Chapter 2 The Social-Natural Environment

§ 1. The Term "Social" and Its Connotations

The *Dictionary of Sociology* [Abercrombie, *et al*. (2006)] does not provide a definition for the adjective "social" and so it must be assumed that in sociology this term is employed in a non-technical language-dictionary connotation. Now, living languages (languages regularly in current expressive use by some group of people) evolve by adding new words, discontinuing the use of some words and adding additional contexts and connotations to other words[1]. If we employ a particular word from a living language in a technical context it is necessary to somehow "freeze the meanings" of that word so that our understanding of its meanings does not gradually shift and change over time. One way to do this is to pick a dictionary with a specified publication date or edition number as a conventional reference standard, thereby pegging the definitions of words (most words in most languages have more than one definition) to a specific moment in history. I follow this practice, and in this treatise (as well as my other technical works) I use Webster (1962) as the reference standard for English language terms. It is a well-researched dictionary, is very thorough in its coverage of the English language (up until 1962), and the quality of the scholarship that went into its compilation is unquestioned[2].

Webster (1962) provides ten definitions for the adjective "social." Of these, nine are metaphors or are derivative from the following primary definition:

> **social**, *a*. [L. *socialis*, from *socious*, companion.]
>
> 1. of or having to do with human beings living together ~~as a group~~ in a situation requiring that they have dealings with one another.

This definition, with the indicated phrase "as a group" struck out, is used in this treatise as the technical definition of ***social***. The reason I strike out that phrase is because the word "group" is a nominal designation made by some particular observer (cf. the Webster's definitions of the word "group") and whether or not the people are living "as a group" is subject to numerous ambiguities in the meaning of what constitutes "living together." We will understand the context of "requiring" here as "living in such a way as to necessitate" that the people will have intercourse (dealings) with one another from time to time. As for "necessitate," this term is used in its technical context in Critical metaphysics and mental physics [Wells (2011); this is the reference source for the numerous Critical and mental physics technical terms used in this treatise].

We will technically employ the word ***situation*** to mean ***the combination of circumstances at any given moment*** [Webster (1962), def. 4(a)]. In Critical terminology, a ***circumstance*** is *the outer connection* (i.e., a *nexus* between two or more objects) *in which an occurrence happens*. An ***occurrence*** is *a single act with its result*. A ***social situation*** is a situation in the context referred to in the above definition of "social." A ***social environment*** is the entirety of all social situations in which a particular human being is living at a given moment.

This definition of social environment is obviously one that obtains its context from a particular human being. Therefore, for every definable *group* of human beings we allow for the possibility

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[1] For this reason, Kant advocated the practice of using words from so-called dead languages (languages no longer used as the expressive language by any populace) as technical terms "because their meanings do not change." In his case, he almost always chose Latin as the dead language from which to obtain his basic terminology. In translating Kant's work, it is always an error to change Kant's Latin phrases.

[2] In the interests of full disclosure, it also happened to be my family's dictionary when I was growing up, I inherited it from my parents, and today I house it in my study at home. These personal factors do not detract from its quality as a reference standard, and I have yet to find any another English dictionary that is not-inferior to it in scope, content or scholarship.

of multiple social environments, each specific to one specific person. This is because it cannot be validly presumed that every social situation for every individual in the defined group is identical. Not every person experiences precisely the same set of circumstances nor will every individual understand the outer connections between himself and other people in the same way. It is a common habit to simply *presume* that there is one social environment present in any intercourse among people. But this presumption disregards the *specific* psychology of the human beings involved. It is a habit of thinking, therefore, that neglects the social atom and so negates the possibility of social-natural sociology at the outset. This is a specific encounter with the difference that an epistemology-centered metaphysical basis makes (in comparison to an ontology-centered one) for social-natural science.

The doctrine of mental physics teaches as a theorem that *all meanings are at root practical*. This means that every meaning a person *designates* for an object is ultimately grounded in the actions taken by the person who designates the meaning in regard to the object. The theorem is deducible from the acroams of Critical metaphysics proper and is capable of being empirically tested. Psychology research has, in fact, already carried out such testing, and the findings concur with the consequences of the theorem. Piaget and Garcia reported,

> It follows that an object is a set of conjoined predicates and its meaning amounts to "what can be done" with it, and is thus an assimilation to an action scheme (whether the action is overt or mental). As for the actions themselves, their meaning is defined by "what they lead to" according to the transformations they produce in the object or in the situations to which they are applied. Whether we are dealing with predicates, objects, or actions, their meanings always implicate the subject's activities, which interact either with an external physical reality or with elements that were previously generated by the subject, such as logico-mathematical entities.
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> Furthermore, we may distinguish various degrees in meanings: They may remain "local" in that they relate to limited data and to particular contexts; they may become "systematic" in laying the groundwork for structures; and finally they may become "structural" when they pertain to the internal compositions of already constituted structures.
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> As for the meaning of meanings, it is that they ["meanings"] are only instruments for understanding, in contrast with mere observations which, before being endowed with meanings, can only provide extensions devoid of any intelligibility. The opposition Frege established between *Sinn* (meaning) and *Bedeutung* (denotation) therefore isn't an essential one because the latter is determined by the former. In this regard, the purely extensional truth tables [of formal logic] should be replaced by variable extensions that are subordinated to meanings. [Piaget and Garcia (1987), pp. 119-120]

 Side note: Many American psychologists oppose Piaget's psychology doctrine, primarily, it appears, from nothing else than pseudo-metaphysical prejudices. There have been published articles in the psychology literature purporting to have found empirical evidence that contradicts Piaget's theory. I have examined many of these, and I have found that the conclusions of alleged contradictions are ungrounded, involve ontological presuppositions that clearly lack objective validity, and not infrequently involve a logical *saltus* in reasoning that renders the conclusion invalid even on purely formal grounds of normal logic. The alleged counterexamples are nothing of the sort. The strength of Piaget's work lies not only in the extraordinary scope of the doctrine but, more fundamentally, in the fact that Piaget and his collaborators made a genuine and strenuous effort to keep their metaphysical presuppositions epistemology-centered. In the latter they did not always succeed and some ontology-centered errors did creep into the doctrine from place to place as a result. But in the main they maintained the correct metaphysical perspective, and Piagetian doctrine is the only doctrine of empirical psychology presently extant that does so as far as I know.

This central fact – namely, that it is not objectively valid to presuppose an abstract universal social environment for human intercourse – is something that has given sociology a great deal of unsurmounted trouble ever since its inception in the 19th century. From the *Dictionary of Sociology* we have the following:

> **sociology as science** A long-standing controversy in sociology is to what extent or in what ways sociology is science. Sciences are commonly understood as having certain objectives and using particular methods to reach those objectives. Most fundamentally, they aim at causal explanation (by means of theories) of regularities in the natural world. They attempt to provide theories which in turn generate testable hypotheses. . . Many sociologists (often called positivists) believe that their subject has many of these features of sciences. They are interested in causal explanations of phenomena in the social world by confronting theories with empirical evidence which is often quantified. It is even said that certain types of causal modeling may be equivalent to the experimental method. . . There are, however, more fundamental objections to the view that sociology is, with some relatively minor exceptions, like the natural sciences. These objections are of two kinds. First, it has been argued that human beings cannot be treated in the same way as objects in the natural world because, among other things, they have the capacity to reason and to make active sense of their world[3]. Sociologists, on this view, cannot aim to produce theories which give causal explanations of social behavior but only ones which provide understanding[4] . . . The second objection to the positivist view of sociology is that, unlike natural science, sociology cannot be separated from value judgments about social behavior. Because sociologists are themselves members of the society they study, they simply cannot make objective studies of society; they can see social reality only as it is filtered through a set of value judgments. [Abercrombie *et al*. (2006)]

The second stated objection here is, of course, quite true *if one's metaphysical presuppositions are ontology-centered and once one has made the abstraction of removing actual people as the social atoms of the science*. The objection is ungrounded, however, when the science is undertaken using Critical and epistemology-centered metaphysical foundations and the individual human being is kept in the context. This last distinction speaks to what Piaget used to call the normative convention of a science. An ontology-centered system is stuck with the normative convention of sociologist-as-observer-and-filter, therefore his theories are subjective, and therefore sociology as a natural science is unobtainable. This is not so for a sociology grounded in Critical epistemology and disciplined by the doctrine of mental physics.

As for the first objection stated in the above, this, too, is perfectly true for ontology-centered systems and doctrines. It is perfectly untrue for epistemology-centered doctrines disciplined by mental physics. The conclusion of the objectors that present-day sociology is not a natural science is perfectly correct. The conclusion that it *cannot* be a natural science is false.

Abercrombie *et al*. also provide (in unquoted segments of the above entry) some discussion of the role of experiment in the methods of natural science and correctly point out that the notion of primacy of experimentation does not hold for a number of doctrines generally recognized to be sciences (such as astronomy). More than anything else, the insistence that a science must conduct controlled laboratory experiments is an insistence proper for physics (astronomy and a few other subspecialties excepted), chemistry and biology. It is, however, a mere physics-centric prejudice not applicable in general. I discuss this at length in Wells (2006), chapter 2. It is important to

[3] It is clear from the context of this statement that by "objects in the natural world" the authors mean dead-matter objects. By natural science they mean physics, biology, chemistry and their offspring.
[4] *All* scientific theories provide understanding. This is obvious once one understands the Critical meaning of the term "understanding." Furthermore, they do so by "causal explanation." This statement in the *Dictionary* is internally inconsistent, another gift from ontology-centered pseudo-metaphysics.

point out in this regard that there has long been a carelessness in usage of the terms "observation" and "experiment." Furthermore, there is a common misconception held by many scientists concerning the meaning of the term "experiment." The misconception is based on an error of analogy, and once it is properly cleared up the concerns recorded by Abercrombie *et al*. cease to be *real* concerns. This was pointed out quite correctly, accurately, and in detail by Bernard in the nineteenth century:

> Men of science learn every day from experience; by experience they constantly correct their scientific ideas, their theories; rectify them, bring them into harmony with more and more facts, and so come nearer and nearer to the truth.
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> We can learn – i.e., gain experience of our surroundings – in two ways, empirically and experimentally. First there is a sort of teaching or unconscious and empirical experience, which we get from dealing with separate objects. But the knowledge which we gain in this way is also accompanied necessarily by vague experimental reasoning which we carry on quite unawares, and in consequence of which we bring together facts to make a judgment about them. Experience, then, may be gained from empirical and unconscious reasoning; but the obscure and spontaneous movement of the mind has been raised by men of science into a clear and reasoned method, which therefore proceeds consciously and more swiftly toward a definite goal. Such is the experimental method in the sciences by which experience is always gained by virtue of precise reasoning based on an idea born out of observation and controlled by experiment. In all experimental knowledge, indeed, there are three phases: an observation made, a comparison established and a judgment rendered. ***By the experimental method, we simply make a judgment on the facts around us, by help of a criterion which is itself just another fact so arranged as to control the judgment and to afford experience*** [5]. Taken in this general sense, experience is the one source of human knowledge. . .
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> Two things must, therefore, be considered in the experimental method: (1) The art of getting accurate facts by means of rigorous investigation; (2) the art of working them up by means of experimental reasoning, so as to deduce knowledge of the law of phenomena. We said that experimental reasoning always and necessarily deals with two facts at a time: observation, used as a starting point; experiment, used as conclusion or control. In reasoning, however, we can distinguish between actual observation and experiment only, as it were, by logical abstraction and because of the position in which they stand.
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> But outside of the experimental reasoning, observation and experiment no longer exist in this abstract sense; there are only concrete facts in each, to be gotten by precise and rigorous methods of investigation. We shall see, further on, that the investigator himself must be analyzed into observer and experimenter; not according to whether he is active or passive in producing phenomena, but according to whether he acts on them or not, to make himself their master. [Bernard (1865), pp. 12-13]

Experimental method does not subsist in whether you use a Bunsen burner, drop a rat into a tank of water or roll a ball down an inclined plane. It subsists in how you select which fact or facts of experience to use as controls and which fact or facts of experience you select to treat as observations-under-scrutiny. Physics has its ways of *practicing experimental method* (and calls the objects of these practices "experiments"). It is, however, an absurd presupposition to presume that the methods most appropriate for physics must also be those which alone are appropriate for every other topic. By the standard most often employed in physics, astronomy can conduct no experiments whatsoever (computer simulations are not experiments because they are do not work with facts of experience but, rather, mathematical objects). By that standard, astronomy is not a

[5] I have added the emphasis here because it is the root meaning of "experimental method" as Bernard explained scientific method. Notice that the "criterion" is "just another fact" and *nothing is said about how we obtained it*. There is more than one way to obtain it. Bernard goes on to amplify on this point.

science, much less "physics," so far as a dogmatic physicist must judge it. Similarly, geology is very limited in its ability to "experiment" in the physics-context of what a proper "experiment" is; shall we say geology is not a science either? That would be absurd. Bernard's *real explanation* ("*Realerklärung*") of what is *actually* an experimental method is epistemologically-centered and objectively valid under Critical epistemology and mental physics.

It is a necessary part of the doctrine of any special science that its doctrine include a doctrine of method explaining what is to constitute experimental method for that science. There is no *a priori* prescription or rule that says the divers special topics of the divers special sciences must all be treated according to some specious "universal" doctrine of experimental method. Rather, it is a fundamental task for the practitioners of a particular special science *to develop* the most appropriate doctrine of experimental method for their special empirical science *as an integral part of that science*. The method must, furthermore, be as "active" and "evolving" as the rest of the special science itself is. The puzzling fact that collegiate curricula in science do not teach this to the students is a fact I regard as disturbing and it evidences that we are merely *training* and not *educating* science students today.

This is quite a string of consequences to come boiling out of the starting point of this section, namely, Critical analysis of the real explanation of the term "social." We are going to run into numerous additional instances of this sort as we proceed with this treatise. All of them are going to be consequences of adopting epistemology-centered metaphysics and abandoning ontology-centered prejudices. For our most immediate purposes, though, the significant consequence is that sociology as social-natural science *is possible*. It can't be physics. It *can* be a natural science because it doesn't have to *be* physics. Physics is just another one of the special sciences and it has *nothing whatsoever* it can say *as science* about social phenomena. The physicist's atom and the social-natural scientist's atom are different. Real sociology is defined near the end of this treatise.

The next consequence of our real explanation of social environment is a logical system for the classification of social environments. This system will prove to be of large practical fecundity for analyzing divers social environments and for understanding the grounds of human behaviors in these different environments. The logical classification system is threefold, corresponding to the three distinct logical functions of Quality in Critical representation theory[6]. The Qualitative species of social environment are: (1) the pure state-of-nature; (2) the state-of-civil-nature; and (3) the mixed-state-of-nature. Our next task is to examine these.

§ 2. Social Situations, Social Environment, and Social Chemistry

All three logical species of social environments take their *real* (natural) grounds from the Critical epistemology and mental physics of the *Realerklärung* for a mental Object called Obligation (*Verbindlichkeit*). This Object is a *noumenon* stationed at the horizon of possible human experience, and we must discuss it in detail later in this treatise as to its grounds of objective validity and its relationship to human experience. I think, however, that it is wise to lead up to this explanation according to Aristotle's dictum of beginning with things that are clearer to us (in experience) and working our way step-by-step to the root explanation (which corresponds to what Aristotle called "things that are clearer by nature" once we have applied what is called "Kant's Copernican turn" to Aristotle's ontology-centered metaphysic to make it epistemology-centered). This we can do because *Realerklärung* of Obligation is not utterly foreign to notions most of us already know. ***Obligation*** is ***an overall orientation of judgmentation in the self-determination of appetites*** [Wells (2011)]. "Appetite" in Critical context doesn't imply "I'm hungry" but refers instead to the human being's power to be the agent of his own actions.

[6] Refer to Wells (2009), chapter 2, for an introduction to Critical representation theory.

Mental physics teaches that human beings first learn and comprehend abstract concepts by beginning with particular and concrete concepts. The abstract concept is a generalization of these particulars, and only after a human being has formed the abstract concept can he apply it to gain a deeper understanding of additional particular and more concrete concepts. Because the usual English word "obligation" is tightly bound to divers notions of ethics, the greater number of people tend to have a "gut reaction" (a strong affective perception) to the word, and I wish to divert this subjective psychological reaction away from the tendency for it to overwhelm the real explanation of the *technical* term Obligation. I think this can most readily be accomplished by beginning with distinctive kinds of social phenomena characteristic of the three divisions. Here we are helped by the fact that many people already have had some experience with the historical contexts of two out of our three species terms, regardless of whether a particular person has studied the original source material or merely, in a metaphorical manner of speaking, "picked up the context by mental osmosis" somewhere in the course of his experience in life. The idea of the pure state-of-nature is one of these "understandable via osmosis" ideas, so we begin with it.

We find the first Renaissance-era recording of ideas characteristic of what would in time come to be called the state-of-nature penned by Machiavelli:

> Everyone admits how praiseworthy it is in a prince to keep faith, and to live with integrity and not with craft. Nevertheless our experience has been that those princes who have done great things have held good faith of little account, and have known how to circumvent the intellect of men by craft, and in the end have overcome those who have relied on their word. You must know that there are two ways of contesting, the one by the law, the other by force; the first method is proper to men, the second to beasts; but because the first is frequently not sufficient, it is necessary to have recourse to the second . . . Therefore it is necessary to be a fox to discover the snares and a lion to terrify the wolves. Those who rely simply on the lion do not understand what they are about. Therefore a wise lord cannot, nor ought he to, keep faith when such observance may be turned against him, and when the reasons that caused him to pledge it exist no longer. If men were entirely good this precept would not hold, but because they are bad, and will not keep faith with you, you too are not bound to observe it with them. Nor will there ever be wanting to a prince legitimate reasons to excuse this nonobservance. [Machiavelli (1551), chap. XVIII]

If he were alive today, Machiavelli would feel right at home working as a political advisor for the national committee of either of America's two dominant political parties. The partisanship, vitriol and deceptive propaganda that have come to characterize both parties over the past forty years are such that it is as if their so-called "talking points" and their vilification of opponents were coming straight out of the pages of *The Prince*. Machiavelli would probably chastise most elected politicians for oratorical incompetence, however, because

> it is necessary to know well how to disguise this characteristic, and to be a great pretender and dissembler; and men are so simple, and so subject to present necessities, that he who seeks to deceive will always find someone who will allow himself to be deceived. [*ibid*.]

After *The Prince*, the next major stab at clothing ideas of the Machiavellian sort as a law of nature is found in the writings of the interesting 17th-century English philosopher Thomas Hobbes. Like Machiavelli, Hobbes had what I would call a dark outlook on human Nature. Out of this dark outlook, though, came the premise that Rousseau would later make the prime condition of the social contract. Hobbes wrote,

> The *right of nature* . . . is the liberty each man hath to use his own power as he will himself for the preservation of his own nature; that is to say, of his own life; and consequently of doing anything which, in his own judgment and reason, he shall conceive

> to be the aptest means thereunto.
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> By *liberty* is understood, according to the proper signification of the word, the absence of external impediments; which impediments may oft take away a part of a man's power to do what he would, but cannot hinder him from using the power left him according as his judgment and reason shall dictate to him.
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> A *law of nature* . . . is a precept, or general rule, found out by reason, by which a man is forbidden to do that which is destructive of his life, or taketh away the means of preserving the same, and to omit that by which he thinketh it may be best preserved. . . *right* consisteth in liberty to do or to forebear; whereas *law* determineth and bindeth to one of them . . .
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> And because the condition of man . . . is a condition of war of every one against every one, in which case every one is governed by his own reason, and there is nothing he can make use of that may not be a help unto him in preserving his life against his enemies; it followeth that in such a condition every man has a right to every thing, even to one another's body. And therefore, as long as this natural right of every man to every thing endureth, there can be no security to any man, how strong or wise soever he be, of living out the time which nature ordinarily alloweth men to live. And consequently it is a precept, or general rule of reason: *that every man ought to endeavor peace, as far as he has hope of obtaining it; and when he cannot obtain it, that he may seek and use all helps and advantages of war*. . . From this fundamental law of nature, by which men are commanded to endeavor peace, is derived this second law: *that a man be willing, when others are so too, as far forth as for peace and defense of himself he shall think it necessary, to lay down this right to all things; and be contented with so much liberty against other men as he would allow other men against himself*. . . [Hobbes (1651), pp. 79-80]

We should note that Hobbes' philosophy expressed here is ontology-centered. His "laws of nature" that "command men" are seen as being something imposed upon each human being from without. He regards "nature" as being some thing that *does something* to man, namely, acts upon him. For Hobbes, who was a thorough-going materialist, this "nature" is not God but, rather, is some mystical entity, the existence of which he simply presupposes to be a self evident truth. For Hobbes, then, "nature" is some sort of non-personified deity.

It is Hobbes who introduces the notion of a *contract* into the context of social environment.

> To lay down a man's right to anything is to divest himself of the liberty of hindering another of the benefit of his own right to the same. For he that renounceth or passeth away his right giveth not to any other man a right which he had not before, because there is nothing to which every man had not right by nature, but only standeth out of his way that he may enjoy his own original right without hindrance from another. So that the effect which reboundeth to one man by another man's defect of right is but so much diminution of impediments to the use of his own original right.
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> Right is laid aside, either by simply renouncing it, or by transferring it to another. By *Simply Renouncing*; when he cares not to whom the benefit thereof reboundeth. By *Transferring*; when he intendeth the benefit thereof to some certain person or persons. And when a man hath in either manner abandoned or granted away his right, then is he said to be *Obliged*, or *Bound*, not to hinder those to whom such right is granted, or abandoned, from the benefit of it: and that he *Ought*, and it is his *Duty*, not to make void that voluntary act of his own: and that such hindrance is *Injustice*, and *Injury* . . .
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> Whensoever a man transferreth his right, or renounceth it, it is either in consideration of some right reciprocally transferred to himself, or for some other good he hopeth for thereby. For it is a voluntary act: and of the voluntary acts of man, the object is some good to himself. And therefore there be some rights which no man can be understood by any words, or other signs, to have abandoned or transferred. As, first, a man cannot lay down the right of resisting them that assault him by force to take away his life, because he cannot

> be understood to aim thereby at any good to himself. The same may be said of wounds, and chains, and imprisonment . . . And lastly the motive and end for which this renouncing and transferring of right is introduced is nothing else but the security of a man's person, in his life, and in the means of so preserving life as not to be weary of it. . . The mutual transferring of right is that which men call *contract*. [*ibid*., pp. 81-82]

With Hobbes we see both the treacherous and dangerous social situation of the state-of-nature (for Hobbes, a state of "natural law") *and* the introduction of a second social situation by means of contracts mutually entered into by men. The second is called the civil-state. In time this idea of a contractual relationship between men would come to be called a social compact.

The problem, of course, is that the terms of the contract one enters into might not be kept by the other person. *You* might fully intend to stand by the terms you have agreed to with me, but perhaps *I* am like Machiavelli's prince, never had the least intention of keeping the terms and agreed to them only for the purpose of deceiving you. History is full of accounts of precisely this sort of behavior. For example, the Greek historian Xenophon tells us of a Machiavellian contemporary of his named Menon the Thessalian who lived in the fifth century B.C.:

> Menon the Thessalian was manifestly eager for enormous wealth – eager for command in order to get more wealth and eager for honor in order to increase his gains; and he desired to be a friend to the men who possessed the greatest power in order that he might commit unjust deeds without suffering the penalty. Again, for the accomplishment of the objects upon which his heart was set, he imagined that the shortest route was by way of perjury and falsehood and deception, while he counted straightforwardness and truth the same thing as folly. Affection he clearly felt for nobody, and if he said that he was a friend to anyone, it would become plain that this man was the one he was plotting against. . . Neither would he devise schemes against his enemies' property, for he saw difficulty in getting hold of the possessions of people who were on their guard; but he thought he was the only one who knew that it was easiest to get hold of the property of friends – just because it was unguarded. Again, all whom he found to be perjurers and wrongdoers he would fear, regarding them as well armed, while those who were pious and practiced truth he would try to make use of, regarding them as weaklings. And just as a man prides himself upon piety, truthfulness, and justice, so Menon prided himself upon ability to deceive, the fabrication of lies, and the mocking of friends; but the man who was not a rascal he always thought of as belonging to the uneducated. [Xenophon (*c*. 394-370 B.C.), II. vi. 21-26]

Let us grant that *you* are not a rascal and are a person who is "pious and practices truth." Let us also assume you are "befriended" by Menon the Thessalian. What is the situation? It is important to understand that here there is not *one* social situation but, rather, *two*. For *you* the social situation *vis à vis* Menon is the state-of-civil-nature. For Menon the social situation *vis à vis* you is the state-of-nature *if he is in fact* the person Xenophon presents him to be. But, after all, could Xenophon actually know *for a fact* that Menon "felt affection for nobody"? Even Albert Anastasia apparently loved his wife and children[7].

It is *ontologically meaningless* to ask, "What is the *real* situation?" or "Wouldn't this really be the mixed-state-of-nature situation?" It is ontologically meaningless to say, "Well, then, we must refer the situation to the judgment of some third person who acts as an *observer*." Suppose Menon dies without making any move to get hold of your property. It would obviously be futile to ask the corpse, "Tell me, were you really my friend or really my enemy?" No one else would be left who could ever answer that question and *truthfully* claim that he *knew* his answer was true. All that can be said *with objective validity* is that "at each moment" there is *some* transeunt you-to-Menon social situation *and* some transeunt Menon-to-you social situation. The social atom is the

[7] Anastasia was the New York City gangster who was boss of Murder, Incorporated.

individual human being.

Let us now make your hypothetical circumstance just a bit more complicated. Let us assume for specificity that Menon is every bit the treacherous scoundrel Xenophon said he was, that Cyrus the Younger[8] is every bit the noble and heroic figure Xenophon said *he* was, and that you have been "befriended" by each. Of your friend Cyrus, Xenophon tells us that

> he showed, in the first place, that he counted it of the utmost importance, when he concluded a treaty or compact with anyone or made anyone any promise, under no circumstance to prove false to his word. It was for this reason, then, that the cities trusted him and put themselves under his protection, and that individuals also trusted him; and if anyone had been an enemy, when Cyrus made a treaty with him he trusted that he would suffer no harm in violation of that treaty. . .
>
> It was manifest also that whenever a man conferred any benefit upon Cyrus or did him any harm, he always strove to outdo him; in fact, some people used to report it as a prayer of his that he might live long enough to outdo both those who benefited and those who injured him, returning like for like. Hence it was that he had a greater following than any other man of our time of friends who eagerly desired to entrust to him both treasure and cities and their very bodies. Yet, on the other hand, none could say that he permitted malefactors and wicked men to laugh at him; on the contrary, he was merciless to the last degree in punishing them, and one might often see along the traveled roads people who had lost feet or hands or eyes; thus in Cyrus' province it became possible for either Greek or barbarian, provided he were guilty of no wrongdoing, to travel fearlessly wherever he wished, carrying with him whatever it was in his interest to have. [*ibid*., I. ix. 7-13]

As Xenophon's report makes clear, *Cyrus'* social *environment* is mixed-state-of-nature because he has both friends and "malefactors" in his sphere of life. Provided we make the reasonable assumption that none of his "malefactors" would "contract" with Cyrus to lose a hand or a foot, his social situation *vis à vis* them is state-of-nature *because between them there is no contract*. With you (because you are a pious person who practices truth) his social situation *vis à vis* you (and yours *vis à vis* him) is state-of-civil-nature. And if Menon is the scoundrel Xenophon paints him to be, he will be acting on his best behavior towards Cyrus, obviously, and towards you *also* (because you are a friend of Cyrus). *Your* social *environment* is therefore state-of-civil-nature *within the scope of you-Cyrus-and-Menon*. If we call this your ***social molecule*** (a useful metaphor), we can *mathematically* represent your social molecule as illustrated by the graph in figure 2.1. The vertices represent you (Y), Cyrus (C) and Menon (M), and the arcs represent the pairwise social interactions existing moment by moment in time.

Obviously the "social chemistry" suggested by figure 2.1 is grossly oversimplified because all three of you have social intercourse with more people than the graph depicts. For example, you and I are in social intercourse because you are reading this book I have written and I am "talking" to you right now. And because you are a pious practitioner of truth, I "desire to be your friend." Figure 2.2 illustrates a more extended picture of your hypothetical social molecule. In both figures, there is something a bit subtle yet important to bring out. Let's take figure 2.1 for specificity. *The arcs (social interactions) connecting you to Menon and he to you functionally depend on the arcs connecting you to Cyrus and Menon to Cyrus*. This is because, as we are assuming, Menon is behaving himself with you *because he fears Cyrus*. He thinks *you're* a boob.

[8] Cyrus the Younger was the younger brother of Artaxerxes II, the eighth king of the Persian Empire. Cyrus was accused of plotting to overthrow his brother, was arrested, and sentenced to be executed. He was pardoned and released by Artaxerxes when their mother interceded on his behalf. Afterward, Cyrus decided for the sake of his safety and honor that he had to overthrow his brother and claim the throne. He was killed in battle during the subsequent revolt. Artaxerxes beheaded the corpse and had the body impaled.

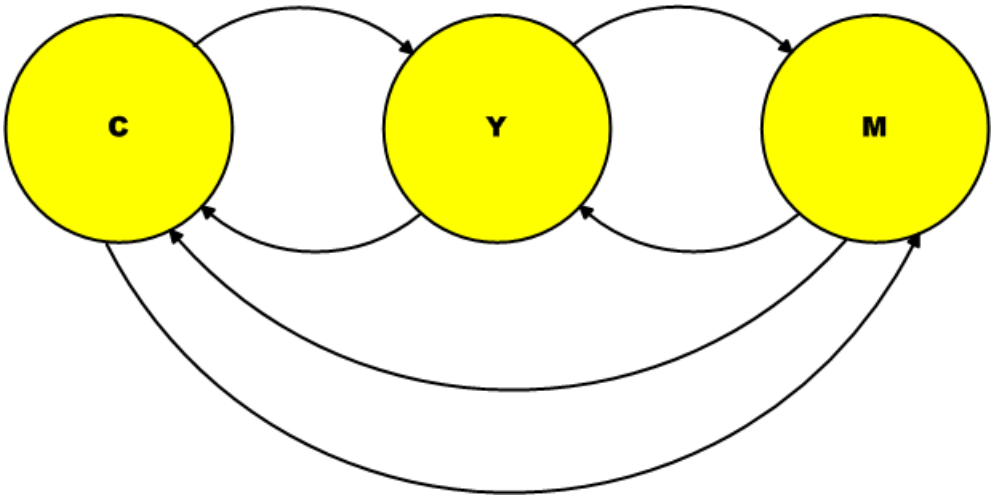

Figure 2.1: Restricted social molecule model of social environments represented as a mathematical graph. Arcs denote social interactions. Vertices denote: you (Y), Cyrus (C) and Menon (M).

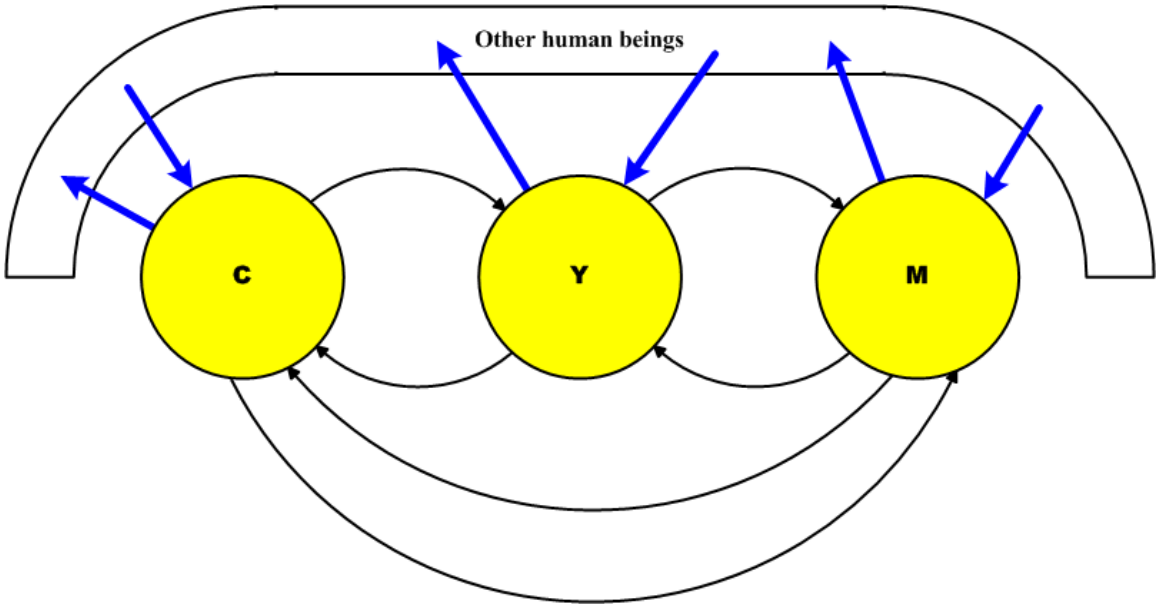

Figure 2.2: Expanded social molecule model of social environments.

Some might find the notion to be a bit disturbing that one specific social situation, for example Y ← M, is partially determined by other social situations, e.g., M → C and C → Y, insofar as I am using the notion of a "social chemistry" as a metaphor for modeling human interactions. The key trick with properly using any analogy is to understand the limitations of context to which the analogy is confined. Those who have had some rudimentary exposure to chemistry at the high school or college level might already be thinking of the arcs in the graphs above as being analogs of chemical bonds (and I am in fact suggesting that they be regarded in this way). At introductory levels, chemical bonds are generally treated as if the various "bonding orbitals" are independent of one another and depend only upon pairwise properties of the two atoms or ions bonded by them. The actual circumstances, as they are taught at the more advanced levels in physics, are different from those presented at the introductory level. In the quantum theory of molecular bonding, *all bonding orbitals are co-determined* (that is, every bonding orbital is a function of

every other bonding orbital) according to the *strict* physical theory. The problem that physics faces is that the mathematical equation involved in this co-determination is so complicated that it cannot be solved in closed form except in a very few special cases. One advanced textbook tells us,

> It has been shown in the preceding chapter that the hydrogen atom can be treated quite accurately and quantitatively through solution of Schrödinger's equation. The close correspondence between these theoretical predictions and actual experimental observations lends confidence to the thought that this same approach might be applied to more complex atoms containing more than just a single electron. This confidence is *not* supported once the attempt is made. The character of [Schrödinger's equation], even in the next simplest case (the helium atom, with two electrons), is such that rigorous solutions are impossible. As a result, various approximation methods have been developed to solve these equations. [Leonard and Martin (1980), pg. 95]

If the equation for the helium atom cannot be solved, you can probably guess that exact solutions for even the simplest molecules cannot be obtained either. Instead of being arguably the most important scientific discovery of the twentieth century, the theory of quantum physics would be utterly useless and unimportant if it were not for the fact that physicists succeeded in finding clever tricks ("approximation methods") for getting approximate solutions that are "good enough" to be put to practical use. Entire textbooks, e.g. Harrison (1980), have been written about these very important mathematical tricks. The reason the mathematical difficulty arises in atomic physics is the same as the reason that social situations in figures 2.1 and 2.2 are co-determined. In both cases, and to use the language a physicist might use, we have a "field interaction" that does not allow us to ignore the interaction effects any one part of the system has on all the other parts. The principal difference (aside from the specific mathematical equations a particular social-natural science might empirically obtain) between our figures here and the corresponding figures that are drawn in the science of physical chemistry is that in quantum mechanics the *pairs* of arcs in our figure are replaced by a single "bi-directional" arc (which means the mathematical relationship is the same in both directions). It is *not* true in social-chemistry that the relationship depicted by, say, $Y \rightarrow M$ is the same as that depicted by $M \rightarrow Y$. Social-chemistry is a more complicated scientific topic than physical chemistry. That *doesn't* mean it is *hopelessly* more complicated. It *does* mean the social-natural scientists of the future are going to need to know a lot more mathematics than today's social scientists do. Sorry. As the old saying goes, "Life is short, the art long, experiment treacherous, judgment difficult[9]."

Another important difference between social-chemistry and physical chemistry is that in the latter stable bonding relationships are static (not time-dependent), whereas social situations are not static (are time-dependent). To appreciate this, let us add something Xenophon also said about Menon that I did not quote earlier:

> Again, if he were attempting to be first in the friendship of anybody, he thought that slandering those who were already first was the proper way of gaining this end. [Xenophon (*c*. 394-370 B.C.), II. vi. 26-27]

Let us suppose Menon is plotting to do you out of some of your property. With Cyrus holding you in high regard, he doesn't dare to move against you directly *unless* he can somehow undermine the social situation $C \rightarrow Y$ in such a way that avoids undermining the situation $C \rightarrow M$. He might try to do this by direct slander ($M \rightarrow C$) or he might try it by indirect slander through intermediaries, e.g. $M \rightarrow X$; $X \rightarrow C$ (refer to figure 2.2; intermediary X would be someone in the

[9] Hippocrates, *Aphorisms*, sec. I, 1. The gloomier American version of this is, "Life is tough, then you die."

"other human beings" part of the model). All the while, he tries to maintain his false front with you (M → Y) so that you do not do something that might change C → M in a way not to his benefit. In the United States, we see politicians trying this sort of thing all the time[10], and it is no different in other countries. This gives us something else to deal with that the physical chemist or the physicist doesn't have to deal with in their sciences.

§ 3. Social Environment and Cooperation

We typically do not call any set of human circumstances "social" or say it presents a "society" or is a "social environment" unless the behaviors of the people involved in it exhibit some sort of cooperation. We do not, for example, typically regard two travelers walking past each other in opposite directions on a road as exhibiting sufficient reason to call them a "society of two" or to say that they present any sort of "social" phenomenon. It is regarded as nitpicking to say they "cooperate" by not colliding with each other on the road, although clearly if they both move out of each other's way this is "cooperation" of some kind. However, the mere fact that if we chose to do so we *could* nitpick the question is a clue that the idea of "cooperation" is one we're going to have to examine more Critically. For instance, shall we say two armies engaged in battle with each other are "cooperating" in trying to kill each other? Do they jointly constitute a "society" of some kind (e.g., a "society of glorious men of honor")? The question is not absurd because people take both sides in answering it and are able to marshal valid arguments in favor of their stand:

> Ah, cousin, could we but survive this war
> to live forever deathless, without age,
> I would not ever go again to battle,
> nor would I send you there for honor's sake!
> But now a thousand shapes of death surround us,
> and no man can escape them, or be safe.
> Let us attack – whether to give some fellow
> glory or to win it from him. [Homer (*The Iliad*), 12. 322-328]

To say the joint actions of two people are "cooperative" usually presumes some sort of tacit or explicit agreement between them exists that antecedes the actions said to be cooperative. One phenomenon usually taken as a sufficient sign of cooperative behavior is the presence of some sort of governance affecting the way people are behaving. Not every social environment contains a concept of governance in its context, but no idea of governance fails to contain concepts of society and cooperation in its context.

The reason Cyrus plays such a central role in the hypothetical example of the previous section is because the historical Cyrus was the satrap of Lydia, Greater Phrygia and Cappadocia as well as military commander of all of western Asia Minor. Within the Persian empire he was second in power only to the king of Persia, his brother Artaxerxes II. A great deal of this power was due to his benevolent behaviors coupled with his ruthlessness Xenophon described earlier. He could be fairly described as a benevolent despot. It is very clear that Xenophon and the other Greeks in the *Anabasis* were devoted to Cyrus, although this devotion suffered a decline after Cyrus tricked them into going off to war with him without telling them his real objective was to overthrow his brother and take over the Persian empire[11].

---

[10] Political party "talking points" and "messages" are almost exclusively aimed at doing this. It is nothing but propaganda aimed at getting you to hate the politician's opponents and the other party. It isn't an open attempt to honestly discuss or explain any particular issue. It works, too. That is why they do it.

[11] They wouldn't have gone along with him if they had known. Powerful as Cyrus was, Artaxerxes commanded an army more than ten times bigger. Cyrus hoped to take him by surprise, before he could

My point in bringing this up to is to illustrate a factor characteristic of social environments throughout history: the phenomenon of leadership. This, in turn, is intimately related to the phenomenon of social contracting in all of its forms. I treat the Critical theory of leadership in Wells (2010) and will not repeat it here except in regard to particular aspects of it that will help us understand the Social Contract. Critical ***leadership*** is ***the reciprocal relationship between two or more people by which the self-determinations of actions by other people (followers) are stimulated by the actions taken by a leader***. It is a *social dynamic* and it is not objectively valid to equate the idea of leadership with the idea of a leader. A ***leader*** is ***a person who purposively stimulates the self-determination of another person to express an action***. That action might or might not be congruent with the leader's purpose in stimulating that action. A ***leader's action*** is any deliberate action he takes that *provokes* (positively or negatively) a reaction by a follower.

In a group of people, the person acting as the leader can and does change as the social dynamic progresses. It is incorrect to equate "the leader" with "the king" or "the manager" or any other such *nominal* designation a particular official might be given. The leader *at this moment* is whoever takes an action that provokes subsequent actions that follow upon it and are taken by others. Because their actions are subsequent to his, these others are called the ***followers***. Merely *naming* someone a "leader" by conferring a title does not make that person the leader. It only designates him as an official. Ontology-centered misconceptions about the nature of leadership are root causes of failures in business, government, and, indeed, every human group enterprise.

I must emphasize that *the actions of the followers might or might not positively cooperate with the purpose of the leader whose action provoked theirs*. If their actions are congruent with his purpose, this is *positive* cooperation. If their actions contradict his purpose, this is *negative* cooperation (uncooperation). If their actions are contrary to his purpose without being contradictory to his purpose, this is non-cooperation. People typically equate "to follow" and "to positively cooperate," but this delimitation is overly restrictive. It recognizes what we can call *positive* followership while ignoring *negative* followership, as when, e.g., the actions of a ruler provoke those he has been dominating into trying to overthrow him. Most people do not casually determine themselves to overthrow their governments or their designated officials. It generally takes some series of grievances before such a *re*action occurs. In this context, it can be said with some degree of truth that the *first* leader of a revolution is the person being overthrown because it was he who provoked others into realizing (making actual) revolutionary actions. It is not unknown to history for such a ruler's particular first-leader's-action to also be the last one he has the opportunity to take. When Julius Caesar provoked the Roman senate into naming him dictator-for-life, he also provoked Brutus and the other conspirators to end his life – what we could call the occurrence of an *unsuccessful* leader's-action on Caesar's part and *negative* cooperation by Brutus *et al*. In Shakespeare's *Julius Caesar*, Marc Antony dupes Brutus and his co-conspirators into allowing him to speak at Caesar's funeral and then provokes the mob into rising up against Brutus *et al*. – both are leader's actions producing positive cooperation.

The phenomenon of human cooperation, when this cooperation is positive, implicates some sort of agreement – either tacit or explicit – has been consented to by the people said to be cooperating. Any such agreement constitutes some sort of contract in the context in which Hobbes introduced that term. Perhaps you spotted the crucial issue Hobbes' idea of a contract raises: *What causes people to keep the terms of a contract they make between themselves?* No less

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muster his forces, but was betrayed by another unsavory character, Tissaphernes, before he could strike. By the time the Greeks found out what he was actually doing, it was too late for them to back out. After Cyrus was killed, Menon tried to save his own skin by betraying them to one of Artaxerxes' field commanders. By doing so, Menon hoped to win the king's affection. Unfortunately for him, Artaxerxes wasn't Cyrus and Menon rather badly miscalculated the A → M social situation his actions produced. Xenophon cheerfully reported Menon's reward was that Artaxerxes had him tortured to death. It took about a year.

important is the question, *What causes a person to break the terms of a contract he had consented to?* Putting these together, the general issue becomes one of understanding what constitutes at the least a set of sufficient conditions for the actual *Existenz*[12] of social contracts. In *Julius Caesar*, Marc Antony kept "the letter" of the social contract he negotiated with Brutus while purposively violating what *Brutus* held-to-be "the spirit" of that same contract[13]. This illustrates yet a third nuance in the idea of cooperation, namely, the nature of *cooperative purposes*.

Hobbes held-to-be-true a number of concepts deduced from his experience but based on ontology-centered presuppositions. He came to conclude that for contracting conditions to be met it was necessary to introduce a ruler. Ironically from a populist point of view, his starting point was a premise of human equality. He held that *because* all men are more-or-less equal it is necessary to *subjugate* them. Hobbes wrote,

> Nature hath made men so equal in the faculties of body and mind as that, though there be found one man sometimes manifestly stronger in body or quicker in mind than another, yet when all is reckoned together the difference between man and man is not so considerable as that one man can thereupon claim to himself any benefit to which another may not pretend as well as he. . . From this equality of ability ariseth equality of hope in the attaining of our ends. And therefore if any two men desire the same thing, which nevertheless they cannot both enjoy, they become enemies; and in the way to their end (which is principally their own conservation, and sometimes their delectation only) endeavor to destroy one another. And from hence it comes to pass that where an invader hath no more to fear from another man's single power . . . others may probably be expected to come prepared with forces united to dispossess and deprive him, not only of the fruits of his labor, but also his life or liberty. And the invader again is in the like danger of another [invader].
>
> And from this diffidence of one another, there is no way for any man to secure himself so reasonable as anticipation; that is, by force or wiles to master the persons of all men he can so long till he see no other power great enough to endanger him: and this is no more than his own conservation requireth, and is generally allowed[14]. [Hobbes (1651), pp. 76-77]

What Hobbes is saying is that, in effect, every person has sufficient reason to try to enslave or kill every other person simply out of self-defense, that to try to do so is simply human nature, and that therefore, all else being equal, that is precisely what every man *will* try to do. He is not entirely wrong in his surmise, although his ontology-based premises do cause him to over-generalize to a specious conclusion. Because the starting premise here is the equality of all men, he concludes that the only solution possible "by human nature" is to introduce *inequality*:

> Again, men have no pleasure (but on the contrary a great deal of grief) in keeping company where there is no power able to overawe them all. For every man looketh that his companion should value him at the same rate he sets upon himself, and upon all signs of contempt or undervaluing naturally endeavors, as far as he dares (which amongst them that have no common power to keep them in quiet is far enough to make them destroy each other), to extort a greater value from his contemnors, by damage; and from others, by the example. So that in the nature of man, we find three principal causes of quarrel. First, competition; secondly, diffidence; thirdly, glory. . . Hereby it is manifest that during the time men live without a common power to keep them all in awe, they are in that condition which is called *war*; and such a war as is of every man against every man. [*ibid*., pg. 77]

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[12] *Existenz* is a technical term that means "the manner in which something exists."
[13] "I come to bury Caesar, not to praise him. The evil that men do lives after them; The good is oft interred with their bones. So let it be with Caesar. . ." &etc. [Shakespeare (*Julius Caesar*), Act III, Scene II].
[14] by "is generally allowed" Hobbes means everybody agrees that what he says here is true.

Note that Hobbes is telling us that men have to be *forced* to refrain from killing or enslaving each other by some "power" that all men have cause to *fear*. Without such a power to impose its *rule* over men, every man will rationally decide that his own safety requires him to, in a manner of speaking, "do unto others *before* they do unto you." Psychiatrists call a person whose behaviors arise from such a premise an *antisocial personality*. Hobbes held a basically dark view of human nature, and he inflates the potential of a threat until he makes it into an actual aspect of universal human nature. His further analysis leads him to conclude that the best practical "power" necessary to keep humankind from destroying itself is the absolute monarch.

Other theorists make the opposite presupposition about man's moral nature. Often theories of this sort begin from some religious premise (and, therefore, begin in the supernatural). Yet, in order to explain the real empirical fact that conquerors have existed throughout all of human history, they find themselves forced to mount objectively specious arguments. One famous example of this sort of reasoning is provided by John Locke. Locke formally introduced the term "state of Nature":

> 4. To understand political power aright, and derive it from its original, we must consider what estate all men are naturally in, and that is, a state of perfect freedom to order their actions, and dispose of their possessions and persons as they think fit, within the bounds of the law of Nature, without asking leave or depending upon the will of any other man.
>
> A state also of equality, wherein all the power and jurisdiction is reciprocal, no one having more than another; there being nothing more evident, than that creatures of the same species and rank, promiscuously born to all the same advantages of Nature, and the use of the same faculties, should also be equal one amongst another, without subordination or subjection, unless the lord and master of them all should, by any manifest declaration of his will, set one above another, and confer on him, by an evident and clear appointment, an undoubted right of dominion and sovereignty. [Locke (1690), pg. 8]

For Hobbes all men *are* equal; for Locke all men are *created* equal (by God) but some men "manifest" that they do not truly *remain* men but, rather, that they degenerate themselves and become "noxious creatures" by violating what he called "the law of Nature" [*ibid*., chap. II, 10]. Although it is unclear if this was his intent, Locke seems to draw an analogy here between these fallen men and Milton's fallen angels:

> And the crystal wall of heaven, which, opening wide,
> Rolled inward, and a spacious gap disclosed
> Into the wasteful deep; the monstrous sight
> Strook them with horror backward; but far worse
> Urged them behind; headlong themselves they threw
> Down from the verge of heaven: eternal wrath
> Burnt after them to the bottomless pit. [Milton (1667), Bk. VI, 860-865]

As for his "law of Nature," Locke's argument here becomes wholly specious:

> 6. But though [the state of Nature] be a state of liberty, yet it is not a state of license; though man in that state have an uncontrollable liberty to dispose of his person or possessions, yet he has not liberty to destroy himself, or so much as any creature in his possession, but where some nobler use than its bare preservation calls for it. The state of Nature has a law of Nature to govern it, which obliges everyone, and reason, *which is that law*, teaches all mankind who will but consult it, that being all equal and independent, no one ought to harm another in his life, health, liberty or possessions; for men being all the workmanship of one omnipotent and infinitely wise Maker; all the servants of one sovereign Master, sent into the world by His order and about His business; they are His property, whose workmanship they are made to last during His, not one another's pleasure.

> And, being furnished with like faculties, sharing all in one community of Nature, there cannot be supposed any such subordination among us that may authorize us to destroy one another, as if we were made for one another's uses, as the inferior ranks of creatures are for ours. Everyone as he is bound to preserve himself, and not to quit his station willfully, so by the like reason, when his own preservation comes not into competition, ought he as much as he can to preserve the rest of mankind, and not unless it be to do justice on an offender, take away or impair the life, or what tends to the preservation of the life, the liberty, health, limb or goods of another. [Locke (1690), pg. 9]

It is a flagrant misuse of the idea of a law of Nature to say such a law merely "obliges" or that it has the force of merely an "ought to." This is as much as to say that a traffic law ordaining that a driver ought to stop at a stop sign is somehow a "law of Nature." Hobbes, at least, does not make such a specious argument, and this is a primary reason he concludes that a third party (according to him, a ruler) is *necessitated* by human Nature. Locke, on the other hand, cannot draw this same conclusion because he thinks every human being is already "obliged" by his spiritual "law of Nature." For him, *everyone* is authorized "to punish the transgressors of that law to such a degree as may hinder its violation" [*ibid*., chap. II, 7]. Government, for Locke, is merely a prudent and convenient means for humankind to put a civil society in good order and to identify and deal with "noxious degenerates" who might be concealing themselves within it:

> 87. Man being born, as has been proved, with a title to perfect freedom and an uncontrolled enjoyment of all the rights and privileges of the law of Nature, equally with any man, or number of men in the world, hath by nature a power not only to preserve his property – that is, his life, liberty, and estate – against the injuries and attempts of other men, but to judge of and punish the breaches of that law in others, as he is persuaded the offense deserves, even with death itself, in crimes where the heinousness of the fact, in his opinion, requires it. But because no political society can be, nor subsist, without having in itself the power to preserve property, and in order thereunto punish the offenses of all those of that society, there, and there only, is political society where every one of the members hath quitted this natural power, resigned it up into the hands of the community in all cases that exclude him not from appealing for protection to the law established by it. And thus all private judgment of every particular member being excluded, the community comes to be umpire, and by understanding indifferent rules and men authorized by the community for their execution, decides all the differences that may happen between any members of that society concerning any matter of right, and punishes those offenses which any member hath committed against the society with such penalties as the law has established; whereby it is easy to discern who are, and are not, in political society together. Those who are united into one body, and have a common established law and judicature to appeal to, with authority to decide controversies between them and punish offenders, are in civil society one with another; but those who have no such common appeal, I mean on earth, are still in the state of Nature, each being where there is no other judge for himself and executioner; which is, as I have before showed it, the perfect state of Nature. [Locke (1690), pp. 46-47]

Other than for starting premises and the argumentation that has to follow from them if he is to arrive at a description that accords with human experience, Locke arrives at basically the same ideas that Rousseau will later call the social contract and the republic. The speciousness of his argument is due to his supernatural premises. Locke's ground for equating natural law with human reason is without objective validity and renders the very idea of nature *scientifically meaningless*.[15] To explain the phenomenon of transgressors-of-the-social-order, he is forced to conclude such men are degenerates (not *really* men); it follows from this immediately that the *true* men of the civil order may deal with them howsoever they see fit *without themselves* being in

[15] "Nothing that exists by nature can form a habit contrary to its nature." [Aristotle (*Nicomachean Ethics*, II. 1)]

violation of Locke's "law of Nature" or making themselves into "noxious degenerates." One consequence of Locke's line of argumentation is that every law a civil society puts in place is going to be a religious law because, should anyone challenge the right of the association to put in force any particular law, its justification is going to lead straight back to people's conceptions of the divinity. This raises the *insolvable* problem of somehow, *with objective validity*, making the *super*natural part of the natural world. Hobbes and Locke both draw their conclusions from what Critical theory calls *judgments of taste*, which are subjective judgments of mere opinion or belief.

Rousseau avoids Locke's error of setting out from a supernatural ground. He premises grounds that are, in one context, pragmatic and technical and, in another, not-incongruent with the idea of empirical evolution that will be put forward by Darwin a little over a century later. We must, he tells us, always go back to "a first convention." He calls this convention *the social compact*:

> I suppose men to have reached the point at which the obstacles in the way of their preservation in the state of nature show [the obstacles'] power of resistance to be greater than the resources at the disposal of each individual for his maintenance in that state. That primitive condition can thus subsist no longer; and the human race would perish unless it changed its manner of existence.
>
> But, as men cannot engender new forces, but only unite and direct existing ones, they have no other means of preserving themselves than the formation, by aggregation, of a sum of forces great enough to overcome the resistance. These they have to bring into play by means of a single motive power, and cause to act in concert.
>
> This sum of forces can arise only where several persons come together: but, as the force and liberty of each man are the chief instruments of his self-preservation, how can he pledge them without harming his own interests, and neglecting the care he owes to himself? This difficulty, in its bearing on my present subject, may be stated in the following terms:
>
> "The problem is to find a form of association which will defend and protect with the whole common force the person and goods of each associate, and in which each, while uniting himself with all, may still obey himself alone, and remain as free as before." This is the fundamental problem of which the *Social Contract* provides the solution. [Rousseau (1762), pg. 13]

Rousseau tells us he "supposes" (premises as a ground) that what people needed to survive would provide the motivating ground for the formation of societies. He takes this as more or less obvious and self-evident to any person of common intelligence who thinks about it, and so he put his case forward in abstract terms without exemplary supports. A little more than a decade later, this omission was filled in by Thomas Paine:

> In order to gain a clear and just idea of the design and end of government, let us suppose a small number of persons settled in some sequestered part of the earth, unconnected with the rest; they will then represent the first peopling of any country, or of the world. In this state of natural liberty, society will be their first thought. A thousand motives will excite them thereto, the strength of one man being so unequal to his wants, and his mind so unfitted for perpetual solitude, that he is soon obliged to seek assurance and relief of another, who in his turn requires the same. Four or five united would be able to raise a tolerable dwelling in the midst of a wilderness, but *one* man might labor out the common period of life without accomplishing anything; when he felled his timber, he could not remove it, nor erect it after it was removed; hunger in the mean time would urge him from his work, and every different want call him a different way. Disease, nay even misfortune would be death, for though neither might be mortal, either would disable him from living and reduce him to a state in which he might rather be said to perish than to die. [Paine (1776), pp. 251-252]

Rousseau and Paine premise their deductions on empirical grounds which, at least, avoids a supernatural point of initial departure for a theory. Their basis is even broad enough to contain Hobbes' materialistic picture of man-in-state-of-nature, expanded *from* an over-narrow context of every man being perpetually at war with every other man *to* a context of every man being in a struggle for his self-preservation in the state-of-nature. Hobbes made this segue in a passage of *Leviathan* that ended with one or the more famous quotes in Western literature:

> Whatsoever therefore is consequent to a time of war, where every man is enemy to every man, the same is consequent to a time wherein men live without other security than what their own strength and their own invention shall furnish them withal. In such condition there is no place for industry, because the fruit thereof is uncertain: and consequently no culture of the earth[16]; no navigation, nor use of the commodities that may be imported by sea; no commodious building; no instruments of moving and removing such things as require much force; no society; and which is worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short. [Hobbes (1651), pg. 78]

We have seen Rousseau's statement of the principal *condition* for making a social compact, i.e., *what the association must accomplish* if a person is to have a reason to commit himself to it. This is what each person expects and requires to gain through his membership in an association with other people. Next Rousseau asks what *terms* a social compact must require:

> The clauses of this contract are so determined by the nature of the act that the slightest modification would make them vain and ineffective; so that, although they have perhaps never been formally set forth, they are everywhere the same and everywhere tacitly admitted and recognized[17], until, on the violation of the social compact, each regains his original rights and resumes his natural liberty, while losing the conventional liberty in favor of which he renounced [his natural liberty].
>
> These clauses, properly understood, reduce to one – the total alienation of each associate, together with all his [natural] rights, to the whole community; for, in the first place, as each gives himself absolutely, the conditions are the same for all; and, this being so, no one has any interest in making them burdensome to others.
>
> Moreover, the alienation being without reserve, the union is as perfect as it can be, and no associate has anything more to demand: for, if the individuals retained certain [natural] rights, as there would be no common superior to decide between them and the public, each, being on one point his own judge, would ask to be so on all; the state of nature would then continue, and the association would necessarily become inoperative or tyrannical.
>
> Finally, each man, in giving himself to all, gives himself to nobody; and as there is no associate over which he does not acquire the same right as he yields others over himself, he gains an equivalent for everything he loses, and an increase of force for the preservation of what he has.
>
> If, then, we discard from the social compact what is not of its essence, we shall find that it reduces itself to the following terms:
>
> "Each of us puts his person and all his power in common under the supreme direction of the general will and, in our corporate capacity, we receive each member as an indivisible

[16] Hobbes means "agriculture." Man in the pure state-of-nature is reduced to being a hunter-gatherer.
[17] Rousseau doesn't mean everyone everywhere and every-when has the same clear and distinct conception of these clauses. He means that members of socially-compacted associations *observe* these clauses in their individual and collective actions. He means people's understanding of the clauses is *practical* rather than theoretical or speculative. They demonstrate their practical understanding by their deeds *and* by what they refrain from doing. There are Critical consequences of this, which we will examine in detail later.

part of the whole." [Rousseau (1762), pg. 14]

This states *what* has to be consented to by every member; *it doesn't say how to practically realize the aim*. How to accomplish it is where Rousseau (and others) begin to run into manifold practical problems and issues. Not the least of these is: *What does 'the general will' mean?* On this point all by itself, social contract theories have stumbled and fallen ever since Rousseau first wrote the words. We will see later that this question has no objectively valid answer if we come at it from ontology-centered premises. We will also see that it has a clear, succinct *and objectively valid* answer when we come at it *de-ontologically* and from the Critical grounds of mental physics. At this point, the notion that *deontological* grounds could produce *objective* validity is likely not in the least convincing to you. I will explain it later in this treatise. But before I can do that, we have to further explore the domain of the social-natural environment.

§ 4. The Social-Natural Environment

Earlier in this chapter, the idea of a social environment was introduced. By itself, this idea is not sufficient for the purposes of a social-natural *science* and so we must extend it. This extension is called ***the social-natural environment***.

The theorists quoted earlier were all men writing on the topic of government. In the course of doing so, they were all led inexorably into proposing political science theories. Because each of them tried to lay his grounds (regardless of the objective validity of their particular presuppositions) in the basis of *human nature*, these were essays in *social-natural* political science. Prior to the close of the nineteenth and beginning of the twentieth centuries, political science *was* approached as a social-natural science. This is the difference between political science then (and since the days of Aristotle) and the impotent social science we today call by the same name. To borrow Locke's term, modern political science has become "degenerate."

In regard to the idea of social compacts, restricting one's perspective to only government is a too-specialized perspective from which to adequately explore the idea. Not every social act of cooperation pertains to government or even governance. Indeed, there are many social situations where trying to cram a theory into the *framework* of the idea of government is impractical. The topic of social compacts, and the topical metaphysic of the Social Contract, is broader than this. The correct *Critical* context is what I am calling the social-natural environment, and now we must see what this means. To begin, I will say at this point that it is a real union of the ideas of social environment and cooperation. Now I move on to the *practical* real explanation (*Realerklärung*) of what this means.

The earlier figures, 2.1 and 2.2, are mathematical illustrations in graph-theoretic form of the idea of social environments. However, the mere *Dasein* of a social situation and its explicit *Existenz*[18] does not immediately implicate *actions* human beings express in their *homo phaenomenal* aspect of being-a-human-being. A human being, regarded in his capacity to be the *agent* of his own actions, is a *self-determining* agent. The social environment model omits this factor. The idea of the social-natural environment includes it.

This requires we add to the idea of the social environment some additional human factors. Figure 2.3 illustrates a picture of this. Here I must emphasize that this picture is ***not*** just the social environment graph with some more arcs added to it. *The real context has changed*, and we must understand *how* it has changed.

[18] *Dasein* is a technical term that means "existence" in the context of "something-exists"; *Existenz* means "existence" in the context of "how-it-exists." *Dasein* without *Existenz* is formless; *Existenz* without *Dasein* is empty, i.e., devoid of all matter. The notion of their *union* constitutes the idea of *real existence*.

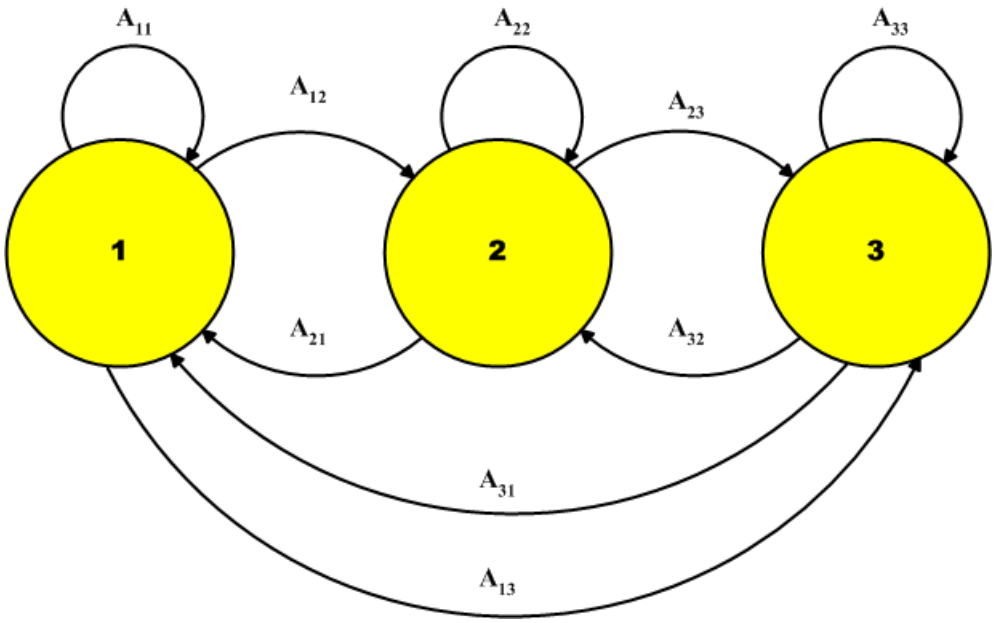

Figure 2.3: Graphical representation of social-natural environment (SNE) depicted as SNE-chemistry.

The Idea I intend to convey by figure 2.3 is that of a doctrine for a social-natural environment (SNE) subsumed under the notion of a doctrine of a science of social-chemistry (SNE-chemistry). This Idea will be elaborated upon in the chapters that follow. Here I set the context for the Idea in its general form. The central ideas of this doctrine are the following.

1. The graph vertices represent people. In the simplest cases each vertex represents one person. In more complicated situations each vertex represents a subpopulation of people, within the same overall social-natural environment, whose social-situation bindings are in some way "tighter" or otherwise especially distinguishable (e.g., a vertex might represent a family, a business enterprise, etc.). In this case, the vertex itself is re-presentable as a subgraph embedded in the overall graph. The utility of this methodology is that it provides a consistent framework for the logical division of large, complex social-natural phenomena into smaller units that can be more easily analyzed and then re-integrated into the larger social-natural environment. In general, the behavior of each vertex-object is described by some system of equations representing a social-natural theory of the object.

2. The arcs represent *actions* taken by the object represented by the source vertex that affect the object represented by the destination vertex. The destination vertex is denoted by the arc arrowhead. Mathematicians call a structure such as this a *directed* graph. The specific action is denoted A_{ij} with the first subscript denoting the source vertex and the second denoting the destination vertex. The nature of a specific action A_{ij} depends on the type of social-natural phenomenon of interest, e.g., economic transactions (including such social factors as negotiations, etc.). In general, each arc is described by some system of equations representing a social-natural model of the action taken. The arc model must provide for some *set* of actions it is possible for the source-object to take, and this means that each arc in figure 2.3 actually represents a *complexio* of possible actions. What specific action or actions being taken at any specific moment is determined by the dynamical equations representing the source vertex. The effects the action *complexio* has on the destination vertex is determined by the dynamical equations representing that vertex model.

3. The self-looping arcs A_{ii} represent actions taken by an object that affect the state of that object. These actions include, for example, the *mental* actions (judgment, thinking, etc.) taken by the person (or persons) represented by the vertex. Whereas the transeunt arcs A_{ij} *must* represent sensible (i.e., physical) actions observable in the *homo phaenomenal* aspects of human beings, the self-looping arcs *must* take into account the mental physics of the *homo noumenal* aspects of being a human being. The *homo phaenomenal* and *homo noumenal* aspects of being a human being can be made *logically* distinct, but no *real* division between them, e.g. the specious Cartesian division into a *res cogitans* and a *res extensa* [Descartes (1641), Med. VI], is objectively valid.

4. The social-natural environment is an *open system*. This means that new vertices can come to be added to the graph (e.g., birth, immigration, new business startup, etc. events) and that vertices can come to be deleted from the graph (e.g., death, emigration, business failure, etc. events). Mathematically, this aspect of the social-natural environment means that in addition to specific equations describing vertices and arcs, the doctrine of a social-natural science also requires what in physics are called *field equations*, i.e., equations that describe global conditions or influences that affect the structure of the system as a whole. In general, such field equations are coupled to the mathematical states of each vertex in the graph and could be explicitly represented in figure 2.3 by adding addition *field arcs* to the graph. (Additional because field equations are logically distinct from the interaction equations and self-action equations depicted by the A_{ij} in the figure). If, however, one is aware that field effects exist in social-natural phenomena then it is convenient to omit the explicit depiction of field arcs (as I have done in figure 2.3) in order to avoid having the graphical picture become so complicated that its image ceases to convey useful ideas.

5. Along with new vertices, new arcs connecting them can come to be added to the graph. Similarly, when vertices come to be deleted, likewise the arcs sourced from or projecting to these vertices are deleted.

6. Transeunt action arc functions A_{ij} depend on the representation of social situations. This means that the arc functions are partially determined by the mental state of the source vertex (or, in the cases where a vertex represents a subpopulation, by the mental states of the people actually expressing the physical actions). This is to say that the determining factor in realizing (making actual) all action arc phenomena is the human capacity for choice, or *Willkürsvermögen*, that is part of the *homo noumenal* aspect of being a human being. This aspect is one the present-day social sciences have tried very hard to avoid coming to grips with. That the practitioners have done so is quite understandable when one remembers that social scientists have employed ontology-centered metaphysics (or pseudo-metaphysics) in the ways in which they view the world. In any ontology-centered viewing of the world, human *Willkürsvermögen* is an utterly occult quality because it is a human capacity that does not answer to physical causality for explanation. That has led some social scientists and philosophers to deny the *Dasein* of human *Willkürsvermögen* – and if one is ontology-centered there really is no other option than this for a scientist. Critical *Willkürsvermögen*, in contrast, is *not* an occult quality and it answers to the general laws of mental physics. One can say that the Nature of its causality is that of a "because." This is why every social-natural science is grounded in teleological causality (or, if you prefer the term, "psychological" causality), and it is why they are different in kind from the physical-natural sciences (where teleological causality is inadmissible).

I can well imagine a social scientist (or two, or ten, or ten thousand) saying to himself at this moment, "Good grief, man! Don't you realize how impossibly complicated what you are describing here really is?" I assure you: I appreciate the complexity; I say it is not impossible.

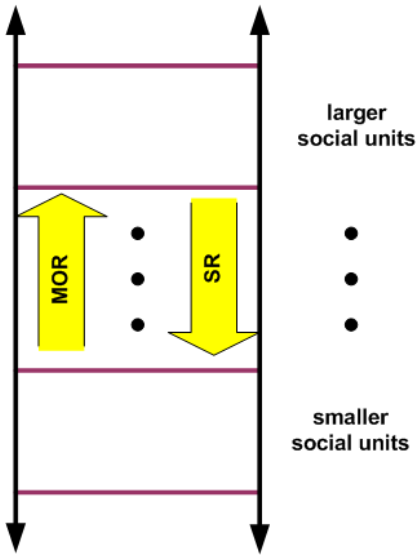

Figure 2.4: The ladder structure of scientific reduction (SR) and model-order reduction (MOR).

Such a claim requires an explanation. This explanation is going to lead to the ladder structure depicted in figure 2.4, but let us climb up to this ladder one step at a time. To begin, let us recognize that the physical-natural sciences, including the engineering sciences, also deal with systems that are extremely complicated. Consider this: the highway bridges that traverse the Mississippi River are made of stuff that is constituted by atoms. The number of atoms that compose a bridge at any particular moment is such a large number that it is unimaginable save by means of metaphors or similes (and even these usually stagger the imagination; to pick on one of my favorites, just exactly how many dollars bills *would there be* in a stack that reached from the earth to the moon? Somebody gave me a number for this once, and I confess I can't imagine it). The number of atoms in even a small bridge greatly exceeds one million-million-million-million. Yet civil engineers routinely design bridges that work and are safe to travel across, and they do so without thinking a great deal about atoms[19]. How?

The answer lies in *methodology* and the division of scientific labor. Most scientists refer to this methodology by the name ***scientific reduction*** (SR), although this is neither a complete nor an adequate overall label for scientific methodology. The idea of scientific reduction is taken so much for granted by physical scientists that it is rare to even find it mentioned in a college freshman's science textbooks. Professor of Human Sciences and Technology Gerald Weinberg wrote,

> Science is the study of those things that can be reduced to the study of other things. Science, in other words, is *essentially* reductionist . . . It should be noted, however, that the reductionists have not yet succeeded in reducing all phenomena to physical and chemical primitives. Whether they can or not is a neat philosophical question, not a scientific one. [Weinberg (1975), pg. 30]

I like Weinberg, but I'm going to take him to task a bit on these points. Is science *essentially* reductionist? No. If it were, civil engineers would be going blind studying atoms and no bridges would ever get built. Is his statement about reduction (of everything) "to physical and chemical primitives" really "a neat philosophical question, not a scientific one"? No. If you think philosophy cannot be science, then the question cannot be shirked off to philosophers. If you

[19] Roman engineers didn't even know atoms existed.

think philosophy – and metaphysics in particular – not only can be but *must* be *made* a science, then *tautologically* Weinberg's question *is* a scientific question.

What scientific reduction *practically* means is: that increasingly specialized sciences (which are frequently called "subdisciplines") focus their attentions on increasingly specialized objective contexts (for example genetics or organic chemistry), the *interest* in which springs from a higher level of scientific scholarship (e.g., biology). These practitioners learn more and more and more about the specialized objects of their studies (e.g. genes or DNA), but they do so with some knowledge or at least awareness of the *applicability* of what they learn "at the next level up" in a hierarchy of scientific knowledge. Put another way, we can regard one particular "level of reduction" as if it were *a rung on a ladder of science*. The further "down" the ladder we go, the more specialized the objective context; the further "up" the ladder we go, the broader is the *scope of contexts* in which what is learned at the lower levels *is put to use*. 1965 Nobel Laureate in Physics Richard Feynman once remarked,

> Physicists always have a habit of taking the simplest example of any phenomenon and calling it "physics," leaving the more complicated examples to become the concern of other fields – say of applied mathematics, electrical engineering, chemistry, or crystallography. Even solid-state physics is almost only half physics because it worries too much about special substances. [Feynman *et al*. (1964), vol. II, chap. 31, pg.1]

Figuratively speaking, what Feynman describes here is the physicists flipping a bit of physics fact up to someone standing on the next higher rung of the ladder. That person must catch it and do so without falling off his perch. But consider this: For this handy division of labor to be possible at all (1) we must have different rungs on the ladder or there would be no one to toss a factoid up to, and (2) the rungs of the ladder can't float unsuspended in midair; the rungs have to be held in place by the *rails* of the ladder. What are these rails? Here we have two considerations. We must have a method for stepping down the ladder, and that is scientific reduction. But we also must have a method for climbing up the ladder, and this is called ***model order reduction*** (MOR).

The need for model order reduction springs from what Weinberg called "the problem of the square law of computation" [Weinberg (1975), pp. 6-8]. He gives a rather splendid example of how MOR is carried out by using Isaac Newton and Newton's Law of Universal Gravitation [*ibid*., pp. 8-12]. Within the scientific division of labor, the practitioners who work on this aspect of *integrating the disciplines* (building the rails of the ladder) are called ***system theorists***. While it is true that all (or, at least, the great majority of) specialized practitioners have a suitable working knowledge of the scientific rungs immediately above and, perhaps, immediately below the one they spend most their time standing upon, the system theorist is charged with knowing how to transform what is known at each particular rung to a form practically usable by practitioners on other rungs on the ladder. He must be ***an interdisciplinarian***. If science-as-a-whole were a factory, system theorists would be the material handlers working in it.

I stress that the problem of complexity is encountered even in physical-natural science. It is true that the scientific problems faced by social-natural sciences are much more difficult than those encountered by any physicist, but it is also true that social scientists have traditionally given the physical-natural sciences a bit more credit for achievement than they merit. Consider this: we know a great deal about the biophysics of the amoeba, but after more than a century of research we still do not know everything about amoebae. A bit more generally, Feynman put it very well when he told his students,

> [The] law $F = ma$ is not exactly true; if it were a definition we should have to say that it is *always* exactly true; but it is not. . . If you insist upon a precise definition of force, you will never get it! First, because Newton's Second Law is not exact, and second, because in order

> to understand physical laws you must understand that they are all some kind of approximation. Any simple idea is approximate; as an illustration, consider an object, . . . what *is* an object? Philosophers are always saying, "Well, just take a chair for example." The moment they say that, you know that they do not know what they are talking about any more. What *is* a chair? Well, a chair is a certain thing over there . . . certain?, how certain? The atoms are evaporating from it from time to time – not many atoms, but a few – dirt falls on it and gets dissolved in the paint; so to define a chair precisely, to say exactly which atoms are chair, and which atoms are air, or which atoms are dirt, or which atoms are paint that belongs to the chair is impossible. So the mass of the chair can defined only approximately. In the same way, to define the mass of a single object is impossible, because there are not any single, left-alone objects in the world – every object is a mixture of a lot of things, so we can deal with it only as a series of approximations and idealizations. The trick is in the idealizations. . .
>
> [Let] us consider the drag on an airplane flying through the air. What is the law for that force? . . . If we continue to study it more and more, measuring more and more accurately, the law will continue to become *more* complicated, not *less*. In other words, as we study this law of the drag on an airplane more and more closely, we find out that it is "falser" and "falser," and the more deeply we study it, and the more accurately we measure it, the more complicated the truth becomes [Feynman *et al*. (1964), vol. I, chap. 12, pp. 2-3].

So, yes, social-natural environment chemistry is complicated; so is physical chemistry. Welcome to natural science, folks. Sixty years ago physicist Gerald Holton wrote the following words, which are as true today as they were in 1952:

> A physical law means nothing without the definition of the concepts and the rules of mathematics or language. A concept is useless unless it appears in relation to other concepts, or if we fail to support it with clear definitions. This has helped us to an important insight about the way science grows: an advance in any one part of science is tentative until the rest of the system absorbs the advance. For example, a newly discovered law may disturb the hitherto accepted relationships between concepts or even the usefulness of some old concept. There will be a period of rearrangement until the new discovery is fully incorporated into the ever-growing structure. The diagrammatic representation of [figure 2.5] would be entirely misleading unless we imagined that each of the steps modified the previous conclusions, or that sometimes a few steps are tentatively skipped. The development of a physical or chemical law is perhaps analogous to the progress of a body of water down a gentle slope, where there are eddies and back currents from the advancing front, and where here and there a sudden surge reaches out to embrace and temporarily hold some territory far ahead of the main advance. Therefore we must allow that if this scheme [figure 2.5] indeed symbolizes the gradual approximation toward a law, the process may stretch over a period of generations. How fortunate for the progress of science that individual scientists do not permit themselves to become discouraged by this wide prospect of lengthy struggles – even if many do achieve their peace of mind usually by a wholehearted devotion to the narrower, day-to-day progress of their work. [Holton (1952), pp. 272-273]

All this is just as true for social-natural science as it is for physical-natural science.

Now, all that I have just written would be a lot of huff and puff it were not for the fact that methodological doctrines for dealing with systems of enormous complexity in a scientific way do already exist. Consider neural science (brain theory science). By currently accepted estimates, the human brain contains on the order of 100 billion neurons with on the order of 100 trillion connections and on the order to 5 to 10 times more glial cells than neurons. Do you think that social-natural microeconomic systems would be more complicated than this? I don't. A successful method of approach to the neural system, and a pretty good one, too, has been around for 40 years

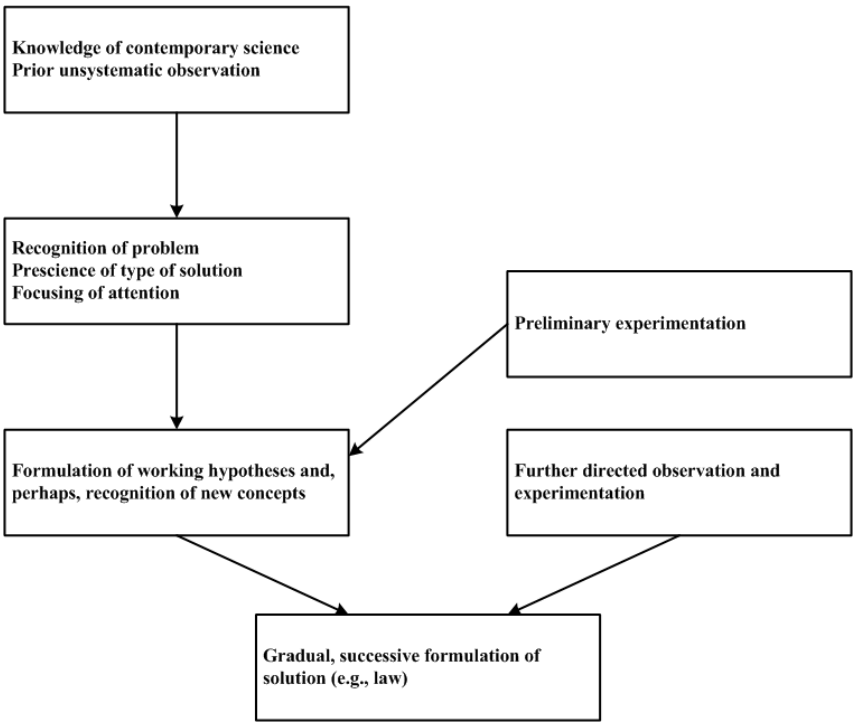

Figure 2.5: Holton's mnemonic diagram for relationships between recurring features in scientific procedure. What does he mean by "prescience of type of solution"? *Metaphysics*. How are we to understand "experimentation"? *In the context Bernard provided for it*.

going by the name *the method of minimal anatomies*. It was introduced by neural network theorist Stephen Grossberg, and it is part of a larger graph-theoretic doctrine he also introduced called *embedding field theory*. Grossberg wrote,

> The theory introduces a particular method to approach the several levels of description that are relevant to understanding behavior. This is the method of *minimal anatomies*. At any given time, we will be confronted by particular laws for individual neural components, which have been derived from psychological postulates. The neural units will be inter-connected in specific anatomies. They will be subjected to inputs, that have a psychological interpretation, which create outputs that also have a psychological interpretation. At no given time could we hope that all of the more than 10^{12} nerves in a human brain would be described in this way. Even if a precise knowledge of the laws for each nerve were known, the task of writing down all the interactions and analyzing them would be bewilderingly complex and time consuming[20]. Instead, a suitable method of successive approximations is needed. Given specific psychological postulates, we derive the minimal network of embedding field type that realizes these postulates. Then we analyze the psychological and neural capabilities of this network. An important part of the analysis is to understand what the network cannot do. This knowledge often suggests what new psychological postulate is needed to derive the next more complex network. In this way, a hierarchy of networks is derived, corresponding to ever more sophisticated postulates. [Grossberg (1972)]

The scope of applicability is much wider than Grossberg was thinking back in 1972 when he introduced the method. It isn't that hard to figure out how his neural network idea is extensible to more general cases. A neural network theory is one form of mathematical graph theory. For now,

[20] "Bewildering" indeed! Grossberg should have written "completely impractical" here.

I leave it to you to ponder how you might extend what he describes above to cover social-natural problems. Hint: Pick *one* social-natural problem to start with. Pick one you finding interesting. If you think retail stores are interesting, pick the how-does-a-retail-store-work problem. If you think politics is interesting, pick the how-does-small-town-government-work problem. Or maybe you'd like the how-does-a-Little-League-work problem. Pick something that interests you *in the specific*. Use analogies and metaphors. Don't try to hit the answer into the upper decks with one swing. We all learn *from* the particular *to* the general. My challenge to you is to try to come up with a corollary. The exercise of thinking about it will help you assimilate the social-natural chemistry ideas in this chapter. If you find the corollary too difficult to solve right now, don't be discouraged. You'll get a better idea of it as this treatise progresses.

 By the way: If you are a psychologist or are interested in psychology, you might like the what-is-Wells-trying-to-do-by-setting-up-the-challenge-the-way-he-does problem. Hint: yes, I *am* applying mental physics to the pedagogy problem of education. If you think you can't attempt the challenge without the benefit of some interviews, I can offer you a 10 Mbyte self-report as a substitute. If you want it, just let me know. It's free.

The social atom for every social-natural science is the individual human being. In chapter 3 we take up some of the rudimentary mental physics of the social atom.

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