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## AXIOLOGY AS A SCIENCE

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Axiology as a science is distinguished from axiology as philosophy in three ways: first, in axiology as philosophy the concept of value is a category while in axiology as a science it is the axiom of a system. A category is a concept abstracted from concrete reality and, according to a fundamental law of logic, its meaning decreases in the proportion in which its generality increases. An axiom, on the other hand, is a formula constructed by the human mind whose meaning-in the form of a system-grows in the proportion in which its extension grows. This means that a category is not applicable to reality because its range of significance does not cover the details of actual situations. A system on the other hand is applicable to reality because it has a complexity which corresponds to the complexity of actual situations. In natural science the system corresponding to natural reality is that of mathematics. In moral science the system corresponding to moral reality is that of formal axiology. Formal axiology is therefore to moral philosophy, that is to say, the humanities and the social sciences of today, what mathematics is to the natural sciences: the frame of reference which orders them.

This means, secondly, that the transition from a philosophy to a science is characterized by the coupling together, the hooking up, as it were, of a chaos of phenomena with a system. Thus, for example, the science of optics was created as soon as a ray of light was defined as a straight line. The notion "straight line" is an element of the system of geometry and, by the definition in question, the chaos of optical phenomena was connected with an exact system, that of geometry. Applying this to the problem of value we have to say that the phenomena of the value world must be joined, through a formal definition, to a system which orders these phenomena.

This means, thirdly, that the analysis of value through the system must follow necessary laws of logic and not accidental philosophies of individual thinkers.

Everything then depends on the definition which is given to value. This definition, if axiology is to be a science, must not be a definition in terms of categories such as pleasure, the will of God, purpose, preference, satisfaction, etc., but must be in the form of an axiom from which a system can be deduced.

The most universal system we know is that of logic. And the fundamental relation of logic is that of class-membership. If value could be defined in terms of this fundamental relation of logic then it would be connected with a system in the same way that the ray of light was coupled to a system by being defined as a straight line. And as in this case the result was the science of optics, so in that case the result would be the science of axiology.

Axiology as a science is the development of the definition of value in terms of the logical relation of class membership: a thing has value in the degree in which it fulfills the concept of its class. This means that it lacks value in the degree in which it does not fulfill it. Let us suppose that the concept of a thing has a certain number of properties, for example, the concept chair has four properties which define the concept "chair," namely: "a knee-high structure with a seat and a back." The four properties are structure, knee-high, seat, and back. A chair which has these properties is a good chair and a chair which lacks some of these, for example, has no seat or no back or no structure but wobbles, is not a good chair even though it may be a good bench or a good frame for acrobats. Naturally, a chair has many more properties than the four mentioned since each of them also has its own properties, and each of these latter in turn has its own and so on. Thus, a chair, as anything, has a great number of conceptual properties. And the degree in which it fulfills or does not fulfill this collection or set of

properties may vary tremendously.

This gives to valuation its interesting character.

We can say then that a thing has a number of properties or that the concept of a thing has a certain number of predicates, say  $n$ . Always when a thing called by a name or by the name of concept, for example the name "chair," has the  $n$  properties corresponding to the predicates of that concept it is a good such thing. If it has less than  $n$  properties it is not a good such thing.

Let us see now how from this little formula the other value terms arise such as average (or so-so), fair, bad, and so on. We define very simply, that a thing is fair if it has more properties than it lacks and that it is bad if it lacks more properties than it has. In other words, that it is fair when it has more than half of its properties and that it is bad when it has less than half of its properties. If it is neither bad nor fair it has exactly half of its properties, or one-half  $n$ , and this we define as the value average or so-so. Now observe how simple becomes the understanding of valuation of things in classes. The value good is represented by  $n$ , the value average by one-half  $n$ . The possible values of a thing are then, first,  $n$ , second, one-half  $n$ , third, one-half  $n$  plus a certain number which is less than half  $n$ , let us say  $m$ , and, fourth, one-half  $n$  minus that number,  $m$ . Now a very peculiar thing happens. The sum of the possible values of a thing is the sum of the values mentioned, that is to say,  $n$  plus  $n$  over two plus  $n$  over two plus  $m$  plus  $n$  over two minus  $m$ . The result, as you see immediately, is two-and-a-half  $n$ .

Thus, if a thing has ten properties, then the sum of its possible values, of its goodness plus its badness plus its fairness plus its average value is twenty-five. This naturally is very strange. How can a thing that has only ten properties have twenty-five properties? How does the ten become twenty-five? The answer is clear for anyone who knows the mathematics of combination and permutation. Any number  $n$  of elements can be arranged in a certain number of subelements or subsets. For example, if we have two elements then we can arrange these in three different manners, namely, the first one, the second one, and the two together. The general formula for the number of subsets possible in a set of elements  $n$  is  $2^n - 1$ . If  $n$  is two then we have two to the second power which is four, minus one is three. If we have three elements the corresponding number of subsets is already seven, namely the three ones, which makes three, the three together which makes four, the first two, the second two, the third two, which makes seven. If we have four elements, the number of subsets is 15. if we have ten elements, as in our example, it is 1023. Thus, it is not very surprising that there can result 25 properties from 10. Actually the sum of values of a thing is not very great. The product is much greater; although, of course, even the sum becomes great when the number of properties of the thing is great. Thus, experts have found that the experience of tasting a glass of Burgundy has 156 elements, and the total of subsets of this experience is  $2^{156}$ , or 3.6 times  $10^{46}$ , an astronomical number of 46 zeros. But so much valuation can only be conceived of, let alone realized, by experts. We usually operate with valuations of between ten and 30 properties. The thing with 10 properties has 1023 subgroups of properties each of which is a value. Thus, the total number of values possible for a thing of ten properties is 1023. For a thing with 30 properties, the corresponding number of values is 1,073,741,824.

What does this teach us concerning valuation? Two important things. First, that value is the intensional, counterpart of number or, inversely, that number is the extensional counterpart of value. All things that are good have the intensional number-Leibniz called it the characteristic number- $n$ . This means that the set of intensions  $n$  is the value goodness, or that goodness is the class of classes similar to the given class  $n$  of properties, or the set of intensions similar to the given intension  $n$  ("Similar to" here means "to be put into one-to-one correspondence with.") The value bad is the totality of all intensions  $n$  over two minus  $m$ ,  $n/2 - C m$ , or the class of intensions similar to that intension. Value in general then is the set of all the intensions similar to a given intension. in other words, both number and value are common properties of sets, number of extensional sets and value of intensional sets. Formal axiology arises simply by applying set theory to sets of predicates, and by identifying axiomatically the subsets of a given set with value. just as Russell excised metaphysics from mathematics by defining number as the class of all those classes similar to a given class, or similarity of extensions, without hunting for a metaphysical notion of number, so we are excising metaphysics from value

theory by defining value as similarity of intensions, instead of hunting for some metaphysical entity called Value. We might call this position axiological positivism. It differs from logical positivism in its view of logic. In logical positivism value theory is impossible because no kind of logic known to positivism covers it. We, rather than shrinking knowledge by calling whatever does not fit into positivistic logic unknowable, and thus using extensional logic as a Procrustes bed hacking off what is too long (or stretching what is too short), extend knowledge by constructing intensional logic parallel to extensional logic, as the structure of sets of predicates.

The second thing that the combinatory increase of properties of a thing in valuation teaches us, is that valuation disregards the thing itself and deals with pure properties. Valuation is a play with properties. It is similar to music which is a play with sounds. The properties of things separated from the things are, so to speak, the sounds of valuation. Formal axiology is nothing else but the score of this play with pure properties: it gives us their combinations and their keys. These keys are the dimensions of value. Let us now turn to them.

As we have seen, there are two kinds of concepts, namely abstract concepts and formal concepts. The first culminate in categories, the second in axioms. The first are abstracted from the things of the concrete world, such as the concept "chair," the latter are constructed as the concepts of science, for example, "number," "circle," "electron." In addition, there is a third class of concepts, the so-called singular concepts, which are neither abstracted nor constructed but which give the totality of a singular thing, for example the concept "this chair" or the concept "Bertrand Russell," or the concept, "my uncle John."

There are very significant differences in the structure of these three kinds of concepts; and, since the value of a thing is the fulfillment of its concept, there would be very significant differences in the fulfillments of these different concepts.

The *formal* concept has the characteristic number, or the intensional cardinality  $s$ , which is a finite and definite number. The formal concept forms part of a system such as the concept "straight line" which belongs to the system of geometry or the concept "4" or the concept "square root of minus one" or "i," which are concepts of the system of arithmetic. Within the system they are defined with precision and exactness. Either they have the properties of their definition and thus are the things in question, the number 4 or the "square root of minus 1," or they do not have these properties of their definition and are not the things in question. There are no bad numbers 4 or bad square roots of minus 1, and the same is true of *any* scientific concept, such as the geometrical concept "circle" or the physical concept "electron." There are no bad circles and no bad electrons. A bad circle simply is no circle, but an ellipse or some other figure, and a bad electron simply is no electron but another particle. (The whole recent development of physics may be characterized as the classification of so-called bad electrons which are no electrons, but mesons, etc.) The reason for this limitation is naturally that these things are defined with such precision-and the word "definition" means limitation-that the least deviation from the definition signifies that the thing is not what it is called. Systemic things, then, have only two values, perfection and non-existence. The fulfillment of a formal concept is called a *systemic value*. Systemic things, then, have only two values, either perfection or non-existence.

The distinctive feature of systemic valuation is that it sees only a very small and a very definite number of properties of a thing in question. Let us remember carefully this distinctive feature of systemic valuation: *the systemic concept has a finite and definite number of properties*.

We now pass to the *abstract* concept. It also has a distinctive feature. We can abstract only if we have at least two things, for abstraction signifies that we draw off-the literal meaning of the Latin word *abstrahere*-properties which things have in common, and naturally properties can not be in common unless there are at least two things. The number 2, thus, is the lower extensional limit of abstraction, but there is no upper limit to the number of things from which common properties can be abstracted; only that the larger the number of things the smaller will be the number of properties they have in common and can be abstracted. If we take all things there are, they will have in common only one property, namely the property of being - *they all are*; and this is not saying much of something. As the philosophical discipline of Ontology has for its object *Being*, you will understand why ontologists have such difficulties in expressing themselves.

On the other hand, a great deal can be said with respect to the lower limit of abstraction. One can say very much of what *two* things have in common. Actually they can have in common an infinity of properties. The number of properties, therefore, which an abstract concept has is between one and infinity. These are the intensional limits of abstraction. This is the first distinctive feature of abstraction. There is a second feature. Each of the common properties must be abstracted by itself, one by one. I have to look in my mind to find each of the properties which the things in question have in common. This means that the group or set of these properties must be discreet or discursive, discontinuous or denumerable. Each property must be taken by itself. This we do in the process of learning to speak; a striking example is found in the autobiography of Helen Keller and the play, *The Miracle Worker*, by William Gibson. The distinctive feature of abstraction then, is, and this again we must remember, that *the set of properties within an abstract concept is a collection potentially or actually infinite, of discrete or denumerable elements*. The fulfillment of an abstract concept is called extrinsic value.

We now pass to the singular concept. When I look at this chair or when I think of Bertrand Russell or my Uncle John, I neither construct nor abstract. Rather, what I have before my mind is a picture, or, in the technical terms of psychology, a Gestalt, and in those of logic, a continuum: the form itself of this very chair, or the unique and singular person Bertrand Russell or of my uncle John. What is the distinctive feature of this class of concept? Obviously, the number of properties which my uncle John has is infinite. He has a thick nose with a pimple, the pimple is blue in winter and white in summer, it has a little dimple on the left side, this dimple has a little wrinkle at the top, this wrinkle is black, and this blackness varies according to his emotional state, etc. -and naturally there is much more to my uncle John than the blackness of the wrinkle of the dimple of the pimple of his nose. Thus, the predicates of a singular concept are infinite, but they are infinite in a different way from those of the abstract concept. They are not discontinuous, discrete, they do not exist by themselves, isolated; rather, they continue one with the other, they are continuous, they form a continuum. Thus the distinctive feature of the singular concept is that it forms an *infinite set of continuous elements, that it is a continuum*. The linguistic expression of this is the metaphor. Metaphors are words of universal meaning, that is, words which may mean any other word in the language. A metaphor is a set of predicates used as a variable. Hence it can, in principle, replace every other word of the language - and even itself as an ordinary word rather than as a metaphor, as in "a peach of a peach." Since the totality of all ordinary languages has  $!_0$  words, each one of which signifies, as metaphor  $!_0$  senses of meaning, the total meaning of the metaphorical language is of  $2^x_0 = !_1$  meaning. The metaphorical language therefore is a non-denumerable infinity, a continuum. Since an element of a continuum may itself be a continuum it follows that a metaphor may, itself, be a continuum. A conjunction of a finite number of metaphors is a poem. The fulfillment by a thing of a singular concept, understood in this sense, constitutes *intrinsic value*. Intrinsic value is the valuation of poets and artists, lovers and mystics, magicians and advertisers, chefs de cuisine and politicians, theologians and creative scientists.

Systemic value, extrinsic value, and intrinsic value are the value dimensions. As is seen, they constitute a hierarchy of richness, with intrinsic - value richer in qualities than extrinsic value, and extrinsic value richer in qualities than systemic value. "Richer in qualities" is the definition of "better," "poorer in qualities" is the definition of "worse." The definition in use of "ought" is "The worse ought to be better." Hence, intrinsic value is better than extrinsic value, and extrinsic value is better than systemic value. Also, systemic value ought to be extrinsic value, and extrinsic value ought to be intrinsic value. The hierarchy of value is a valuation of value.

Let us now make a summary of the distinctive features of the three classes of concepts. The first, the formal concept, or construct, has as distinctive feature that it possesses a finite and definite number of properties. The second, the abstract concept, has as distinctive feature that it possesses a group of potentially or actually infinite denumerable or discontinuous properties. And the third, the singular concept, has as distinctive feature an infinite group of non-denumerable or continuous properties.

Up to now we have characterized the three classes of concepts only through commonsense or, if you will, phenomenologically. We have stated the facts of the matter. Now we have to do what the creative scientist does and find a formal framework which accounts in a systematic manner for all we have said. Moreover, in doing so, the frame of reference has to account for much more than what we have said; because *if* we can find a system which contains all we have said, then if it is a *genuine* system, it must contain much more. Thus, in

natural science, when Galileo found the arithmetical relation of division between distance and time and defined it as velocity he found much more than what he was looking for: he inserted the phenomenon of motion into the system of mathematics which naturally contains much more than the simple relation of division. Following him, Newton found the system of gravitation and Einstein that of relativity, mainly by extending the simple equations of Galileo. Thus, the scientist who finds a system always finds more than he looks for. This feature of science is called serendipity, from the tale of Walpole *The Princess of Serendip* (Serendip being Ceylon) who, being on the right track, always found more than she was looking for.

What we need then is a system which contains the distinctive features of the three classes of concepts, namely, first, sets of finite and definite elements, secondly, infinite sets of discontinuous elements, and thirdly, infinite sets of continuous elements. It so happens that there is such a system completely elaborated within the field of mathematics, namely, the mathematics of sets which includes both finite and infinite sets, the latter in the so-called transfinite numbers. In this system the finite set of elements is called  $n$ , that is to say any integer number, the infinite collection of discontinuous elements is called  $\aleph_0$  the first letter of the Hebrew alphabet, and the infinite collection of continuous elements, or the continuum, is called  $\aleph_1$ . There are precisely defined operations between these three classes of numbers, and on using these operations we obtain in a beautiful and transparent manner a calculus of valuation. The system of transfinite mathematics, in other words, is isomorphic to, or corresponds with, the realm of values and formulates symbolically the vast field of valuation. It reflects in systematic detail what philosophers of value have said and, even more significantly, what they have not said.

We have no time to enter into the details of this calculus. It is complex and technical, as you may judge from the fact that we have used an electronic computer to prepare a table of values and value situations, like a logarithmic table. This work took several years to program but then the computer printed within half an hour 48,000 different formulae of different value situations, each of them infinitely applicable. The resulting book of tables has some 300 pages.

However, I shall give you an idea of the three dimensions of value with which this calculus deals, namely systemic value, extrinsic value and intrinsic value.

The value of a thing, we said - and you will see that we always have to repeat the axiom - is the degree of fulfillment of the thing's concept. The fulfillment of a formal concept is a systemic value, the fulfillment of an abstract concept is an extrinsic value, and the fulfillment of a singular concept is an intrinsic value. By fulfillment we mean the correspondence between the set of properties contained in the thing and the set of predicates contained in the intension of the concept of the thing. This correspondence we may also call *measurement*, and say that the intension of the concept measures the value of the corresponding thing.

Systemic valuation is correct for mental constructions but not for human beings. It is correct for anything which is part of a system and not correct, and inappropriate for anything which is not part of a system. It is the value of conformity to a system. Therefore political systems which require conformity use systemic valuation. When you read Rousseau's *Contrat Social* you will see that it is a complete system of conformity and that the citizens in it are like the elements in a mathematical system. Democracy, Rousseau says, is only for the most perfect, truly Gods but not for the people. The General Will is a formal concept, a construction, and its fulfillment a systemic value elaborated to the last detail. As any synthetic or constructed concept, the General Will is always correct (Book 11, chapter 3) and cannot be modified without being alienated, or limited without being destroyed (*Social Contract*, Book III, chapter 16). Since people are not systemic elements, not perfect as Rousseau says, such systems by definition can work only imperfectly.

Extrinsic value is the value of comparison. It values the things and also, of course, people within classes and as members of classes. A good chair is better than a bad chair, but it cannot be said that a good chair is better than a good horse. The chair has its chair goodness and the horse has its equine goodness. Horse and chair are not of the same class and therefore cannot be compared. This incomparability of different kinds of extrinsic goodness was what stumped Aristotle who said in his *Ethics* that goodness was not an idea as Plato had said, but only a homonym, for each thing has its own goodness; and, in a way, it also stumped Plato for, although he was

convinced that there must be a goodness valid for everything, he was unable to define it. It even stumped so acute an observer as George E. Moore who, equally convinced as Plato that there must be a goodness valid for everything, held it to be indefinable. And finally it stumped Nicolai Hartmann, who said that the idea of goodness throughout the history of philosophy has remained an empty genus whose content has not yet been discovered. The reason, he says, is that the good cannot be intelligibly understood. Good, he says, is a metaphysical problem.

The definition of good-in-general, given by formal axiology, is thus the first such definition proposed in philosophy. This was possible through the completely synthetic or constructive approach to the problem. The definition covers the variety of all possible goodnesses. The comparability of goodnesses belongs only to extrinsic goodness. Even though extrinsic goods, such as horses and chairs, are not accessible to the *same* axiological measuring rod-chairs are measured by the concept "chair" and horses by the concept "horse"-we can measure chair and horse extrinsically, that is, compare them, if we can find a *common class* for both. Facetiously we could say this would be the class of four-legged things, but actually there is a common class for all concrete things, such as chairs and horses and the like. The concept of this class is the concept "goods," its measure is called "price," and its extension is the totality of all economic goods from pins to battleships. Thus there arises the science of *Economics* as an application of axiology. it is defined as the application of extrinsic value of things. Economic value is the only value there is *common* to *all* concrete, and even some ideal things, which signifies anything precise and detailed. Therefore the great importance of economics in life is no accident. But it is only *one* of the values and not, as many people seem to think, Value itself. Naturally, things can be compared in other respects than the economic if one does not consider the totality of *all* things extrinsically but only specific sections of things, in particular if the things in question are conceptually close. Thus, apples and pears can be compared under the concept 'fruit.' While we cannot say that a good pear is better than a good apple we *can* say that a good pear is a better *fruit* than a good apple and vice versa. *People*, of course, can be compared extrinsically when they are members of a class, for example streetcar conductors, bakers, doctors, secretaries and so on. I cannot say that a good baker is better than a good streetcar conductor but I *can* say that a good baker is better than a bad baker.

The science which treats of people compared in classes is *Sociology*. Thus, we see how this science grows out of axiology. It is defined as extrinsic value applied to groups of persons.

Let us now pass to intrinsic valuation which is the fulfillment of the singular concept. What is important to remember is that here we have neither abstraction nor construction. Thus, *how* are we to understand a singular thing in the totality of its infinite properties? Obviously, when we speak of this chair or of Bertrand Russell or of my uncle John we do not think of them in the totality of their properties but only in the degree in which we know them, which does not have to be very great. But if I speak for example of my wife or you speak of your husband or your son, then we know them intimately, by familiarity rather than by abstraction or construction. Actually, the plenitude of knowledge of a singular thing is the *complete identification* with the thing known. Thus, the painter who paints the chair identifies himself with that chair, reproduces all its features in the infinity of its shapes and aspects and, as many artists have expressed it, *becomes* this chair. Think of the famous painting of Van Gogh which he entitled "Portrait of a Chair." The chair actually has personality, and the personality is that of the artist. The branch of knowledge dealing with such identifications with things in art is called *Aesthetics*, and here we see how aesthetics grows naturally out of axiology. It is defined as intrinsic valuation applied to things.

You also see how axiology relates fields of phenomena which previously were without any mutual relationship as, for example, aesthetics and economics. We defined economics as extrinsic valuation applied to things. The difference between aesthetics and economics is then the difference between intrinsic and extrinsic valuation applied to things. As this difference is defined with precision in the system of axiology, namely, as the relationship between predicative sets  $!_1$  and  $!_0$ , the difference between aesthetics and economics is defined with equal precision. From the precise relation between  $!_1$  and  $!_0$  results that aesthetic value is an infinitely more valuable value, in the exact sense of the words "infinitely more" which is defined by the relation between  $!_1$

and !<sub>0</sub>, than economic value. Thus, it is infinitely more valuable to consider a thing aesthetically than economically. It follows that the business of buying and selling pictures has nothing whatsoever to do with aesthetics. Hence the many freak values of objects of art.

As we have seen, there are all degrees of looking at a singular thing, from superficial knowledge to most intimate familiarity to the point of identification. None of these views is that of abstraction or construction. These degrees of intrinsic valuation are called, rather, degrees of differentiation. Differentiation is to the singular thing what exemplification is to the thing in a class, the so-called particular thing. Differentiation in this sense is the closer and closer intimacy with and detailedness of, the thing in question. This differentiation may also be called singular exemplification and its contrary, the lack of differentiation, singular abstraction (as it is called by the American philosopher Susanne Langer); and exemplification may be called differentiation of the particular thing or the thing in class (as it was called by Plato and Aristotle in their doctrine of division or diairesis).

A singular thing is known in the degree in which are known most intimately the greatest quantity of its features or, in other words, in the degree in which the thing has been differentiated in detail. Intrinsic abstraction is then, within the intrinsic dimension of the thing, the opposite of intrinsic differentiation. The less differentiated the thing the more it is singularly abstracted, and the more differentiated it is the less it is singularly abstracted. The upper limit of differentiation is identification with the thing, the lower limit is to see the thing as numerically one. The first is seeing the singular thing in intension or meaning, the second is to see it in extension. The first is the view of the thing as unique, the second the view of the thing as one.

We shall now apply all this to a singular thing which is the most important to everyone of us, namely our own Self. We are all given to ourselves, and the task of our life consists in knowing our selves more and more and to become more familiar with our own selves, becoming more and more what we are, becoming, as the psychologists say, more and more integrated or, as the axiologists say, to differentiate ourselves more and more. The completely differentiated person is the person who is completely himself or, more specifically, the person who completely fulfills his concept of himself, which is the concept "I." According to our definition of value, such a person is a good person, and it is this goodness that we define as moral goodness. The various expressions for moral goodness, such as "sincere," "authentic," "genuine," "honest," "true to oneself," all mean being completely who one is. This moral goodness is the subject matter of Ethics and of Humanistic or Existential Psychology. It is defined as intrinsic valuation applied to the individual person, or the "I." Here we see how these disciplines - we call them for short Ethics - grow naturally out of axiology.

Again observe how axiology connects what was formerly unconnected, such as Ethics and Sociology, Ethics and Aesthetics, Ethics and Psychology, Ethics and Economics, to name a few. The difference between Sociology and Ethics is the difference between extrinsic valuation applied to groups, in Sociology, and intrinsic valuation applied to individual persons, in Ethics. From this distinction it follows that it is infinitely more valuable to be a morally good person, in the strictly defined meaning of infinity, than to be a good trolley car conductor, baker or professor.

It is also evident how axiology can discover or define new sciences. If Sociology is extrinsic valuation applied to groups of persons, and Ethics intrinsic valuation applied to individual persons, then there must be a science that is extrinsic valuation applied to individual persons and another that is intrinsic valuation applied to groups of persons. The first, extrinsic valuation applied to individual persons, deals with individual persons as a class of functions, and is Psychology, in the usual sense of the word; the second, intrinsic valuation applied to groups of persons, deals with groups of persons identified with common causes, and is Political Science.

The difference between moral and sociological, or social, values has been fascinatingly dealt with in many works of literature, especially by Tolstoy in his short novel, *The Death of Ivan Ilyich*. Ivan Ilyich is a judge in a Russian imperial court and has all the dignity and pomposity of his profession. His appointment as Judge of the Supreme Court fulfills a lifetime ambition, and one day, while arranging the curtains in his new home in Moscow, he falls from the ladder, breaking a rib and doing fatal damage to his liver. His consciousness of

imminent death awakens in him a consciousness of the futility and worthlessness of all of his former values and he becomes aware of the importance of the "I" in him, of himself as a human being, and of other human beings. As time goes by neither his colleagues nor his own family concern themselves with him, and his only friend turns out to be his dull-witted servant, Gerasim, who relieves his pain and makes him comfortable. The story is a poignant description of the infinite superiority of moral over social values. A more recent literary work on the same subject is Dr. Zhivago by Boris Pasternak; which explains why its publication was banned in Russia. That government, based entirely on social value, would fall if moral values became supreme. It showed its consciousness of this fact in the invasion of Czechoslovakia.

The relation between Ethics and Aesthetics lies in intrinsic valuation as applied to things, which is Aesthetics, and intrinsic valuation applied to persons, which is Ethics. It can be demonstrated that a person is of infinitely greater value than a thing, for it is the only thing which contains within itself its own definition. Man is the thinking thing, as Descartes said. This relation to himself is of an infinite nature, as the German Mathematician Dedekind demonstrated a hundred years before axiology was conceived. Although a thing, considered intrinsically, has an infinity of properties, a person considered intrinsically has a higher infinity of properties. His value is not  $!_1$  but  $!_2$ , or even higher. The subject matter of Ethics and of Existential and Humanistic Psychology, therefore, is of an infinitely higher value than the subject matter of Aesthetics; and to consider life ethically is an infinitely higher value than to consider it aesthetically. This is the message of Kierkegaard's classic on the relation between Ethics and Aesthetics, *Either/Or*, written more than one hundred years before axiology. Kierkegaard's ethics is exactly the ethics that results from the system of axiology. (The relation between Ethics and Sociology, or between ethical value and social value, is minutely described by Kierkegaard in his *Point of View*, and in parts of his classic *Sickness Unto Death* (Doubleday Anchor Book No. 30).)

The difference between *Ethics* and *Psychology* is at the same time that between Existential and Humanistic Psychology, on the one hand, and Psychology in general - behavioristic, functional, Freudian, Adlerian etc. - on the other. The difference is, in axiological terms, that between the human person as intrinsic and as extrinsic value. In the former view, the person is unique, sane when one with himself, and known when loved, that is, being identified by, and with, another person. In the latter, the person is a collection of functions, sane when functioning as a member of society, and known when classified. In the former aspect man has an infinitely higher value than in the latter,  $!_1$  as against  $!_0$ . The former school understands the latter but the latter cannot understand the former. The difference between the two schools is the reenactment of an old drama played on the world stage itself in which, so far, the latter school, that of man's extrinsic value, has won, while the former has been crucified. In our age, maybe, there will be a happier ending.

The difference between *Ethics* and *Economics* is the difference between the application of *intrinsic* value to *persons* and the application of *extrinsic* value to *things*. Since intrinsic value is infinitely more valuable than extrinsic value,  $!_1$  being infinitely more infinite, in the mathematical sense, than  $!_0$ . and since *persons* are infinitely more valuable than *things*, the ethical aspect is infinitely more valuable than the economic aspect. It is, therefore, profoundly bad to confuse the moral and economic values, as for example, to sell one's child, or sell a person into slavery, or to degrade a moral value such as love, by selling it in prostitution. Intellectually, it is profoundly bad to subordinate a moral value to an economic value; and when this occurs within a political system it is, as measured by axiological science, a bad system in the strict definition of this term. For this reason, when I was young, I was certain of the fall of Nazism in spite of its triumphs in war and in the world in general. I have also experienced that the absence of moral value is beginning to plague Communism and am sure this will either reform or break it.

As early as 1953, when I lectured in a number of German universities, among the students were some from the Communist University of East Berlin who told me that, although they were convinced communists, they were profoundly disturbed by the lack of an articulated human-as against collective-morality within the Communist system. Historically, we know that revolutions within a system arise from the conflict between the *systemic* values of the system and the *intrinsic* values of the human person. However, this conflict is not limited to totalitarian systems, but only pronounced in them to the point of producing intolerable tensions. Any

government is a system dominated, to a large extent, by systemic values. The art of governing consists in adjusting as much as possible the systemic values of bureaucracy, red tape and so on, to human values. Gian-Carlo Menotti's opera *The Consul* is a dramatic presentation of the interrelation between the systemic values of a totalitarian system and a democratic system, on the one hand, and the intrinsic value of a human being, on the other. Today the student rebellions, both East and West, speak their own undeniable axiological language.

Let us now summarize the three dimensions of value in an example.

The best example for illustrating the interrelation of the three dimensions of value is love. Love is, of course, the value phenomenon par excellence. Let us take, as an example, a young mathematics student, John, who is going to Europe for his summer vacation. As he boards the Queen Elizabeth II, he says to himself, "I am going to have myself a time!" In his mind is the image of a curve, undulating, which belongs to the concept "girl." At that moment, this is nothing but a systemic concept; for he is thinking of no girl in particular but only of what might be called the principle of femininity. The second day out there is a dance and, as is customary on European boats, the girls are lined up on one side of the hall and the young men on the other. As he stares at the young ladies opposite, his valuation changes from systemic to extrinsic. Now he is seeing real girls, examples of the class "girl," from whom the common properties of the concept "girl" have been abstracted. His extrinsic valuation consists in applying the yardstick of this concept, "girl," to the examples of girlhood before him, to see which one of them fulfills this concept to the greatest degree, that is, which one has the greatest number of the properties of "girl." He weighs, as it were - and it is interesting to note that the Greek word *axios* is the English axle, meaning the axle of a scale - he weighs, as it were, the girls against their own girl-measure, namely, "girl." He finally decides on one of the girls and dances with her. While they dance, the same process of extrinsic valuation continues; he compares what he has in his arms with what he has in his mind. He dances with a few other girls and finally decides that one of them, Betty, is the best girl, which does not mean that she is morally the best but rather that, to the greatest degree, she fulfills the properties in question. He has a glorious voyage. But the day before the ship is due to arrive at Southampton, something happens to him which seems utterly irrational and can only be explained by formal axiology. When he awakens in the morning, a thought suddenly takes hold of him: Betty is not just a girl, a member of the class of girls who can be compared to other girls, but she is *the only girl in the world and incomparable!* He knows full well that there are one thousand million girls in the world, yet, he knows with equal certainty, and actually with greater certainty, that Betty is *the only girl in the world.* From this he logically concludes that, since he is a man and a man cannot live without a woman, and since she is the only woman in the world, he must live with her. He writes her an extremely strange letter, filled with poetic words and such metaphors as "my treasure," "my incomparable one," telling her that she must marry him and, adding in a postscript, that if she doesn't he will throw himself overboard. All this from a mathematician.

Of course, we all know what has happened to John. Axiologically, it is the transition from systemic valuation to extrinsic and from extrinsic to intrinsic valuation up to complete identification. John and Betty marry and live happily ever after - up to a point. For, after several months or years of married life, the process suddenly reverses itself. While John is walking along Main Street one day, he happens to notice that there are other girls in the world, and begins to compare Betty with them; and a little while later he even goes back to systemic valuation, valuing her as his housekeeper, an element in the routine of his home, and he becomes angry when the soup is not ready on time or when she squeezes the toothpaste at the top while he squeezes it at the bottom. He scolds her for being so disorganized, and when she begins to cry his heart melts and she becomes again the only woman in the world - and so in our lives we constantly swing from one dimension of value to another. Formal axiology is the norm that clarifies these situations for us.

It is clear then that formal axiology is not a game without meaning or with only logical meaning like chess, but is a meaningful game as that of mathematics. It applies to many situations of everyday life. Corporations such as General Electric, General Foods, AT and T, IBM, Nationwide Insurance Company have at one time or another used axiological advice. The last named, for example, wanted to know what is the worth of a life sold in life insurance, what kind of people should sell such insurance, and whether they should be on commissioned or salary. Another company wanted to know who would be a good salesman and how to train salesmen. Another

wanted to know what error it had made in its planning of a refrigerator after having designed the perfect motor, the perfect door, and all the other parts to perfection, but when they were put together the result was a monster. Besides these everyday applications there are at present some twenty projects in various fields of the humanities which apply formal axiology. One very extensive project in a Mexican village applied axiology to the ritual of taking mushrooms (mescaline, etc.) and to witchcraft. As a matter of fact, this was a dissertation in the Anthropological Institute of the National University. Others are in the field of management science, organization theory, aesthetics, theology, ethics, political science, and psychology. Thus, formal axiology has been used to provide the logical framework for a science of management. Organization Theory, on the basis of formal axiology, is being extended to form the basis of a science of sociology. There is an axiological analysis of literature, the value content of a work of literature is being determined with precision by the value calculus. There is a project in theology, applying axiology to the ontological proof, from St. Anselm to Kant; one in scholastic ethics on the relationship of transcendental good to axiological good. There is the application to a work of art; and of course anyone may apply it to other fields, for example political science, where a work such as Rousseau's *Contrat Social* can be fruitfully interpreted axiologically. A mathematician is applying topology to the measurement of intrinsic value; and it has been tried, and with success, to put the value calculus into musical notations; for valuation is the structuring of feeling, and so is music.

In psychology, there are a number of interesting projects. There is a project on the "Axiological Foundations of Psychology." Psychology today uses categories such as "value," "function," "self," etc., which are undefined. Formal axiology supplies these definitions. There is a project on the axiological meaning of Freudian symbolism. As you know, this symbolism is derived empirically. Formal axiology, through its theory of metaphor, determines the meaning of these symbols within the whole of the value realm.

But the most promising project, already in the practical phase, is an objective test of value differentiation and integration, the Hartman Value Inventory (or Profile). It measures the value sensitivity of a person, his capacity of seeing the relevant in a situation, his sense of proportion, degree of value distortion, his vision of value, and his organization in recognizing extrinsic, intrinsic and systemic value. In all, it provides some sixty personality features, yet takes only about 15-20 minutes to take. It is being validated in various countries; in Mexico, among other organizations, by the National University and the Social Security Administration. By the latter it is used, among other things, to measure the dosage and comparative effect of psychodrugs. Where, due to his emotional condition, the person is unable to take the test, the effect can be gauged by measuring the value content of the person's verbal output.

In sum thus, it may be said that the science of axiology, though it cannot be compared yet to natural science and its four centuries of development, is already more than a mere ideal. It has begun its actual life. Nobody knows where it will lead, but its capacity for ordering the moral life may help us one day to extract ourselves from the social and moral difficulties in which at present we are imprisoned.

The new science is being taught and we have found that learning its laws changes the character of the young people, making them more aware, more awake, and more sensitive. As a matter of fact, we have found that it changes whole families, bringing them happiness and insight. Let me mention only one such case. One of my students, at M.I.T., told me a week or so before term papers were due that the writing of that paper was "the most important thing -in my life." When I got the paper the title was "The Homecoming of a Son." The subject was that through learning the various value dimensions he had found that he had never loved his parents. He had been ashamed of them for being workers. Learning the true values-that intrinsic value has nothing to do with what a person does, but only with what he is - he had seen the injustice he had done them. He wanted to correct it, but the problem was how to do it without showing them that he had never loved them before. The paper was about the method he evolved to overcome this difficulty. It was, in short, by producing situations in which he could pour his love. This changed the whole atmosphere in the home, from one of indifference and tension to one of love. "Harmony and continual laughter prevailed." He did all this during the Christmas vacation, and wrote the paper while he acted out its content. To read it was a thrilling experience, like a miracle consciously wrought. About two weeks later he came to me with a letter from his mother. She wrote that such strange and wonderful things had happened during the vacation that she and his dad had been thinking and

talking about what it was, and they had finally come to a conclusion. The conclusion was she wrote, that they had never loved him before. "I have felt for years that somewhere along the line Daddy and I failed you in some way... Life is sure funny, isn't it? You go through the years while life is passing you by, thinking you are doing what's right and yet you are blind to what really is happening around you."

This, it seems to me, is a perfect description of the present situation of all of us. We are blind to the true values which surround us, and are within us. If the whole world could learn the true values as they were learned by this boy and his family our difficulties would largely disappear and the imbalance in human affairs, between the progress of technology and the regress in ethics, would be righted.