Prolegomenon to a Theoretical Unification of the Social and Natural Sciences

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Introduction

A hundred years ago the social sciences were much more unified than they are today. Sociology and anthropology, for example, were disciplines that overlapped extensively and shared a common ancestry in such great founding figures as Durkheim. Many early sociologists could just as easily have been classified as anthropologists; the names Sumner, Keller, Hobhouse, Westermarck, and Spencer come most immediately to mind, but there are numerous others. Today most sociologists and anthropologists are barely aware of each other and seldom read each other's work.

Early sociology was also very aware of biology and most early sociologists took biology into account in one way or another, none more than the great Edward Westermarck, who wrote major books on family and marriage systems and the moral emotions from a Darwinian evolutionary perspective [Westermarck 1891; Westermarck 1906-08]. And of course the celebrated (at the time) Herbert Spencer made extensive use of organismic analogies and wrote a multi-volume *Principles of Biology* to go alongside his three-volume *Principles of Sociology*. Spencer and Darwin belonged to the same intellectual club and saw each other frequently.

But today sociology and biology are, on the whole, much farther apart than sociology and anthropology, if such a thing is possible. Most sociologists have an embarrassing degree of ignorance of biology. And few people think of reuniting the two fields. But there are some. The contemporary evolutionary biologist and

founder of sociobiology, Edward O. Wilson [1998], has gone even further in his book *Consilience: The Unity of Knowledge*. In this book he argues forcefully not only for bringing biology and the social sciences closer together, but for the unification of the natural and social sciences in a common theoretical framework. This is a great idea. Unfortunately, it is developed in only a sketchy and programmatic way. Wilson talks of sociobiology as one of the keys to unification, and also of how the social sciences, the arts, and ethics and religion need to be part of any synthesis. This is all well and good, but Wilson leaves us hanging with respect to the specific shape the unification should take. His book points us in the right direction, but it remains for us to complete what he began. This is a task that I welcome with open arms.

Unifying Social Science, Unifying Sociology

But it will be a difficult task, certainly not impossible, but a demanding and time-consuming endeavor that will take many years and many committed scholars on both sides of the natural/social divide. One of the things that makes the task so difficult is that before the natural and social sciences can be unified, the social sciences themselves have to be unified. I have already pointed out that sociologists and anthropologists today have little contact with each other, but the same is true of social scientists in all of the major disciplines. Each discipline has its own sort of imperialism, and each feels that it is on the yellow brick road to truth and that the members of other fields are sadly misguided. When I listen to sociologists talk, both informally and at professional meetings, it is clear that most of them are anti-psychology and anti-economics and see both disciplines as unfriendly rivals rather than potential collaborators, as well as serious threats to their own disciplinary status. The political scientists appear to be, like the anthropologists, largely a nuisance and are therefore mostly ignored (except perhaps by political sociologists, such as Seymour Martin Lipset and Charles Tilly).

Indeed, the situation is actually worse, for sociologists have become split into various tribes many of which are engaged in ongoing wars. These tribes have formed largely along theoretical and methodological lines. There is a wide range of mutually hostile theoretical perspectives in sociology, and serious methodological disputes between quantitative and qualitative sociologists, and within each of these two camps as well. Moreover, the American Sociological Association has been splitting into a growing number of "sections," which are both topical areas and theoretical approaches (e.g., gender, the family, sociology of emotions, rational choice, world-systems), and increasingly the action in sociology is in these sections. New sections are forming all

the time, and it is possible that sociology in the future could split apart into some of these sections.

Another problem is that sociology long ago became mostly the study of industrial societies, and in reality just one of those, the society to which the sociologist in question happens to belong. There are some sociologists who look at other kinds of societies, but even most of these sociologists seldom venture beyond the study of the agrarian states of the past few centuries. The vast majority of sociologists know virtually nothing about the pre-agrarian societies that anthropologists have focused on: hunter-gatherer bands, horticultural and pastoral tribes, or chiefdoms and early states. There are exceptions, but they can be named on the fingers of a single hand, two at the most. Gerhard Lenski was one of the first; his groundbreaking work on the evolution of stratification, *Power and Privilege* [Lenski 1966], focused on the entire range of human societies, and he later generalized his evolutionary approach to sociology as a whole [Lenski 1970]. I myself have tried to follow Lenski's lead in much of my work, developing my own theory of long-term social evolution [Sanderson 1990; Sanderson 1994; Sanderson 1995; Sanderson 2007a]. Other full-blown comparativists would include Pierre van den Berghe, Christopher Chase-Dunn, and Thomas D. Hall. There are others, but it is a short list and most of us know each other.

So before we can have any hope of unifying the natural and social sciences, we first have to unify the social sciences, and before we do that we have to try to unify sociology. The odds (and the Gods) are not with us. Twenty years ago I wrote a paper [Sanderson 1987] in which I argued that since most sociologists have difficulty choosing among the cacophony of theoretical voices, they take the easy way out and declare that all (or at least most) of these voices have something to contribute and we should listen to each of them. This point of view, of course, is known as *eclecticism*. Most of the big-name theorists are not eclectics. Each has his own perspective to which he is strongly committed and which he (or sometimes she) pushes very hard – which is, after all, how you become a big name in the first place – while at the same time vigorously attacking other approaches. But the majority of garden-variety sociologists are eclectics.[1]

As a graduate student and young assistant professor I advocated eclecticism myself, but mainly because I still lacked the knowledge to sift through the theories and figure out which one or ones worked best. Eventually – it was around 1977, I believe – I settled on a couple of approaches that I thought seemed to work best,

[1] On the basis of two surveys I have conducted [Sanderson and Ellis 1992; Lord and Sanderson 1999], I have estimated that about 61 percent of sociologists in general, and 52 percent of sociological theorists, either openly state that they are eclectics, or identify their theoretical views in such a way that they must be considered eclectics at least by default.

the cultural materialism of the anthropologist Marvin Harris, and sociobiology. It seemed to me that these two approaches had enough similarities to allow them to be brought together. And gradually I came to work out in my mind just what was so wrongheaded in eclectic standpoints.

Here are the main arguments I made against eclecticism twenty years ago:

1. since many of the theoretical perspectives in sociology not only diverge greatly, but are often saying opposite and highly inconsistent things, eclecticism taken very far at all inevitably leads to fatal contradictions in theoretical logic. Trying to understanding the world in this way blows up in your face;

2. eclecticism forces us to embrace not only contradictory arguments, but a very large number of specific principles and propositions. This undermines the time-honored scientific goal – time-honored at least in the natural sciences – of producing parsimonious explanations, which are those that explain the greatest number of phenomena with the smallest number of concepts and principles. Since sociologists do not pay much attention to the natural sciences, and because they have virtually no training in the history or philosophy of science, many do not even know that this is an important scientific goal. As we know, the sociology journals that publish mainly the results of empirical research strongly favor quantitative multivariate analyses. Most of the sociologists who do this research are not especially interested in trying to explain as much as possible with just one or two key variables, but rather try to throw as many variables into the mix as they can dream up. This produces extremely unparsimonious explanations; I call it "multivariate chaos;"

3. some philosophers of science emphasize that in testing theories we cannot just test them against data; we also have to test them *against each other* to see which ones hold up the best [Lakatos 1970; Laudan 1977] (even theories regarded as seriously flawed will usually be held onto in the absence of a better alternative). This is the strategy of *comparative theory assessment*, and it seems to be the general rule in the natural sciences, at least implicitly. But adopting an eclectic position from the start of one's research makes it extremely difficult, and in most instances impossible, to test theories comparatively;

4. eclecticism leads to what philosophers think of as a major scientific sin – *ad hoc theorizing*. Ad hoc theorizing means that you basically invent a separate theory for each phenomenon you are trying to explain, starting over with each new phenomenon or research problem. This is usually tied to an inductive approach, one in which you already have data and try to imagine an explanation for them. Not only does this violate the time-honored hypothetico-deductive model of scientific research, but the result is, once again, confusion and chaos on a grand scale;

5. most importantly for the topic of this paper, ad hoc theorizing not only leads to contradictory and unparsimonious explanations, but it makes even a small amount of theoretical unification – within, say, any of sociology's sub-fields, or even sub-sub-fields – impossible.

Unification in the Natural Sciences

Since I am urging sociologists to eschew eclecticism, what are the alternatives? What should sociologists do instead? Basically, there are three possibilities:

1. One can commit to a given theoretical approach, defend it against its critics, and push it as far as it can go. This is extremely common in both the natural and social sciences, especially among the heavy-hitters.

2. Alternatively, one can go slightly further by committing to one perspective and pursuing one or more other approaches that appear promising on the assumption that they may eventually lead to interesting results. This is an approach that is known as *simultaneous acceptance and pursuit* [Laudan 1977]. However, this strategy can only be a provisional one. The approach that is being pursued must eventually be integrated into the approach that has already been accepted if in fact the pursued approach turns out to produce good results; but if it does not lead anywhere after a reasonable period of time, it must be discarded. (Actually, there is one other possibility: one can eventually conclude that the pursued approach actually works much better than the previously accepted one, and thus switch allegiances. I myself have sometimes experienced this outcome).

3. The final possibility is that of theoretical synthesis and unification. Here one takes the most useful and productive elements of different approaches, discards their weaknesses, and tries to recombine the strong elements into a new approach that melds everything together. This is the most difficult alternative to eclecticism, first because it requires extremely bright minds that only a handful of scholars possess, and second because it is very hard work that requires an enormous stock of knowledge and many years' expenditure of time and energy. These are undoubtedly the main reasons why only a handful of thinkers in any field have attempted synthetic work, and why only a handful of that handful have achieved much success.

The philosopher of science Nicholas Maxwell's summary of the importance of unification in science, or at least in natural science, is almost impossible to improve upon:

> Some of the greatest contributions to science are precisely contributions which "unify" apparently diverse phenomena (often against a background of entirely dif-

> ferent metaphysical blueprints): there is, for example, Newton's unification of the motion of terrestrial and astronomical bodies by means of his laws of motion and law of gravitation; Maxwell's unification of electricity, magnetism, and optics (further unified by the special theory of relativity); Einstein's unification of gravitation and geometry. Again, there is the discovery of the relatively few chemical elements, from which all the millions of diverse chemical compounds can be built up; there is Mendeleev's discovery of a pattern in the properties in the elements; and the twentieth century discovery that matter is built up of just three types of particles – electrons, protons, and neutrons. There is the tremendous unification achieved by quantum theory – a few relatively simple physical postulates sufficing in principle to predict and explain all the vast diversity of physical and chemical properties of ordinary matter. And there is the discovery that all natural phenomena can be understood in terms of just four (or even possibly only three) kinds of forces or interactions [Maxwell 1974, 140-141].

Maxwell refers to Einstein but makes no mention in the passage above of his attempt to develop a unified field theory of physical phenomena. Einstein failed in this attempt, but by the time he began he was already past his peak. Failure was also guaranteed by his hostility to quantum mechanics, exemplified by his famous statement, "I cannot believe that God plays dice with the universe." Yet others who came after Einstein have attempted their own unifications. This has been achieved to some extent with the so-called "standard model" of elementary particle physics, although physicists have not yet been able to make gravity, one of the four fundamental physical forces, part of the synthesis (the other three forces have been theoretically unified). Physicists have even begun to talk about the formulation of a "theory of everything," and some even of the "end of science," meaning that everything will have been explained by a grand unified theory [Barrow 1991; Weinberg 1992] and there will be nothing more for science to do, or at least nothing fundamental [Horgan 1996]. The latest candidate for such a theory is string or superstring theory [Greene 1999; Weinberg 1992], which attempts nothing less than an identification of the most elementary building blocks of nature, unimaginably small one-dimensional "strings" that have different patterns of vibration, with each pattern corresponding to a particular particle. Although string theory has recently run into trouble and there is growing controversy over it [Smolin 2006; Woit 2006], for the purposes of this paper all that is important is to take note of physicists' ultimate goal.

And then of course there was the great Darwin, who created one of the two most productive scientific theories of all time (the other being Einstein's relativity). Darwin was not so much a theoretical synthesizer as a thinker who understood brilliantly how to bring together theoretical ideas with a wide range of field observations [Mayr 1991]. Ernst Mayr [1991] has argued that Darwin had not just one theory,

but five. One of these was the simple claim that evolution had occurred and that all species were linked by means of it. Another, which was his key theory, was his idea that the natural selection of favorable traits was the main mechanism of evolution that allowed organisms to be well adapted to their environments. Biologists of the day quickly accepted the first theory, but there was great resistance to the second, mainly because natural selection seemed to eliminate purpose from the world, and scientists of the day were deeply committed on philosophical grounds to this notion [Mayr 1982]. Natural selection actually declined in influence in the late nineteenth and early twentieth centuries, to the point where it was accepted by almost no one [Mayr 1982; Bowler 1983]. But this was to change completely with the development of population genetics around 1930. This new field showed both what the source of biological variation was and how natural selection could act on it. The result was a grand synthesis, the so-called modern synthetic theory pioneered by Dobzhansky, Mayr, Huxley, Simpson, Rensch, and Stebbins [Mayr 1982, 566-570], sometimes called neo-Darwinism. This theory is not only the great unifying idea of all modern biology, but it has spilled over into such fields as paleontology and biological anthropology, where its influence is great and where even higher levels of unification have been and are being achieved.

Steps to the Unification of the Social and Natural Sciences

But as impressive as these unifications are, they are mostly unifications within a particular discipline or set of closely related disciplines; they are a far cry from being the grand unification of the natural and social sciences. How can that be achieved? In my view, primarily by connecting the social sciences with fields or approaches that are explicitly or implicitly neo-Darwinian. The most important of these are:

- *Evolutionary biology and its direct social science offshoots, especially sociobiology and evolutionary psychology*.[2] This path has already been taken for approximately the past twenty years by several hundred psychologists and an-

[2] The term sociobiology, coined in the 1950s and later made popular by Wilson, was changed sometime in the 1980s to evolutionary psychology by Daly and Wilson and Tooby and Cosmides, three of whom are psychologists. Probably there were two main reasons for the change. First, the term sociobiology had become one of abuse and a red flag, so it was probably thought that switching to a new term might help disarm the critics (or at least confuse them for awhile!). Second, the new term no doubt resonated well with the psychologist HBES founders because it made it into a subfield of their own discipline. (Disciplinary imperialism never seems to be completely erased, even among interdisciplinary scholars!) E.O. Wilson contends that sociobiology and evolutionary psychology are the same thing, and I basically agree with him. My preference is to continue to use the older term because I think it more accurately captures what practitioners like myself are doing.

thropologists, who are far ahead of the practitioners of all the other social sciences in time, in theoretical conceptualization, and in the generation of empirical evidence. In the late 1980s the psychologists Martin Daly, Margo Wilson, and Leda Cosmides, along with the biologist Richard Alexander and the anthropologists John Tooby, Napoleon Chagnon, and William Irons, founded the Human Behavior and Evolution Society (HBES), which has been holding annual meetings since then and has now grown into a large and impressive organization with hundreds upon hundreds of members. The above-named scholars were also instrumental in founding HBES's leading journal, Ethology and Sociobiology, later renamed Evolution and Human Behavior [for citations to the voluminous work of these scholars, see the extensive bibliography in Sanderson 2001]. Some sociologists have picked up on sociobiology, for example, Pierre van den Berghe (who was really the first pioneer in this area), Joseph Lopreato and his student Timothy Crippen, Rosemary Hopcroft, Satoshi Kanazawa, François Nielsen, Michael Hammond, Jeremy Freese (although in an inconsistent and ambiguous way), and myself. Jonathan Turner and Alexandra Maryanski take biology seriously, but as yet have not been persuaded by much of sociobiology (Westermarck's theory of incest avoidance being one of the exceptions), concentrating mainly on the implications of primate and hominid evolution, and the structure of the brain as the basis for human emotions [see Sanderson 2008 for an much more detailed discussion of the recent history of Darwinian pursuits and applications by sociologists, with extensive references to the work of the sociologists listed above and others]. There are a few evolutionists in political science, in particular Frank Salter [2003], Albert Somit and Steven Peterson [1997; 2005], and the political philosopher Larry Arnhart [1998]; and some economists have begun to apply Darwinian ideas to economic behavior and institutions [Laurent and Nightingale 2001; Hudson www.evolutionary-economics.org].[3] There is also a smattering of people from other fields, such as philosophy [Dennett 1995], public policy [Rhoads 2004], law [Beckstrom 1985; Browne 1995; Browne 2002], literary theory [Carroll 1994; Carroll 2004; Barash and Barash 2005], and art [Dissanayake 1990; Dissanayake 1995]. But the psychologists and anthropologists are way ahead of everyone else both in numbers and in theoretical and empirical advances.

[3] There is an older subfield of economics known as evolutionary economics [Nelson and Winter 1982; Anderson 2005], but this is a version of *social* rather than Darwinian evolutionism and should not be confused with it. Hirshleifer [1977; Hirshleifer 1982] is one of the very few economists to have a foot in each evolutionary camp.

- *The closely related fields of human genomics and genetics*. I am much less qualified to speak about these fields, but they are extremely important and indeed necessary in enabling us to identify and describe evolutionary adaptations at the genetic level. Let me mention three examples, although there are many others. Several geneticists have recently discovered a gene called Microcephalin, which has been hypothesized to play an important role in determining brain size. Several alleles of the gene have been identified. One allele, MCPH1, is thought to have originated approximately 37,000 years ago in Eurasia and spread very rapidly thereafter [Evans *et al*. 2005]. The prevalence of this allele has been mapped for individuals living in different societies and cultures all over the world. That the allele spread so rapidly after its origin suggests to its discoverers that it was under strong selective pressure. The timing of this allele's origin and rapid spread is especially interesting, because it corresponds closely to the cognitive revolution represented by the Upper Paleolithic transition in Europe, which of course is associated with the famous cave paintings and a variety of other new symbolic manifestations. A second allele, ASPM, has been dated to about 5,800 years ago, and its geographic representation has also been mapped [Mekel-Bobrov *et al*. 2005]. In this case the timing corresponds reasonably well to the rise of civilization and the state in several regions of the Old World. However, these discoveries must be treated with great caution because the claim that the two Microcephalin alleles determine brain size has not been supported empirically [Woods *et al*. 2006]. Nevertheless, it is well established that brain size is highly heritable, and the genes that do significantly determine it will be discovered in due time [*ibidem*]. And there can be no doubt that many other genes related to different features of brain organization will also be discovered. A second example concerns the work of Luca Cavalli-Sforza and his colleagues in mapping the global distribution of genes and languages [Cavalli-Sforza 2000; Cavalli-Sforza, Menozzi, and Piazza 1994; Cavalli-Sforza and Cavalli-Sforza 1995]. The extremely detailed studies these scholars have conducted have contributed in a major way to identifying worldwide patterns of human migration over tens of thousands of years and the resulting patterns of linguistic and genetic diversity among the world's peoples. Finally, there is new research on the highly controversial subject of race and race differences, a major area of focus in sociology from its very beginning. Until the late 1950s or early 1960s, race was regarded as a biological concept and various schemes of racial classification set forth. Emphasis then shifted gradually toward the view that races are at most skin deep and are really "social constructions"

with little biological foundation. According to this view, racial classification is either impossible or meaningless since peoples blend imperceptibly into each other. But the idea that race is biological and that we can meaningfully classify races is making a comeback, not among sociologists but among geneticists and biomedical researchers. Some recent genetic research has produced a classification of five fairly distinct racial groups: 1) Africans from sub-Saharan Africa; 2) Caucasians from western Eurasia, North Africa, and the Indian subcontinent; 3) Asians from eastern and southeastern Eurasia; 4) Pacific Islanders, including Australian aborigines, Polynesians, Melanesians, and Micronesians; and 5) Amerindians, who are the original inhabitants of North and South America [Risch *et al*. 2002; Wade 2006]. This genetically based classification of racial groups has been shown to relate astonishing well to subjective race, with people's self-reported race corresponding to their biological race 99 percent of the time! Physicians and biomedical researchers have also been discovering biological race differences. For example, gestation time in blacks is about two weeks shorter than in whites; blacks have higher rates than whites of cardiovascular disease, Type II diabetes, colorectal cancer, prostate cancer, and Alzheimer's disease; and certain drugs that work well in whites work less well or not at all in blacks [Wood 2001; Risch *et al*. 2002; Entine 2000, 287-288]. It is only a matter of time before the genes underlying these characteristics are identified.

- *Human ethology*. This is a discipline that preceded sociobiology by several decades and that has since declined in influence and largely been eclipsed by its newer cousins. But ethology still can prove useful because of its emphasis on the direct field observation of behavior and its focus on innate mechanisms visible in facial expressions, body language, and the like [cf. Salter 1995]. Let us not forget that Darwin wrote an entire book on facial expressions and kindred phenomena, The Expression of the Emotions in Man and Animals [Darwin 1872]. And recently Randall Collins [2008] has written a book on human violence that makes extensive use of an ethological perspective in data collection.[4]

[4] Unfortunately, Collins views ethology as the tolerable outer limit of Darwinian applications and fails to see how going further and adopting a sociobiological perspective on violence would dramatically alter some of his major conclusions. This could be because he is unfamiliar with the extensive anthropological literature showing how common lethal violence is in band and tribal societies, as well as how it is universally concentrated overwhelmingly among young males. Or perhaps he actually *does see*, but prefers not to acknowledge what he sees.

- *Dual inheritance or coevolutionary theories*. These have been pioneered mainly by Robert Boyd, Peter Richerson [Boyd and Richerson 1985; Richerson and Boyd 2005], and William Durham [1991]. Dual inheritance theories are related to sociobiology, but they emphasize culture more and try to show how there are modes of cultural transmission that are intertwined with, but often independent of, genetic transmission. Boyd and Richerson have attracted numerous adherents and trained many students who have applied their ideas in various ways, especially in terms of models of cultural transmission and group selection bearing on the questions of cooperation and altruism [Henrich 2001; Fehr, Fischbacher, and Gachter 2002; Gintis, Bowles, Boyd, and Fehr 2003; Gintis, Bowles, Boyd, and Fehr 2005; Fehr and Fischbacher 2004]. I am not especially persuaded by a lot of this work, although I remain open to it and may eventually come to accept more of it. In any event, it is important and needs careful consideration. And there can be no doubt that a good deal of cultural transmission is only partially tied to genetic transmission. On this virtually everyone agrees; the key question is how much of cultural transmission is independent of genetic mechanisms and to what extent.
- *Behavior genetics*. This field is devoted to explaining individual differences in a wide range of behaviors, e.g., academic achievement, religiosity, political attitudes, crime. Behavior geneticists attempt to partition the causal variance in these behaviors and attitudes into three parts [Rowe 1994; Rowe 2002; Plomin *et al*. 2008]: genetics, shared environment, and unshared environment. They find that, averaging across all of the attitudes and behaviors they have been studying, approximately 45 percent of the variance is due to genetics, another 45 percent to unshared environment, and just 10 percent to shared environment. Sociologists have almost totally ignored this field, but one happy exception is François Nielsen. In a recent study, Nielsen looked at three dimensions of achievement in a sample of adolescents: verbal IQ, high school grade point average, and college aspirations and expectations [Nielsen 2006]. Averaging across all three dimensions, Nielsen found that genetics explained 60.2 percent of the total variance in achievement, unshared environment 34.2 percent, and shared environment a mere 5.6 percent. Since the effects of shared environments are the stock-in-trade of most sociological models of status attainment, Nielsen's findings will prove to be extremely awkward for traditional sociology, especially if they can be generalized to other forms of social behavior of major interest to sociologists.
- *Cognitive neuroscience*. The focus of this field is primarily a very detailed study of the anatomy and physiology of the brain. A particularly hot topic

> in recent years has been the notion of mirror neurons, which are alleged to be the mechanism underlying human empathy and role taking [Gallese and Goldman 1998; Stamenov and Gallese 2002; Rizzolatti and Sinigaglia 2008]. One of my graduate students who is interested in these neurons believes that they provide the biological underpinning for Mead's theory of the social self, an idea that, if correct, is itself a small-scale unification. And Jonathan Turner's work on the brain, what he originally called "neurosociology," basically fits in here [Turner 2000].

Sociologists very badly need to study these fields and approaches and read the research literature in the specialized journals. These include, in addition to *Evolution and Human Behavior*, *Human Nature, Behavioral and Brain Sciences, Evolutionary Psychology*, *Evolutionary Anthropology*, *Human Molecular Genetics*, *Molecular Biology and Evolution*, and *Trends in Cognitive Sciences*. Very few sociologists read these journals, or even know that they exist. Sociologists need to educate themselves in these fields. Too many continue to claim that there is no supporting evidence for sociobiology without realizing that in fact there is a great deal, much of it quite compelling. Sociologists are unaware of this evidence because they fail to come into contact with the journals in which 99 percent of it is published. Sociologists could also benefit greatly from attending the annual conferences of HBES, which is far and away the best academic association in the world for encountering the work of sociobiologists, evolutionary psychologists, and likeminded scholars.[5]

And there is something we can and should do pedagogically: revise and update the sociology curriculum. I would require anyone pursuing a PhD in sociology to take courses in all the above fields, plus biological anthropology and the history and philosophy of science. Whatever they had not taken as undergraduates would have to be taken in the first year of graduate study. A fair amount of instruction in areas bordering on philosophy of science, such as theory construction, is currently provided in some departments, but this is no substitute for directly confronting the history and philosophy of science themselves. Sociologists very badly need to learn how "real science" is done [Sanderson 2007b].[6]

[5] I regularly attend and present papers at HBES. Interestingly, when I meet new people there and tell them I am a sociologist, they always react with great surprise, thinking that there was not a single sociologist anywhere interested in HBES approaches and issues. Truth to tell, they are not far off the mark.

[6] Actually, to do this we would have to split off the social problems oriented and ideologically driven sociologists, who now seem to be the vast majority, and create a new association, which we might call the Society for Scientific Sociology (SSS). This idea (but not the name) has actually been seriously proposed, although to the best of my knowledge little has been done to advance it.

A Proposed Unification

But so far my ideas have only been programmatic and suggestive. I have not done what I criticized Wilson for failing to do. Do I have a proposed synthesis in mind? Indeed I do, and in fact have already done it in formulating what I call *Darwinian conflict theory* (*DCT*). In my book *The Evolution of Human Sociality* (*EHS*) [Sanderson 2001], I draw on two existing sociological approaches, most importantly conflict theory and rational choice theory, and one major anthropological theory, Marvin Harris' [Harris 1968; Harris 1979] cultural materialism, and try to show how their most important claims can be and need to be grounded in sociobiological principles. DCT contains seven major components, each of which consists of a series of highly abstract principles and propositions. The major components are 1) The Deep Wellsprings of Human Action. 2) Group Relations. 3) Basic Components of Human Societies and Causal Flows Between Them. 4) The Three Fundamental Modes of Darwinian Conflict Explanation. 5) Social Order and Change. 6) Relations Between Micro and Macro Levels of Analysis. 7) Scope and Sufficiency of the Principles of Darwinian Conflict Theory (the entire theory is laid out in *EHS*, pp. 147-153).

I then review the research evidence concerning six major dimensions of social behavior that I contend offer substantial support for DCT: human reproductive strategies; sexuality; sex and gender; marriage, family, and kinship; economic behavior; social hierarchies; and politics and war. This evidence comes from hundreds of studies of the entire range of societies (hunter-gatherer through industrial) from all over the world, including those known archaeologically and historically (see pp. 161-330 of *EHS* for my discussions of the evidence).

DCT is very much a work in progress. I continue to tinker with it and update it, but I can never live long enough to finish it, and no doubt some parts of it are wrong.[7] DCT has been almost totally ignored by sociologists in the United States, but some sociologists in Europe have picked up on it, three of them organizing a conference around it at the University of Innsbruck in Austria in 2006 and publishing the papers presented at that conference [Niedenzu, Meleghy, and Meyer 2008].

[7] Some tweaking of it that has appeared in print so far can be found in my *Evolutionism and Its Critics* [2007, 298-299]. However, even this very recent tinkering is still missing some important elements, which I hope to add sooner rather than later.

Conclusions

My focus in this paper has been on the vast amount of biology and biosocial science sociologists need to learn in order to lead us toward unification. But the onus for unification cannot be completely on us social scientists. Unification must also be approached from the other direction, i.e., biological scientists need to learn much more social science than they currently know, sociology and anthropology in particular. Most of them are probably as woefully ignorant of our fields as we are of theirs.[8] We need to vigorously promote interdisciplinary collaboration at the highest levels, beginning, perhaps, by setting up cross-departmental colloquia in universities in which biological scientists would present their research to social scientists, and vice versa.

Let me conclude simply by saying that the proposals I have made in this paper will not sit well with most sociologists. I have no illusions about that. Sociologists do not want to go near the natural sciences, nor do many of them want to go very near their cousins in the other social sciences. They prefer to cling to their Durkheimian antireductionist imperialism, most of them completely oblivious to the fact that reductionism is the standard mode of procedure in the natural sciences. But I say to these sociologists, open your eyes wider – much wider. Because of the revolutions currently going on in the biological and biosocial sciences, those of us interested in a deep understanding of human social life live in exciting times. We have before us a great opportunity. Let it not pass us by. Let us not turn away in fear or loathing. Let us look The Beast square in the face and straight in the eye and say, "The Beast is not what you think. The Beast is good. Very good. Let us climb up onto The Beast and let it carry us as far as it can. Let us ride it all the way to the new home that some of us are building. For in this home are many mansions."[9]

[8] This is true even of E.O. Wilson. He has managed to learn some social science since he wrote *Sociobiology* in 1975, but he is still far behind the curve.

[9] Some readers may wonder why we should not go even further and include chemistry and physics in a Grand Ultimate Unification. I do not know if this is possible, but if so I myself would have no idea how to do it. However, one of my very astute graduate students, Richard Niemeyer, is writing a dissertation organized around the concept of *fractals* as one of the keys to understanding the evolution of groups and societies from the very small scale to the very large. It remains to be seen whether Niemeyer's work will bear the fruit he hopes it will, but there is precedent for what he is attempting, e.g., Zhou *et al.* 2005 and Hamilton *et al.* 2007. Like myself, Niemeyer is a natural synthesizer and unifier and believes that sociology must draw heavily on ideas from the natural sciences. He is the same student referred to above as seeing in mirror neurons a link to Mead's theory of the social self.

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Prolegomenon to a Theoretical Unification of the Social and Natural Sciences

Abstract: Sociology today is in disarray on every significant front, not only theoretically and methodologically, but on what the most important sociological questions are and even on whether the discipline should be an objective science of society or a form of social activism. In short, it is anything but a unified field. The social sciences themselves are not all in disarray, but they hardly connect to each other and interdisciplinary work is by far the exception rather than the rule. When we bring the natural sciences into the equation, it goes without saying that the social sciences and the natural sciences are about as far apart as they can possibly be. Few scholars on the social/natural divide lament this fact, but some of us hold out hope that these two major branches of science, or at least parts of them, can be brought together into a Grand Unified Theory of the natural and social world. This paper tries to point the way toward such a unification, mostly by sketching out the natural science fields and their social-scientific applications that sociologists need to immerse themselves in. The paper also makes brief reference to the author's own provisional theoretical synthesis, Darwinian conflict theory, an unfinished unification that may provide a foundation on which other sociologists can build in due time.

Keywords: unification, Darwinism, sociobiology, neuroscience, genetics, coevolution.

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