aid of $\overline{A}$ general semantics and the resulting 'consciousness of abstracting'.

As an example, I quote Russell's analysis of the 'simple' statement 'I am lying', as given in the *Principia.* 'The oldest contradiction of the kind

in question is the *Epimenides.* Epimenides the Cretan said that all Cretans were liars, and all other statements made by Cretans were certainly lies. Was this a lie? The simplest form of this contradiction is afforded by the man who says "I am lying"; if he is lying, he is speaking the truth, and vice versa . . . .

'When a man says "I am lying", we may interpret his statement as: "There is a proposition which I am affirming and which is false." That is to say, he is asserting the truth of some value of the function "I assert p, and p is false." But we saw that the word "false" is ambiguous, and that, in order to make it unambiguous, we must specify the order of falsehood, or, what comes to the same thing, the order of the proposition to which falsehood is ascribed. We saw also that, if p is a proposition of the nth order, a proposition in which p occurs as an apparent variable is not of the nth order, but of a higher order. Hence the kind of truth or falsehood which can belong to the statement "there is a proposition p which I am affirming and which has falsehood of the nth order" is truth or falsehood of a higher order than the nth. Hence the statement of Epimenides does not fall within its own scope, and therefore no contradiction emerges.

'If we regard the statement "I am lying" as a compact way of simultaneously making all the following statements: "I am asserting a false proposition of the first order," "I am asserting a false proposition of the second order," and so on, we find the following curious state of things: As no proposition of the first order is being asserted, the statement "I am asserting a false proposition of the first order" is false. This statement is of the second order, hence the statement "I am making a false statement of the second order" is true. This is a statement of the third order, and is the only statement of the third order which is being made. Hence the statement "I am making a false statement of the third order" is false. Thus we see that the statement "I am making a false statement of order $2n+1$" is false, while the statement "I am making a false statement of order $2n$" is true. But in this state of things there is no contradiction.'[5]

Clearly, if we should apply the language of orders of abstractions to the above case, a similar outcome is reached more generally and more simply. If we should confuse the orders of abstractions, we might naturally have an endless argument at hand. This example shows how a confusion of orders of abstractions might lead to insoluble verbal problems, and how semantically important it is that we should not identify, and that we should be conscious of abstracting, with the resulting instinctive feeling for this peculiar structural stratification of 'human

knowledge'. We should notice that with the confusion of orders of abstractions, and by the use of *m.o* terms, *without realizing their ∞-valued* character, we may always construct an endless array of such verbal arguments to befog the issues, but that as soon as we assign a definite order to the *m.o* terms, and so settle a specific single meaning in a given context for the many meanings any *m.o* term may have, the difficulties vanish.

As the above analysis applies to all *m.o* terms, and these terms happen to be most important in our lives, there is no use in trying to avoid these terms and the consequences of using them. Quite the contrary; often it is structurally necessary to build a *m.o* term——for instance, 'abstracting'——we must take for granted that it has many meanings, and indicate these meanings by assigning to the term the definite order of abstraction. Thus, such a term as 'abstracting' or 'characteristic'. , might be confusing and troublesome; but 'abstracting in different orders'. , is not, as in a given context we may always assign the definite order and single meaning to the term.

It has been repeatedly said that a *m.o* term has, by structural necessity, many meanings. No matter how we define it, its definition is again based on other *m.o* terms. If we try to give a *general* 'meaning' to a *m.o* term, which it cannot have, further and deeper analysis would disclose the multiordinality of the terms by which it is defined, restoring once more its multiordinality. As there is no possibility of avoiding the above structural issue, it is more correct and also more expedient to recognize at once the fundamental multiordinality of a term. If we do so, we shall not get confused as to the meaning of such a term in a given context, because, in principle, in a context its meaning is single and fixed by that context.

The semantic benefits of such a recognition of multiordinality are, in the main, seven-fold: (1) we gain an enormous economy of 'time' and effort, as we stop 'the hunting of the snark', usually called 'philosophy', or for a one-valued general definition of a *m.o* term, which would not be formulated in other *m.o* terms; (2) we acquire great versatility in expression, as our most important vocabulary consists of *m.o* terms, which can be extended indefinitely by assigning many different orders and, therefore, meanings; (3) we recognize that a definition of a *m.o* term must, by necessity, represent not a proposition but a propositional function involving variables; (4) we do not need to bother much about formal definitions of a *m.o* term outside of mathematics, but may use the term freely, realizing that its unique, in principle, meaning in a given context is structurally indicated by the context; (5) under such struc-

tural conditions, the freedom of the writer or speaker becomes very much accentuated; his vocabulary consists potentially of infinite numbers of words, and psycho-logical, semantic blockages are eliminated; (6) he knows that a reader who understands that ∞-valued mechanism will never be confused as to the meaning intended; and (2) the whole linguistic process becomes extremely flexible, yet it preserves its essential extensional one-valued character, in a given case.

In a certain sense, such a use of *m.o* terms is to be found in poetry, and it is well known that many scientists, particularly the creative ones, like poetry. Moreover, poetry often conveys in a few sentences more of lasting values than a whole volume of scientific analysis. The free use of *m.o* terms without the bother of a structurally impossible formalism outside of mathematics accomplishes this, *provided we are conscious of abstracting; otherwise only confusion results.*

It should be understood that I have no intention of condemning formalism. Formalism of the most rigorous character is an extremely important and valuable discipline (mathematics at present); but formalism, as such, in experimental science and life appears often as a handicap and not as a benefit, because, in empirical science and life, we are engaged in exploring and discovering the unknown structure of the world as a means for structural adjustment. The formal elaboration of some language is only the consistent elaboration of its structure, which must be accomplished independently if we are to have means to compare verbal with empirical structures. From a $\overline{A}$ point of view, both issues are equally important in the search for structure.

Under such structural empirical conditions the *m.o* terms acquire great semantic importance, and perhaps, without them, language, mathematics, and science would be impossible. As soon as we understand this, we are forced to realize the profound structural and semantic difference between the A and $\overline{A}$ systems. What in the old days were considered propositions, become propositional functions, and most of our doctrines become the doctrinal functions of Keyser, or system-functions, allowing multiple interpretations.

Terms belong to verbal levels and their meanings *must* be given by definitions, these definitions depending on undefined terms, which consist always, as far as my knowledge goes, of *m.o* terms. Perhaps it is necessary for them to have this character, to be useful at all. When these structural empirical conditions are taken into account, we must conclude that the postulational method which gives the structure of a given doctrine lies at the foundation of all human linguistic performances, in daily life as well as in mathematics and science. The study of these prob-

lems throws a most important light on all mysteries of language, and on the proper use of this most important human neurological and semantic function, without which sanity is impossible.

From a structural point of view, postulates or definitions or assumptions must be considered as those relational or multi-dimensional order structural assumptions which establish, conjointly with the undefined terms, the structure of a given language. Obviously, to find the structure of a language we must work out the given language to a system of postulates and find the minimum of its (never unique) undefined terms. This done, we should have the structure of such a system fully disclosed; and, with the structure of the language thoroughly known, we should have a most valuable tool for investigating empirical structure by predicting verbally, and then verifying empirically.

To pacify the non-specialist, let me say at once that this work is very tedious and difficult, although a crying need; nevertheless, it may be accomplished by a single individual. Because of the character of the problem, however, when this work is done, the semantic results have always proved thus far⸺and probably will continue so⸺quite simple and comprehensible to the common sense, even of a child.

One very important point should be noted. Since language was first used by the human race, the structural and related semantic conditions disclosed by the present analysis *have not been changed,* as they are inherent in the structure of 'human knowledge' and language. Historically, we were always most interested in the immediacy of our daily lives. We began with grunts symbolizing this immediacy, and we never realize, even now, that these historically first grunts were the most complex and difficult of them all. Besides these grunts, we have also developed others, which we call mathematics, dealing with, and elaborating, a language of numbers, or (as I define it semantically) a language of *two symmetrical and infinitely many asymmetrical unique, specific relations* for exploring the structure of the world, which is, at present, the most effective and the simplest language yet formed. Only in 1933, after many hundreds of thousands of years, have the last mentioned grunts become sufficiently elaborate to give us a sidelight on structure. We must revise the whole linguistic procedure and structure, and gain the means by which to disclose the structure of 'human knowledge'. Such semantic means will provide for the proper handling of our neurological structure, which, in turn, is the foundation for the structurally proper use of the human nervous system, and will lead to human nervous adjustment, appropriate *s.r,* and, therefore, to sanity.

Human beings are quite accustomed to the fact that words have different meanings, and by making use of this fact have produced some rather detrimental speculations, but, to the best of my knowledge, the structural discovery of the multiordinality of terms and of the psychophysiological importance of the treatment of orders of abstractions resulting from the rejection of the 'is' of identity——as formulated in the present system——is novel. In this mechanism of multiordinality, we shall find an unusually important structural problem of human psycho-logics, responsible for a great many fundamental, desirable, undesirable, and even morbid, human characteristics. The full mastery of this mechanism is only possible when it is formulated, and leads automatically to a possibility of a complete psychophysiological adjustment. This adjustment often reverses the psycho-logical process prevailing at a given date; and this is the foundation, among others, of what we call 'culture' and 'sublimation' in psychiatry.

Let me recall that one of the most fundamental functional differences between animal and man consists in the fact that no matter in how many orders the animal may abstract, its abstractions stop on some level beyond which the animal cannot proceed. Not so with man. Structurally and potentially, man can abstract in indefinitely many orders, and no one can say legitimately that he has reached the 'final' order of abstractions beyond which no one can go. In the older days, when this semantic mechanism was not made structurally obvious, the majority of us copied animals, and stopped abstracting on some level, as if this were the 'final' level. In our semantic training in language and the 'is' of identity given to us by our parents or teachers or in school, the multiordinality of terms was never suspected, and, although the human physiological mechanism was operating all the while, we used it on the conscious level in the animalistic way, which means ceasing to abstract at some level. Instead of being told of the mechanism, and of being trained consciously in the fluid and dynamic *s.r* of *passing to higher and higher abstractions as normal,* for Smith, we preserved a sub-normal, animalistic semantic blockage, and 'emotionally' stopped abstracting on some level.

Thus, for instance, if as a result of life, we come to a psycho-logical state of hate or doubt, and stop at that level, then, as we know from experience, the lives of the given individual and of those close to him are not so happy. But a hate or doubt of a higher order reverses or annuls the first order semantic effect. Thus, hate of hate, or doubt of doubt——a second order effect——has reversed or annulled the first order effect, which was detrimental to all concerned because it remained a *structurally-stopped or an animalistic* first order effect.

The whole subject of our human capacity for higher abstracting without discernible limits appears extremely broad, novel, and unanalysed. It will take many years and volumes to work it out; so, of necessity, the examples given below will be only suggestive and will serve to illustrate roughly the enormous power of the $\overline{A}$ methods and structure, aiming to make them workable as an educational, powerful, semantic device.

Let us take some terms which may be considered as of a positive character and represent the structure of 'culture', science, and what is known in psychiatry as 'sublimation'; such as curiosity, attention, analysis, reasoning, choice, consideration, knowing, evaluation, . The first order effects are well known, and we do not need to analyse them. But if we transform them into second order effects, we then have curiosity of curiosity, attention of attention, analysis of analysis, reasoning about reasoning, (which represents science, psycho-logics, epistemology. ,); choice of choice (which represents freedom, lack of psycho-logical blockages, and shows, also, the semantic mechanism of eliminating those blocks); consideration of consideration gives an important cultural achievement; knowing of knowing involves abstracting and structure, becomes 'consciousness', at least in its limited aspect, taken as consciousness of abstracting; evaluation of evaluation becomes a theory of sanity, .

Another group represents morbid semantic reactions. Thus the first order worry, nervousness, fear, pity. , may be quite legitimate and comparatively harmless. But when these are of a higher order and identified with the first order as in worry about worry, fear of fear. , they become morbid. Pity of pity is dangerously near to self-pity. Second order effects, such as belief in belief, makes fanaticism. To know that we know, to have conviction of conviction, ignorance of ignorance. , shows the mechanism of dogmatism; while such effects as free will of free will, or cause of cause. , often become delusions and illusions.

A third group is represented by such first order effects as inhibition, hate, doubt, contempt, disgust, anger, and similar semantic states; the *second order reverses and annuls* the first order effects. Thus an inhibition of an inhibition becomes a positive excitation or release (see Part VI); hate of hate is close to 'love'; doubt of doubt becomes scientific criticism and imparts the scientific tendency; the others obviously reverse or annul the first order undesirable *s.r.*

In this connection the pernicious effect of identification becomes quite obvious. In the first and third cases beneficial effects were *prevented,* because identification of orders of abstractions, as a semantic

state, produced a semantic blockage which did not allow us to pass to higher order abstractions; in the second ease, it actually produced morbid manifestations.

The consciousness of abstracting, which involves, among others, the full instinctive semantic realization of non-identity and the stratification of human knowledge, and so the multiordinality of the most important terms we use, solves these weighty and complex problems because it gives us structural methods for semantic evaluation, for orientation, and for handling them. By passing to higher orders these states which involve inhibition or negative excitation become reversed. Some of them on higher levels become culturally important; and some of them become morbid. Now consciousness of abstracting in all cases gives us the semantic *freedom* of all levels and so helps *evaluation* and selection, thus removing the possibility of remaining animalistically fixed or blocked on any one level. Here we find the mechanism of the 'change of human nature' and an assistance for persons in morbid states to revise by themselves their own afflictions by the simple realization that the symptoms are due to identifying levels which are essentially different, an unconscious jumping of a level or of otherwise confusing the orders of abstractions. Even at present all psychotherapy is unconsciously using this mechanism, although, as far as I know, it has never before been structurally formulated in a general way.

It should be added that the moment we eliminate identification and acquire the consciousness of abstracting, as explained in the present system, we have already acquired the permanent semantic feeling of this peculiar *structural stratification* of human knowledge which is found in the psycho-logics of the differential and integral calculus and mathematics, similar in structure to the world around us, without any difficult mathematical technique. Psycho-logically, both mathematics and the present system appear structurally similar, not only to themselves, but also to the world and our nervous system; and at this point it departs very widely from the older systems.

Let me give another example of how the recognition of order of abstractions clears up semantic difficulties.

I recall vividly an argument I had with a young and very gifted mathematician. Our conversation was about the geometries of Euclid and Lobatchevski, and we were discussing the *dropping* and *introduction* of assumptions. I maintained that Lobatchevski *introduced* an assumption; he maintained that Lobatchevski *dropped* an assumption. On the surface, it might have appeared that this is a problem of 'fact' and not of *preference*. The famous fifth postulate of Euclid reads, 'If a straight

line falling on two straight lines makes the interior angles on the same side less than two right angles, the two straight lines, if produced indefinitely, meet on that side on which are the angles less than two right angles'. We should note, in passing, that a straight line is *assumed* to be of 'infinite' length, which involves a definite type of structural metaphysics of 'space', common to the *A* and older systems. This postulate of Euclid can be expressed in one of its equivalent forms, as, for instance, 'Through a point outside a straight line one, and only one, parallel to it can be drawn'. Lobatchevski and others decided to build up a geometry *without* this postulate, and in this they were successful. Let us consider what Lobatchevski did. For this, we go to a deeper level—otherwise, to a higher order abstraction—where we discover that what on *his level* had been the *dropping* of an assumption becomes on our deeper level or higher order abstraction the *introduction* of an assumption; namely, the assumption that through a point outside a straight line there passes *more* than one parallel line.

Now such a process is *structurally inherent in all human knowledge.* More than this, it is a unique characteristic of the structure of human knowledge. We can always do this. If we pass to higher orders of abstractions, situations seemingly 'insoluble', 'matters of fact', quite often become problems of *preference.* This problem is of extreme semantic importance, and of indefinitely extended consequences for all science, psychiatry, and education in particular.

The examples I have given show a most astonishing semantic situation; namely, that one question can sometimes be answered 'yes' or 'no', 'true' or 'false', depending on the order of abstractions the answerer is considering. The above facts alter considerably the former supposedly sharply defined fields of 'yes' and 'no', 'true' and 'false', and, in general, of all multiordinal terms. Many problems of 'fact' on one level of abstraction become problems of 'preference' on another, thereby helping to diminish the semantic field of disagreement.

It is interesting to throw some light on the problem of 'preference'. Which statement or attitude is preferable ? The one claiming that Lobatchevski *dropped* a postulate, or the one claiming that Lobatchevski *introduced* a new postulate ? Both are 'facts', but on different levels, or of different orders. The *dropping* appears as an historical fact; the *introducing* as a psycho-logical fact *inherent* in the structure of human knowledge. The preference is fairly indicated; the psycho-logical fact is of the utmost generality (as all psycho-logical facts are) and, therefore, more useful, since it applies to all human endeavours and not merely to what a certain mathematician did under certain circumstances.

Section C. Confusion of higher orders of abstractions.

We have already seen that Fido's power of abstracting stops somewhere. If we are finalists of any kind, we also assume that *our* power of abstracting stops somewhere. In some such way the finalistic, dogmatic and absolutistic semantic attitudes are built.

If, however, by the aid of the Structural Differential we train the *s.r* of our children in $\overline{A}$ non-identity and the inherent stratification of human knowledge and power of abstracting, we *facilitate* the passing to higher order abstractions and establish *flexible s.r* of *full conditionality* which are unique for Smith and of great preventive and therapeutic value. We thus build up 'human mind' for efficiency and sanity, by eliminating the factors of semantic blockages, while, by engaging the activity of the higher nerve centres, we diminish the vicious overflow of nervous energy upon the lower nerve centres, which, if allowed, must, of necessity, make itself manifest in arrested or regressive symptoms.

The above issues are of serious semantic importance in our daily lives and in sanity. All semantic disturbances involve evaluation, doctrines, creeds, speculations. , and vice versa. Under circumstances such as described above, which appear inherent with us, it is dangerous not to have means to see one's way clear in the maze of verbal difficulties with all their dangerous and ever-present semantic components.

By disregarding the orders of abstractions, we can manufacture any kind of verbal difficulties; and, without the consciousness of abstracting, we all become nearly helpless and hopeless semantic victims of a primitive-made language and its underlying structural metaphysics. Yet the way out is simple; non-identity leads to 'consciousness of abstracting' and gives us a new working sense for *values,* new *s.r,* to guide us in the verbal labyrinth.

Outside of 'objectification', which is defined as the evaluation of higher order abstractions as lower; namely, words, memories. , as objects, experiences, feelings. , the most usual identification of different *higher order* abstractions appears as the confusion of inferences and inferential terms with descriptions and descriptive terms.
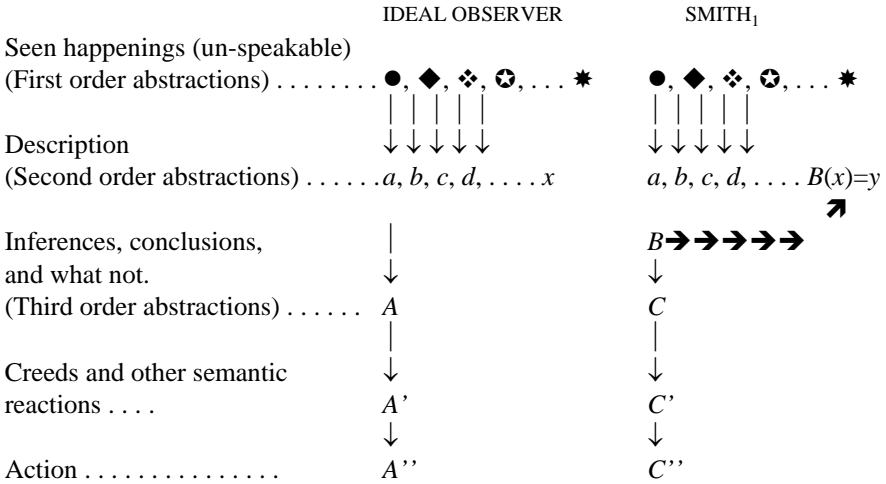
Obviously, if we consider a description as of the *n*th order, then an inference from such a description (or others) should be considered as an abstraction of a higher order (*n*+1). Before we make a decision, we usually make a more or less hasty survey of happenings, this survey establishing a foundation for our judgements, which become the basis of our action. This statement is fairly general, as the components

of it can be found by analysis practically everywhere. Our problem is to analyse the general case. Let us follow up roughly the process.

We assume, for instance, an hypothetical case of an ideal observer who observes correctly and gives an impersonal, unbiased account of what he has observed. Let us assume that the happenings he has observed appeared as: ●, ◆, ❖, ✪, . . . , and then a new happening ✳ occurred. At this level of *observation,* no speaking can be done, and, therefore, I use various fanciful symbols, and not words. The observer then gives a *description* of the above happenings, let us say a, b, c, d, . . . , x; then he makes an inference from these descriptions and reaches a conclusion or forms a judgement A about these facts. We assume that facts unknown to him, which always exist, are not important in this case. Let us assume, also, that his conclusion seems correct and that the action A'' which this conclusion motivates is appropriate. Obviously, we deal with at least three different levels of abstractions: the seen, experienced. , lower order abstractions (un-speakable); then the descriptive level, and. finally, the inferential levels.

Let us assume now another individual, Smith$_1$, ignorant of structure or the orders of abstractions, of consciousness of abstracting, of *s.r.* ; a politician or a preacher, let us say, a person who habitually identifies, confuses his orders, uses inferential language for descriptions, and rather makes a business out of it. Let us assume that Smith$_1$ observes the 'same happenings'. He would witness the happenings ●, ◆, ❖, ✪, . . . , and the happening ✳ would appear new to him. The happenings ●, ◆, ❖, ✪, . . . , he would describe in the form a, b, c, d, . . . , from which fewer descriptions he *would form a judgement, reach a conclusion, B*; which means that he would pass to another order of abstractions. When the new happening ✳ occurs, he handles it with an already formed opinion B, and so his description of the happening ✳ is *coloured* by his older *s.r* and no longer the x of the ideal observer, but $B(x)=y$. His description of 'facts' would *not* appear as the a, b, c, d, . . . , x, of the ideal observer but a, b, c, d, . . . , $B(x)=y$. Next he would abstract on a higher level, form a new judgement, about 'facts' a, b, c, d, . . . , $B(x)=y$, let us say, C. We see how the semantic error was produced. The happenings appeared the 'same', yet the unconscious identification of levels brought finally an entirely different conclusion to motivate a quite different action, C''.

A diagram will make this structurally clearer, as it is very difficult to explain this by words alone. On the Structural Differential it is shown without difficulty.

	IDEAL OBSERVER	SMITH$_1$

Seen happenings (un-speakable)

(First order abstractions) . . . . ●, ◆, ❖, ✪, . . . ✳   ●, ◆, ❖, ✪, . . . ✳

       | | | | | | | | | |

Description

(Second order abstractions) . . . . . . $a, b, c, d, \ldots x$ $a, b, c, d, \ldots B(x)=y$

Inferences, conclusions, | B➜➜➜➜➜

and what not.   ↓   ↓

(Third order abstractions) . . . . . . A C

           | |

Creeds and other semantic   ↓   ↓

reactions . . . . A' C'

           ↓   ↓

Action . . . . A'' C''

Let us illustrate the foregoing with two clinical examples. In one case, a young boy persistently did not get up in the morning. In another case, a boy persistently took money from his mother's pocketbook. In both cases, the actions were undesirable. In both cases, the parents unconsciously identified the levels, x was identified with $B(x)$, and confused their orders of abstractions. In the first case, they *concluded* that the boy was *lazy*; in the second, that the boy was a *thief*. The parents, through semantic identification, read these inferences into every new 'description' of forthcoming facts, so that the parents' new 'facts' became more and more semantically distorted and coloured in evaluation, and their actions more and more detrimental to all concerned. The general conditions in both families became continually worse, until the reading of inferences into descriptions by the ignorant parents produced a semantic background in the boys of driving them to murderous intents.

A psychiatrist dealt with the problem as shown in the diagram of the ideal observer. The net result was that the one boy was not 'lazy', nor the other a 'thief', but that both were ill. After medical attention, of which the first step was to clarify the symbolic semantic situation, though not in such a general way as given here, all went smoothly. Two families were saved from crime and wreck.

I may give another example out of a long list which it is unnecessary for our purpose to analyse, because as soon as the 'consciousness of abstracting' is acquired, the avoidance of these inherent semantic difficulties becomes automatic. In a common fallacy of *'Petitio Principii',*

or 'Begging the Question' fallacy, we, by self-deceptive semantic evaluation, *assume the conclusion* to be proved. In other words, we confuse the orders of abstractions. Beside the wilful use of this fallacy by lawyers in courts to influence juries of low intelligence. , a similar fallacy is widely committed in the reasonings of daily life and leads to many unnecessary semantic difficulties. Particularly vicious is the use of the so-called 'question-begging epithets'. We postulate the fact which we wish to prove, label it by another name, and then use the new higher order name in our premise. It represents clearly a confusion of orders of abstractions.

All such terms as 'un-patriotic', 'un-christian', 'un-american', 'pro-german' (during the World War), 'wet', 'dry'. , fall into this group. It is probably no secret that a large part of the population of this world was swayed by such methods during the war. In times of peace, large countries are continually swayed by such use of terms which play upon the pathological *s.r* of the population, thereby facilitating the 'putting over' of different propagandas. Similar procedures lead to many semantic difficulties in daily life. It is easy to see that the difficulty is general; namely, 'the confusion of orders of abstractions'. The antidote is equally general, and is found in the elimination of the 'is' of identity, resulting in the 'consciousness of abstracting'. It should be noticed that these pathological reactions have long been known, and that they are extremely general. We are told about them in schools under the name of 'logical fallacies', disregarding their semantic character, and so it is practically impossible to eliminate them or to apply the wisdom we are taught. It is not difficult to see why this should occur. In the older days, all the 'wisdom' was taught to us by purely 'intellectual', 'verbal', classical *A* and *el* methods. We had no simple psycho*physiological* method of *complete* generality, which could be taught in a *non-el* way affecting *all* nerve centres. It is known how difficult it is to 'change human nature', which simply means that the older verbal educational methods could not properly affect the lower centres. It seems that the first step in developing a method to accomplish these ends is to use the Structural Differential, without which it is practically impossible to teach 'silence on the objective level' and 'delayed action' and to train through *all* centres in non-identity, 'stratification', natural order, and so in appropriate *s.r.* It appears that now, to begin with, we have acquired a workable and simple psychophysiological method for changing identification into visualization, and, in general, for the prevention or elimination of identification or confusion of orders of abstractions. We have now discovered a mechanism which involves and deals directly with the reactions of the

lower centres, 'senses', affects, 'emotions', . The older, difficult 'change in human nature' becomes an easily accomplished fact in a structural, $\overline{A}$ semantic education. 'Human nature' can best be described, perhaps, as a complex of *s.r,* which *can* be educated and 'changed' to a large extent.

It seems unnecessary to enlarge further upon this subject. Every attentive reader can supply endless examples of this kind of semantic disturbances from his own observation or experience. Naturally, the generality, simplicity, and *physiological* character of the method proposed in this work become powerful assets, and instruction in the $\overline{A}$ methods can easily be given to, or acquired by, everybody. It can be taught in homes and schools. It gives a preventive psychophysiological method of training the *s.r* in the millions and millions of cases in which human life becomes wrecked through the lack of a *working structural educational theory* concerned with these reactions. But it is not enough to preach these 'platitudes'; they must be practised as well. If the parents and the boys mentioned above had been trained as children with the Structural Differential, it would have been an impossibility for the situation to have become so acute.

Let us follow our *daily experiences* by the aid of the Structural Differential. We find ourselves on at least five levels. The first represents the un-speakable event, or the scientific object, or the unseen physico-chemical processes on the sub-microscopic levels which constitute stimuli registered by our nervous system as objects. The second consists of the external, objective, also un-speakable, levels on which we see with our eyes, . On this level, we could make a moving picture, including actions. , (writing a book is also behaviour). The third level represents the equally un-speakable psycho-logical 'pictures' and *s.r.* On the fourth level of abstractions we describe verbally our facts, that humans (*a*) eat, sleep. ; (*b*) cheat, murder. ; (*c*) moralize, philosophize, legislate. ; (*d*) scientize, mathematize, . Finally, in the present context, our inferences belong to the fifth level.

Unfortunately, we usually abstract facts (*a*), identify the levels, and form a conclusion 'man is an animal', . From this *conclusion* we confuse the levels again and colour the description of the facts (*b*), (*c*), (*d*). ; jump again to higher levels and build conclusions from descriptions (*a*) and from *distorted,* coloured descriptions (*b*), (*c*), (*d*), and so obtain the prevailing doctrines in all fields. These again lead us, in the field of action, to the mess we all find ourselves in. In this dervish dance between the levels we entirely *disregarded uncoloured facts* (*d*).

The ideal observer would observe *all* forms of human behaviour at a given date, *not leaving out facts* (*d*); then, without confusing his

levels, and also without confusing descriptions with inferences, he would reach his higher order of abstractions properly, with very different resultant doctrines, which would produce entirely different semantic evaluation, and motivate equally different action.

We may understand now why we must constantly revise our doctrines, for the above analysis throws a considerable light on the fact that scientists need training with the Differential as much as other mortals (the author included). History shows that they have not officially checked themselves up sufficiently to become aware of this fatal habit of confusion of orders of abstractions through identification.

It might appear, at first glance, that all that has been said here is simple and easy. On the contrary, it is *not* for the grown-ups; it is easy only for children and the young. In all my studies and experimenting I have found that, for the reasons already given, the use of the Differential appears essential, and that it requires a long while and training to accomplish new semantic results. As a rule, unless they are very unhappy, people try to trust their 'understanding', and dislike to train repeatedly with the Differential. For some reason or other, they usually forget that they cannot acquire structural familiarity with, or reflex-reactions in, spelling, or typewriting, or driving a car. , *by verbal means alone.* Similar considerations apply in this case. Without the actual training with the Differential, certainly the best results cannot be expected.

To gain the full benefit involves the uprooting of old habits, taboos, 'philosophies', and private doctrines, the worst being the structure of our primitive *A* language with the 'is' of identity, all of which are deeply rooted and work unconsciously. Only the semantic training with the Differential in *non-identity* can affect the 'habitual' and the 'unconscious'. Rationalization, lip-service to the 'understanding' of it, will be of no use whatsoever. Persistent training seems the only way to acquire this *special structural sense for proper evaluation,* and the habit of *feeling* when identification, or the confusion of orders of abstractions becomes particularly dangerous. This feeling, as it involves most important factors of evaluation, is difficult to acquire, as difficult, perhaps, as reflex-learning to spell or to typewrite. But, when acquired, it makes us aware of the continuous, necessary utilization of many levels of abstractions, which becomes dangerous only when we identify them or are *not conscious* of this fact. We can then utilize the different orders of abstractions *consciously,* without identification, and thus keep out of danger. Most of the important *terms* appear as multiordinal, and, although they *belong* to verbal levels, they *apply* often to all levels, an

important structural fact impossible to avoid, and one which makes this special semantic sense uniquely necessary to acquire.

It seems unnecessary to repeat that everything that has been said above applies in the fullest extent to our ethical, social, political, economic, and international relations. Before any sanity can be brought into the analysis of these relations, before they can be rationally analysed, the investigators would have to be trained to observe correctly and to avoid verbal structural pitfalls. For the lack of such semantic training and re-education, the 'time-honoured' 'Fido' debates involving the 'is' of identity, continue on all sides, and lead to naught else but a waste of 'time' and effort.

I say waste of 'time', simply because there seems no end to the paradoxes which, with a little ingenuity, we can build up when we begin to gamble with confusion of orders of abstractions and disregard multiordinality. Any doctrine, no matter how structurally true or beneficial, can be defeated, confused, or delayed, by the use of such methods. These problems appear of crucial semantic importance, because our lives are lived in a *permanent* structural interplay between different orders of abstractions. All our achievements depend upon this interplay, yet the most acute and painful dangers also have their sources in the non-realization of this dervish dance between different orders of abstractions.

Since we cannot evade the passing from level to level, or the use of multiordinal terms, our wisdom should consist only in not abusing these semantic conditions of human life. As we must do that, let us do it, but let us not identify the orders, and thus let us evade the dangers. Consciousness of abstracting gives us the complete *psychophysiological* solution of this complex situation, as it allows us to have the psycho-logical benefits and to avoid the dangers by the use of *physiological* means.

In conclusion, I must stress once more the importance of the structure of the language in which we analyse any given problem. In the $\overline{A}$-system I am proposing, the term *order* is accepted as one of its very foundations. In 1933, we know that as words *are not* the things spoken about. , structure, and structure alone, becomes the only possible content of knowledge, and the search for structure, the only possible aim of science. If we try to define structure, we can do so in terms of relations and multi-dimensional order. The recent advances of science show, beyond doubt, that the day will come when all science will be formulated in terms of structure and, therefore, of physics, and physics formulated as a form of multi-dimensional geometry, based on multi-dimensional order, giving us, ultimately, multiordinal structure.

The application of the term *order,* which involves physiological, as well as semantic, mechanisms of evaluation, to the analysis of human behaviour, has led me to the present $\overline{A}$-system and the investigation of the structure of language. The discovery that some of the most important terms we use appear multiordinal, a character *concealed* by the 'is' of identity, has disclosed to us a most vital and inherent psycho-logical mechanism, responsible in humans for many most desirable, many undesirable, and many morbid human characteristics. It disclosed, also, the psycho-logical *structure* of these characteristics, and so we have obtained *physiological* means by which to enhance the development of desirable characteristics, and to prevent or transform the others.

Further analysis has disclosed a natural survival order in evaluation: the event first, the object next; the object first, the label next; description first, inferences next. , in inherent importance. We have also found that the majority of human difficulties, 'mental' ills included, involve semantic disturbances and exhibit, *not* the natural survival order, but the identification of different orders, resulting in a reversed (pathological) order.

It is impossible in this book to review the data of psychiatry from the $\overline{A}$ point of view, as this would require a separate large volume, which, I hope, will be written some day; but any one can verify the statements made above by himself from clinical literature, and also by analysing his own or other persons' life-difficulties, quarrels, disagreements. , which generally involve quite unnecessary sufferings. Psycho-therapeutic literature shows abundantly that the success of the physicians depends mostly on reversing the pathological reversed order in a given field, and so restoring the natural order in the *s.r.* It is easily verified that, in most cases, when 'mental' illness originated through different life experiences, these would have affected very little, if at all, a child or an adult who was conscious of abstracting, and whose nervous processes and corresponding semantic states followed the natural order.

With the aid of the Structural Differential and a $\overline{A}$ language of new structure, it is easy to train the *s.r* of an infant, a child, or a young person, and possible, although much more difficult, to train a grown-up in the natural order. Such a training becomes a potent preventive structural *physiological* method, as it eliminates the psycho-logical states of identification or reversed order, both of which represent the raw semantic material out of which future nervous disorders are produced.

The *non-el* term 'order' is equally applicable in life and science; gives us, in 1933, the simplest structural common base, and allows us to

attempt the formulation of a science of man, which ultimately becomes a theory of sanity, a consequence of a *non-aristotelian system.* It should be recalled that order is accepted in the present system as undefined and fundamental; yet its use is easily explained by the aid of the term 'between', and can be shown and applied in reference to empirical structures. If we can formulate a method which, through the application of a psychophysiological term such as *order,* and a simple device such as the training of *s.r* in the natural survival order, or reversing the pathological reversed order, includes the mechanism of non-identity and one of the most important human nervous functionings, such a method, because of its structural simplicity and physiological character, may be expected to prove very workable. I desire to stress most emphatically the very important *general, impersonal, preventive, semantic, reflex-character* of such a method. In actual life, we deal, for the most part, with persons who are 'mentally' or nervously disturbed in different degrees. We could, eventually, divide them for our purpose into two groups: (1) those who do not want to improve or get well, but who somehow like their fictitious worlds and the maladjustments connected with them; (2) those who genuinely want to get over their difficulties.

In general, it is extremely difficult or impossible to achieve anything at all with the first group. The second group is greatly helped if we give them means to work by themselves at their problems. Very often it is most effective to explain to them this simple 'natural order', 'identification', and 'reversed order' mechanism, the multiordinality of terms. , and so give them a *definite psychophysiological symptom* to struggle against. These symptoms of identification or reversed order, in their generality and structural neurological fundamentality, underlie the process of formation of practically all known semantic difficulties of evaluation.

The reader should not assume that it is always possible to eliminate identification and so achieve this coveted natural order, or the reversal of the reversed pathological order; but, whenever this *is* possible, the person is relieved in a great many psycho-logical fields. The simplicity and generality, the physiological and structural character of this method seems its main recommendation, particularly as a preventive measure or semantic training for sanity. The training is a laborious process, requiring great persistence; but, to my knowledge, very few trainings are easy, and. perhaps, none leads to more important results than does this one.