RULES OF RIGHTNESS

Michael Polanyi

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ABSTRACT

This is a recently discovered 1954 Polanyi lecture that was part of a lost eight-part series in Chicago. It develops Polanyi's interest in unformalized personal participation in knowledge. The lecture discusses how normative "rules of rightness" work and Polanyi expands these ideas later in PK.

[**Editor's Note:** The following hitherto unpublished lecture, as well as a second lecture, by Michael Polanyi, was recently discovered by Alessio Tartaro on the re-organized website of The Karl Polanyi Archives at Concordia University, Montreal, Canada. With the help of the Archives staff, Phil Mullins retrieved copies of both lectures, "Rules of Rightness," and "Knowing Life." These lectures, delivered February 4 and 11, 1954, are the fifth and sixth lectures of an eight-part series at the University of Chicago. These two lectures were followed by the seventh lecture in this set, titled "Persons," that was earlier published in *Tradition and Discovery* 36:3. Michael Polanyi apparently either sent or gave his brother Karl copies of these lectures near the time that they were delivered. Other lectures in the series have not to date turned up at either the University of Chicago or the Karl Polanyi Archives. These typed manuscripts suggest the texts had not yet received some of the final touches that a published essay might have received but they are clear enough and are of significant interest. In a few places, there are typographical errors in the text and in brackets following are the likely words that were mistyped. American spelling is used.

In a March 8, 1954 letter to his older sister who attended the lectures, Polanyi described his 1954 Chicago lectures as "very useful to me for it led to a sharpening of my points and tightening of my argument" (quoted in Scott and Moleski, *Michael Polanyi: Scientist and Philosopher*, 225). "Rules of Rightness," like "Persons," should be considered a stage on the way toward the June 1958 publication of *Personal Knowledge: Towards a Post-Critical Philosophy*. Parts of the lecture re-appear in *Personal Knowledge* in more than one chapter. Nevertheless, as Polanyi's letter perhaps suggests, this lecture is of interest in itself because of the ways in which Polanyi knits elements together into a coherent discussion of "rules of rightness." The lecture's focused account of "rules of rightness" perhaps makes the rich implications of this Polanyian philosophical idea clearer than *Personal Knowledge* where there is an unfolding discussion of a number of related themes in the four sections of Polanyi's magnum opus.

Tradition and Discovery appreciates the help of Ana Gomez, Coordinator of the Karl Polanyi Archives. This lecture is in Container 46- Folder 17 and is made available on the Polanyi Society website for non-commercial use by scholars and students.]

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I hope to have shown in my first four lectures that the bearing of a formalism on the facts of experience can be established only by the personal participation of the scientist. This participation has two interrelated aspects, namely its own skillfulness and the appraisal of an orderly pattern in nature. I have shown also that wherever skill is exercised or coherence is appraised, we establish a formal knowledge of a comprehensive whole in terms of our subsidiary awareness of the particulars. I have given a number of examples to show that this kind of personal knowledge is not specifiable in terms of its more impersonal particulars. Depersonalization paralyses the skill which is being practiced and destroys any meaning that is being appreciated.

However, this insistence on our personal participation in the art of knowing was not meant to give license to arbitrariness. Quite the contrary: I have represented such participation as an act of discovery, by which we submit to reality; as an effort to make sense of things as they are. Skillfulness and connoisseurship are thus seen to be exercised with universal intent.

At this point, there is an important piece missing in my picture of the exact sciences which I must supplement now, both for its own sake and because its analysis will turn out to be indispensable to the critique of biology to which it should presently lead on.

The most distinctive purpose of a scientific formalism representing experience lies in its power immensely to facilitate the process of thinking about the experience in question. Take the example of a geographic map. A rough map of England can be drawn by marking on a sheet of paper the geographical positions of the 200 largest English towns, the Cartesian co-ordinates of each mark being chosen in a constant proportion to the longitude and latitude of each town, and each mark having the name of the corresponding town printed below it. From such a map we can read off a great deal of information which we did not explicitly possess before. We can recognize from it at a glance the itineraries by which we can get about from any town to another. We may say that our original input of 400 positional data (200 longitudes and 200 latitudes) has yielded by the process of mapping 200 x 200/2 = 20,000 itineraries. The formation derived from mapping will actually be much ampler since each itinerary will comprise on the average some fifty places. This would amount to something like a million items, representing 2500 times the input. When such vast powers are generated by so crude an instrument as our map would be, we realize the immense scope of intellectual achievement to be gained by formal representation.

This power is not due to the act of denotation in itself. A catalogue of the 200 main towns of England listing their longitudes and latitudes would be comparatively useless for the purpose of finding one's way from one place to another. It could be probably done by the aid of an electronic computer, but the answers could certainly not be simply read off from the list. In order to be intellectually revealing, denotations must form a record which is more easily handled than the original facts which it represents. There are many cases like the map in which a mere inspection of the records yields a new understanding of the facts. The operational room of the Air Force Command where the changing situation of the air battles over England were continuously pictured on a large table by assistants collecting the flow of incoming reports, offered to the Supreme Commander a representation of these reports which he could grasp far better than the aggregate of the original reports. Similarly, the mere plotting of a series of measurements on paper in the form of a graph may reveal functional relationships, quite unsuspected from our knowledge of the original figures. This manner of grasping a state of affairs by a mere inspection of its symbolic representation amounts to an informal operation on the symbols.

In other instances, new light can be derived only by a formal operation carried out on the denoting symbols. Such operations lie largely in the province of formalized languages and particularly mathematics. Numbers representing the result of counting or measuring things can be used for representing one state of affairs from which we may compute other numbers giving us further new information about the same state of affairs (or some other predictable state of affairs). If, e.g., we are told that Paul is one year less than twice the age of Peter, while the difference between their ages is four, we can find the ages of each by first setting out the situation symbolically; age of Paul x, age of Peter y; $x = 2y-1$ and $x – y = 4$ and then operating on these symbols so as to solve the two equations. The result $x = 9$, $y = 5$ is then re-translated into Paul is aged 9 and Peter is aged 5.

The intellectual powers of formal symbolic operations are great. We must acknowledge that it is only by virtue of such operations that we are able to carry out any course of strict reasoning, and that all our discursive thought is but a looser form of such reasoning. No wonder that a critical philosophy (guided by the idea) of impersonal thought has seized on the chance for advancing towards its goal by completely reducing this central agency of human intelligence to the performance of certain formal rules. The hope of achieving this was recently enhanced by the construction of highly effective computers, in the first place for military purposes. Anti-aircraft guns were equipped with predictors automatically governed by the gunner's initial readings. Once the sights were set on a plane, the machines computed the course of the swiftly moving target and of the projectile ready to be sent out, operating the gun so as to assure a hit. Such high intellectual performances achieved without any intervention of man clearly offered new prospects to philosophers for pursuing the ideal of completely detached thought.

But the most effective attempt to realize this program originated earlier from the movement toward a formalization of logic, initiated by Boole in 1846 and followed up by the attempt of Hilbert in 1900 to set out completely the axioms and procedures of mathematics thus bringing the entire range of mathematics, both present and future, within the scope of an explicitly stated set of strictly impersonal operations. It is this process of formalization, as taught by modern textbooks of symbolic logic of which I now propose to define the inherent limitations.

The process of formalization is threefold. (1) it designates undefined terms (2) it specifies unproven asserted formulae (axioms) and (3) it prescribes the handling of such formulae for the purpose of writing down new asserted formulae (proofs). Throughout this process there prevails the desire of eliminating what are called 'psychological' elements. The undefined terms are said not to signify anything, but to be complete in themselves as marks on paper; unproven asserted formulae are to replace and eliminate statements believed to be self-evident; operations constituting 'formal proof' are similarly intended to replace 'merely psychological' proof.

I know that the axiomatization of mathematics pursued on these lines has great achievements to its credit. Yet I must say nevertheless that there is something absurd in the ultimate aim of this undertaking. Why use the utmost ingenuity and the most rigorous care to prove the theorems of logic or mathematics, while the premises of these inferences are to be cheerfully accepted—without any grounds given for doing so—as "unproven asserted formulas"? Such a proceeding is very much like that of the clown who solemnly sets up in the middle of the arena two gateposts with a securely locked gate between them and then pulls out a large bunch of keys from which he finally selects one which fits the lock of the gate, then passes through the gate and carefully locks it after himself—while all the while the whole arena lies open on either side of the gate posts where he could go round them quite unhindered. A fully axiomatized deductive system is like a carefully locked gate in the midst of an infinite empty area.

But I must try to put this criticism in more technical terms. I regard the attempt at a complete formalization of a deductive system as unperformable for the following reasons: (1) No undefined term can be introduced without an explanation, given in ordinary speech and amplified by some examples of its use. The acceptance of a mark on paper as a symbol implies that (a) we believe that we can identify the mark in various instances of it and (b) that we know its proper symbolic use. In both these beliefs we may be mistaken and they constitute therefore commitments of our own. (2) In agreeing to regard an aggregate of symbols as a formula we accept it as something that can be asserted. This implies that we believe that such an aggregate says something about something. We expect to recognize things which satisfy a formula as distinct from other things which fail to do so. Since the process by which our axioms will be satisfied is necessarily left unformalized, our countenancing of this process constitutes an act of commitment on our part. (3) The handling of symbols according to mechanical rules cannot be said to be proof unless it carries the conviction that whatever satisfies the axioms from which the operation starts will also satisfy the theorems arrived at. 'Proof', to use Professor Ryle's terms, is a success-word. No handling of symbols to which we refuse to award the success of having convinced us that an implication has been demonstrated can be said to be a proof. And again, this award is an unformalized process which constitutes a commitment.

Thus at a number of points a formal system of symbols and operations can be said to function as a deductive system only by virtue of unformalized supplements to which we accede by personal commitment. Symbols must be identifiable and their meaning known, axioms must be understood to assert something, proofs must be acknowledged to demonstrate something. This identifying, knowing, understanding, acknowledging, are unformalized operations on which the operation of a formal system depends. We may call them the semantic functions of the formal system, which are performed by a person with the aid of the formal system, when the person commits himself to its use.

Formalization can be extended to hitherto unformalized semantic operations, but only if the resulting formal system can in its turn rely on hitherto unformalized semantic supplements. The legitimate purpose of formalization lies in the reduction of informal functions to what we believe to be more limited and obvious informal operations; but it is nonsensical to aim at the elimination of informality. Such an attempt is logically on par with the policy of the Hungarian Minister of Transport, who decided to eliminate the swaying of the last carriages of trains by issuing an order that the last carriages are to be detached from all trains.

But this endeavor has further forms, carrying wider implications, to which I have yet to attend. The performance of complex symbolic operations by a relatively detached formal process, is physically embodied in the operations of automatic computers. Other intelligent behavior has been successfully imitated by mechanical models and it has been argued effectively that all intelligent manifestations could be matched by the workings of some suitably constructed machinery. This raises the question whether, in such a case, machines should not be accredited with possessing intelligence and having a mind of their own.

The problem is more serious than it might appear at first sight, for the science of neurology is based on the very assumption that the nervous system—being no more than a machine functioning according to the essentially known laws of physics and chemistry determines or at least represents all the manifestations which we normally attribute to the mind of man. Moreover, the study of psychology, in pursuing the ideal of scientific detachment, has shown a consistent tendency towards reducing its subject matter to explicitly formulated relationships between measurable variables, which as such can always be represented as the performances of a mechanical artefact. It is therefore of real importance, to ascertain whether there is any essential difference between machine and mind, and if so, what this difference consists in.

From what I have said about the limits of formalization, the difference between machine and mind should be found in the unformalized semantic operations by which formal systems must be supplemented in order to perform any intelligent act. These are the actions of an intelligence using the formal system, that is of an intelligent mind which understands and correctly operates this system. Mind, *thus defined as the agent directing an irreducible residue of unformalized operations, is inherently unformalizable and therefore not capable of being represented by any artefact.* By the same token its functions are not capable of representations by any neural model and neurology cannot ever account for these functions in terms of any specifiable system of physico-chemical processes. The existence of an irreducible unformalized residue is thus seen to imply a conception of the mind essentially undetermined by any specifiable material mechanism.

Since a machine on the other hand must be conceived as determined by a specific material mechanism, we have here a fundamental difference between mind and machines, and equally between the mind and any neurological mechanism underlying mental functions.

We may say more particularly, that a formalized deductive system is an instrument, which as such requires for its logical completion a mind using it as its instrument in a manner not fully determined by the mechanism of the instrument, while the mind of the person using the instrument requires no corresponding logical completion. For obviously a person can carry out computations by the aid of a machine or without it, but a computing machine cannot be said to function except within a tripartite system:

I II III
mind---→machine---→things to which mind informally refers.

It is true that some use of articulation is present in almost every conspicuous mental process, but the intelligence of animals shows that articulation is not strictly indispensable for the exercise of intelligence. We have actually met already in previous lectures an ample range of informal intellectual performances of a very high quality, exercised by scientists.

By a variation of our tripartite system we may now recognize the logical limitations of an exact experimental psychology. Replacing 'machine' by a mind ('mind 2') we have,

I II III
mind (1)---→mind (2)---→things to which mind (1) informally refers.

Insofar as mind (2) can be replaced by a machine it functions as an instrument of mind (1). If for example the psychologist had discovered a mechanism which completely accounts for the performance of mind (2) in solving a certain type of problem or drawing a certain kind of inferences, mind (1) could use mind (2) as an instrument for solving this kind of problem or for drawing this kind of inference, much as it would use a computing machine for such a purpose. In doing so mind (1) would have to exercise unformalized powers which cannot be represented by a machine and which are lacking in the mechanical model of mind (2). These unformalized functions include the capacity for understanding a meaning and for reaching convictions by an act of responsible judgment. By virtue of these powers of mind (1) the mechanical picture of mind (2) has a meaning for mind (1) which results from an intellectual judgment of its own, even while it represents mind (2) as lacking any similar powers.

This inconsistency between the powers which the observing mind is confidently exercising in the very act of denying them to another mind under its observation, can be excused if the observer is concerned only with the automatic responses of his subject. When a physiologist records the reflexes of a person he is rightly claiming for himself powers of judgment which are absent in the faculties he is examining in another person. The situation may be similar when a psychiatrist examines a patient having an epileptic seizure; and to the extent to which mental illness deprives those suffering from them of control over their thoughts, a psychiatrist will observe the underlying pathological mechanism from the superior position assumed by mind (1) towards mind (2).

But when two persons envisage each other as equals each must credit the other with the powers he claims for himself. They must reciprocally acknowledge each other as centers of unformalized mental activities. And each must accredit the other with a striving to fulfill intellectual standards acknowledged by itself, which is logically indispensable to its rational control of unformalizable mental capacities.

This responsible core of personhood cannot be observed in terms of specifiable variables and is therefore absent from any explanatory model of a person embodying relations between such variables. It is only by conversing with this responsible core of a fellow person that we can come to know it personally. Only by repudiating the logically untenable deal of completely formalized thinking, can be we gain the conception of a mind capable of convivial interaction with other minds.

More generally, the attempt at knowing man impersonally necessarily leads to a conception of man altogether lacking the capacity of knowing. Such a man could only go through the motions of mental activity but not have any genuine intelligence. Only by actively participating in the intelligent personhood of others can I recognize them as persons; and the recognition of such personhood cannot therefore be consistently upheld unless I acknowledge and accredit my own participation as contributing to it.

This conclusion is a slight digression on which I could not fail to engage in analyzing the limits of formalization. For the personal supplementation required by a computing machine in order that it may function as an instrument of thought coincides with the deficiencies which make a computing machine fall short of representing the responsibly thinking mind. This argument leads up for the first time to the unspecifiability of a living function and a living being. The formalization of thinking and of thinking man amounts to their identification with such of their particulars as can be depicted by a formalism or a machine, and it is this which was shown to be unperformable. Formalization or mechanization is of course only one among many possible exhaustive specifications of a responsible person which destroy its responsible personhood. There are psychological and physiological representations which lead to the same result. But I must not pursue this theme any further here, before having answered more fully my original question concerning the possibilities of depersonalized thought.

Resuming therefore my logical analysis of deductive systems and computing machines, I shall now generalize its conclusions to all systems of rules and all kinds of machines. I want to take as my clue the fact that both rules [and?] the operational principles of machines are normative, in the sense that <u>within their own framework they can only function</u> rightly.

In respect to rules this is quite obvious. They presuppose an intention which will be satisfied by their observance. Some rules like those of logic or ethics convey intentions which are widely held, while others may be merely personal commands, like the notice board 'No Trespassers'. Certain rules may be unacceptable to us, or considered invalid, but they still continue to express someone's convictions of what is right, and to operate that person's appraisal of relevant occurrences. All the operations of a system of rules are necessarily believed to be right by someone upholding the system of rules.

I want to show that machines—not only computers, but all kinds of machines—have a similar normative character, and I wish to seize then upon the curious fact, which is not quite so easily apparent in the functioning of rules like those of logic or ethics, that the actual operations of all these normative systems are due to the causal interaction of particulars having themselves no normative intent. Let me cast this observation into a more concrete form, specializing for the moment on machines.

Take mechanical devices like clocks, sewing machines, typewriters and jet engines, and call all such artifacts 'machines'. I can identify any such things as a machine only if I believe that it works, which includes the assumptions of a purpose which it achieves in working; and no purpose can be said to exist unless I either share it or consider it to prevail in some other person. Self-propelled machines have movable parts constituting an internal context of their own, but nevertheless the context of the machine must be taken to include its purpose together with the person who entertains the purpose.

When a machine is in good working order it presents an instance for the operational principle which would characterize it in a patent. The principle of a machine describes its various parts and how each of its parts fulfills its function by acting upon each other as a means for achieving the purpose of the machine. The law of patents acknowledges the invention of a new machine as taking place when its principle is first clearly formulated or when it is first put into practice.

The same machine can be constructed from the most varied materials and in so [many] different shapes and sizes that only a close analysis will identify these machines as embodiments of the same principle. A patent which attempts to cover all conceivable embodiments of a mechanical principle will avoid therefore mentioning the physical or chemical particulars of any actually constructed machine except insofar as these particulars are essential to the operation of the principle. Just as the rules of algebra will operate for any set of numbers for which the algebraic constants of the equation may stand, so the operational principle of a machine is valid for any particulars which are covered by its general terms and such a principle must be stated, therefore, like the rules of algebra, at the highest possible level of abstraction.

The normative intention implied in the conception of a machine is manifested by the fact that it does not cover any instances of failure; or perhaps even more obviously in the fact that it sets off by contrast the conception of a machine that is out of order. When a boiler bursts, a train derails or a crankshaft snaps, these things behave against the rules laid down for them within the conception of the machine. Clearly, while this conception accredits certain events as orderly performances, it condemns others as failures.

A patent defining a machine in terms of its operative principles tells you how the machine should function; but it can say nothings about the possible failure, for these consist in departures from the principles of operation by which the patent defines the machine. However, failures do occur nevertheless and a scientifically trained engineer may be able to tell us why. He might observe strains under which the material of the machine will break down, or corrosive effects which whittle away its substance. So it would look as if the patent gave merely an imperfect knowledge of a machine, which has to be supplemented by the scientist who comprehends both the correct functioning and the failures of a machine.

But this is not so. The most exhaustive physical and chemical investigations cannot replace the understanding of a machine as conveyed by a correct statement of its operational principles. A physical and chemical analysis can be carried out only on a particular sample of the machine. It would reveal therefore much that is irrelevant to the operation of the machine, while it would not in itself establish anything that is essential to its operation.

This may sound strange, but suppose you are faced with a piece of machinery the purpose of which is quite unknown to you so that you have no idea how it operates. It would be quite useless to make an exact physical and chemical map of such an object. You could predict from such data all possible configurations which the problematical object may take up in the future in a wide variety of hypothetical circumstances. But this would not in itself tell you whether such predicted events should be regarded as the proper operation of your machine or as a disastrous break-down of it. Not until you have guessed what the thing is for and the manner in which it is supposed to achieve its purpose, can your physical and chemical data be of any use to you. It is not the material detail, but its putative character which constitutes a machine. A machine is a personal fact which cannot be specified in the comparatively depersonalized terms of physical and chemical data.

Should we wish to make use of physical or chemical observations in order to deepen our understanding of a machine—for example of a clock—we must have previously guessed or at least surmised that the clock was a time-keeping instrument and have some intimation of the functions performed by its various parts, as of the weights which drive it, the pendulum which controls its speed by rhythmically releasing the escape and the hands which indicate the passage of time. We could then go on to verify these operational elements and gain a more precise insight into them by the aid of physical and chemical observations, suggested by this context. This should subsequently enable us to improve on the operational principle of the clock and perhaps transform it from a household timekeeper into an instrument of precision for the use of astronomers. While on the other hand no physical or chemical observation of clocks will be of any use to a clockmaker unless such observation has a value in the light of the operational principles of a clock; by telling us how the working of some type of clock is made possible, or else is hampered, or is caused to fail altogether.

Some physical and chemical characteristics of a machine, such as its weight, size and shape or its fragility, its susceptibility to corrosion or to damage by sunlight, will be of interest in themselves on certain occasions, for example to a carter undertaking the transport of the machine. But this is about as much as the scientific study of a machine can achieve when pursued in itself, without reference to the principles by which the machine performs its purpose.

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These illustrations should suffice to make it clear that the operational principles of machines resemble [a] system [of] rules, like those of logic or ethics, by the fact that they set up formal standards of rightness. As in logic or ethics, these rules must be assumed to be accredited by some person who accepts their operation in respect to the things to which the rules refer.

Machines, like any other embodiments of rules of rightness accepted by one person, may be altogether repudiated by other persons. I may say of a machine that it cannot work. I say for example that the wheel of perpetual motion described by the Marquis of Worcester in 1663 could not be kept circling around by the succeeding descents of the weight attached to its rim and therefore it could not and cannot work. I can analyze such a machine in terms of its alleged operational principles and show that these contradict the law of conservation of energy which I believe to be true. A criticism of this kind does not deny that the machine is defined by certain principle of rightness, but merely denies that these are right. It is a critique of rightness, not very different from that which we could exercise in criticizing logic, ethics or law, except for the fact that it often relies on natural science which may expose certain of its operational principles as unperformable.

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We may now sum up conclusions and cast them in a new form. I started off by showing that logical operations, in order to be effective, must be supplemented by a person relying on them in respect to something to which they refer. They must function as the middle piece in a tripartite system with a person at one end carrying out through them certain unformalized operations at the other end. The formal rules mediate the personal appraisal of its user, guiding him in carrying out computations or logical proofs, in behaving correctly or judging others correctly, be it in respect of their behavior, or of some computations or logical proofs which they put forward. It has appeared that all machines have to be considered as "middle pieces" in a similar sense. They function in accordance with principles—similar to those of logic or law—which are rules of rightness and these principles serve as guides for the appraisals of the events occurring in the machine or caused by the machines outside themselves.

And we can now generalize in respect to this whole group of formal instruments what has already been adumbrated for the case of the machine. Rules of rightness can never account for failure, and there is a difference therefore between the terms in which we account for anything that is in accordance with them and anything that is not. Anything that is thought to be in accordance with logic is accounted for in terms of logical reasons. Anything that is believed to be in accordance with the law is accounted for in terms of legal reasons. Ethical behavior is justified in terms of moral reasons. This corresponds to the fact that the proper functioning of a machine, as well as its design and the nature of its several parts are all accounted for in terms of reasons derived from the purpose and operative principles of the machine.

Not so if something goes wrong. An error is a process of inference which (though it can be defined as a deviation from logic) cannot be accounted for by logical reasons, but can only be understood psychologically, by reference to some disturbing causes. A judicial error cannot be accounted for in terms of the law, but only as a result of such causes as personal bias or other extraneous facts. This is on the par with the way we account for the breakdown of a machine, namely by the physical or chemical properties of its parts.

And again, the inverse is true as well. It would be meaningless to enquire into the causes of a mathematical theorem. Psychology cannot account for the rightness of logical inferences, nor for the rightness of the law. Any more than physical or chemical observations can account in themselves for the operational principles of a machine.

We can now go further and formulate the following general principles. Any system of causes which accounts both for failures and successes, as defined by a system of rightness, necessarily ignores the difference between what is right and wrong according to that system of rightness. Any causal account of the process of thought, whether given in terms of a mechanical model, or neuro-physiological mechanism, or a psychological analysis, is lacking the grounds for accrediting a process of logical inference. If any such account of human thought claimed to be exhaustive, it would deny by implication the very existence of any right process of inferences. The same holds for the analysis of ethical judgments or of processes of law in terms of psychological or other causes. Such a system of causation contains no grounds for constructing the conception of right behavior or correct judgment, and if it claimed to be exhaustive, the system would imply the denial of any such rightness.

Pan-psychologism, like pan-mechanism, or for that matter pan-sociologism or pan-historicism would spell logical, moral and legal nihilism. Once more we are faced here with a kind of unspecifiability. Rules of rightness and things which function according to rules of rightness exist only by virtue of someone's personal commitment to their principles of operation and valuation. Any attempt to specify them in terms of more depersonalized particulars, not charged with this personal commitment, necessarily denies the whole system of beliefs accredited by this commitment. The case is analogous to the kind of paralysis and destruction of meaning due to a dismemberment of a logically unspecifiable whole, except that in the present case we are dealing with formal rules of rightness and with machines operating according to formal rules, which implies that our personal participation in these wholes consists in the acceptance of certain rules of procedure and appreciation. It is the rightness of the behavior following these rules which then turns out to be logically unspecifiable in terms of the observed particulars of such behavior.

It has been said many times, since Hume, that we can never infer what <u>ought</u> to be the case from a knowledge of what <u>is</u> the case. The acceptance of personal knowledge would affiliate Hume's theorem to the general fact of logical unspecifiability and would accordingly regard the incommensurability of the 'is' and the 'ought' as arising not between two utterly different categories of judgment, but merely between two different degrees of personal participation in the act of our knowing. The division would no longer imperil the validity of the <u>ought</u>, but would on the contrary lend support to it by acknowledging its kinship with the validity of the <u>is</u>.

No longer is then the great and perilous issue of man's moral nature allowed to hinge on a slight grammatical distinction, but it is seen standing instead in a much larger perspective. Being affiliated to the unspecifiability of personal knowledge in all its variants, it is connected with such essential characteristics of our universe as the unspecifiability of mind in terms of matter, which I demonstrated earlier in my analysis of mechanisms and neurological systems as thinking machines.

But this is not to say that the realm of natural causation is irrelevant to the conduct of logical thought or to the fulfillment of ethical and legal imperatives. Just as the operational principles defining a machine must take into account the physical and chemical properties of matter in order to be embodied effectively in actual pieces of machinery, so in like matter all rules of rightness accepted by us can become operative only within a given set of physical, psychological, social or historical conditions. To the responsible person committed to a system of such rules, the totality of these conditions represents the terms in which the problem of right thought and right conduct is set to him. This given bodily and cultural situation for which he bears no responsibility, demands of him that he shall fulfill his responsibility within this particular situation. The circumstances of this situation offer him his opportunity for acting rightly, as it also limits his possibilities for doing so and lays temptations in his way for falling short of what he could do.

Thought or action guided by reason cannot arise except within a body and a mind actuated by causes. They are the indispensable conditions of man's calling. But when natural causes are assumed to <u>determine</u> the outcome of thought or action, they deny the very conception of human reason. The distinction is decisive, and underlies the conception of commitment to which these lectures should introduce us.