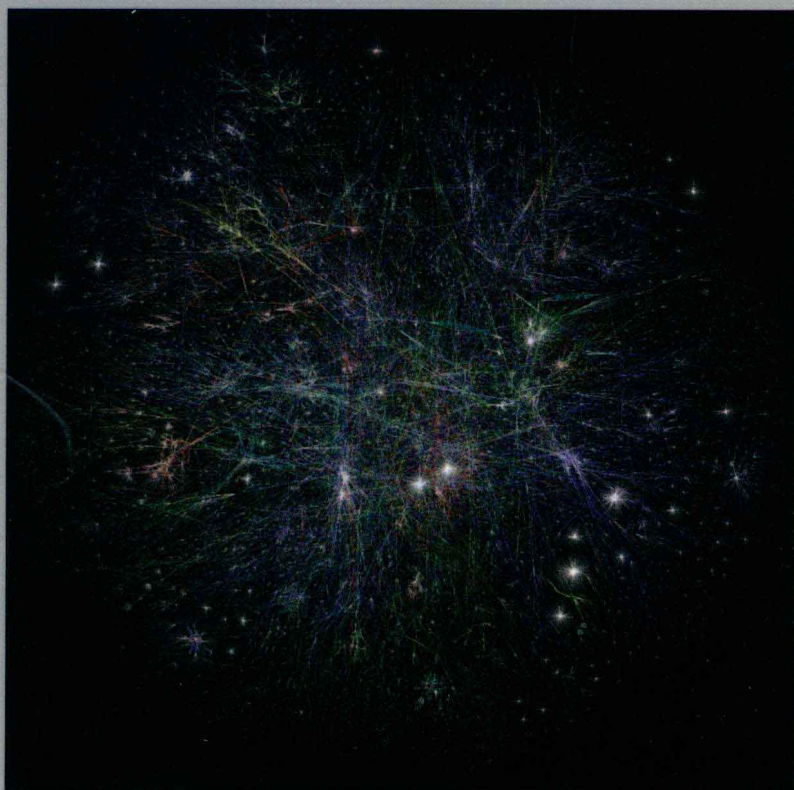


COMMON KNOWLEDGE: THE CHALLENGE OF TRANSDISCIPLINARITY

Moira Cockell, Jérôme Billotte, Frédéric Darbellay,
Francis Waldvogel, Editors



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Foreword

by Edward O. Wilson¹

The World Knowledge Dialogue, is an important effort to seek unity among the great branches of learning, and thereby render knowledge more relevant to the understanding of the real world and the human condition within it.

Since the eighteenth century the great branches of learning have been classified into the natural sciences, the social sciences, and humanities. Today we have the choice between, on the one hand, trying to make the great branches of learning consilient – that is, coherent and interconnected by cause-and-effect explanation – or, on the other hand, *not* trying to make them consilient. Surely universal consilience is worth a serious try. After all, the brain, mind, and culture are composed of material entities and processes; they do not exist in an astral plane that floats above and outside the tangible world.

The most useful term to capture the unity of knowledge is surely *consilience*. It means the interlocking of cause-and-effect explanations across different disciplines, as for example between physics and chemistry, chemistry and biology, and, more controversially, biology and the social sciences. The word consilience was introduced in 1840 by William Whewell, the founder of the modern philosophy of science. It is more serviceable than the words coherence or interconnectedness, because its rarity of usage since 1840 has preserved its original meaning, whereas coherence and interconnectedness have acquired many meanings scattered among the different disciplines.

Consilience, defined then as cause-and-effect explanation across the disciplines, has plenty of credibility. It is the mother's milk of the natural sciences. Its material understanding of how the world works and its technological spin-off are the foundation of modern civilization. The time has come, I believe, to consider more seriously its relevance to the social sciences and humanities. I will grant immediately that belief in the possibility of

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consilience beyond the natural sciences and across to the other great branches of learning is not the same as science, at least not yet. It is a metaphysical world view, and a minority one at that, shared by only a few scientists and philosophers. Its best support is little more than an extrapolation of the consistent past success of the natural sciences. Its strongest appeal is in the prospect of intellectual adventure and, given even modest success, the value of understanding the human condition with a higher degree of certainty.

Why is this conjunction among the great branches of learning important? Because it offers the prospect of characterizing human nature with greater objectivity and precision, an exactitude that is the key to human self-understanding. The intuitive grasp of human nature has been the substance of the creative arts, the underpinning of the social sciences, and a beckoning mystery to the natural sciences. To grasp human nature objectively, to explore it to its depths scientifically, and to grasp its ramifications, would be to approach if not attain the grail of scholarship, and to fulfill the dreams of the Enlightenment.

Now, rather than let the matter hang in the air thus rhetorically, I want to suggest a preliminary definition of human nature, and then illustrate it with an example. Human nature is not the genes, which prescribe it. It is not the cultural universals, such as the incest taboos and rites of passage, that are the products of human nature. Rather, human nature is the collectivity of the epigenetic rules, the inherited regularities of mental development. These rules are the genetic biases in the way our senses perceive the world, the symbolic coding by which we represent the world, the options we open to ourselves, and the responses we find easiest and most rewarding to make. In ways that are beginning to come into focus at the physiological and even a few cases the genetic level, the epigenetic rules alter the way we see and linguistically classify color. They cause us to evaluate the aesthetics of artistic design according to elementary abstract shapes and the degree of complexity. They lead us differentially to acquire fears and phobias concerning dangers in the environment (as from snakes and heights), to communicate with certain facial expressions and forms of body language, to bond with infants, to bond conjugally, and so on across a wide range of categories in behavior and thought. Most are evidently very ancient, dating back millions of years in mammalian ancestry. Others, like the stages of linguistic development, are uniquely human and probably only hundreds of thousands of years old.

As an example of epigenetic rules, consider the instinct to avoid incest. Its key element is the Westermarck effect, named after Edward Westermarck, the Finnish anthropologist who discovered it a century ago. When two people live in close domestic proximity during the first 30 months in the life of either one, both are desensitized to later close sexual attraction and bonding. The Westermarck effect has been well documented in anthropological studies, although the genetic prescription and neurobiological mechanics underlying it remain to be studied. What makes the human evidence the more convincing is that all of the nonhuman primates whose sexual behavior has been closely studied also display the Westermarck effect. It therefore appears probable that the trait prevailed in the human ancestral line millions of years before the origin of *Homo sapiens*, our present-day species. The existence of the Westermarck effect runs directly counter to the more widely known Freudian theory of incest avoidance. Freud argued that members of the same family lust for one another, making it necessary for societies to create incest taboos in order to avoid the social damage that would follow if within-family sex were allowed. But the opposite is

evidently true. That is, incest taboos arise naturally as products of response mediated by a relatively simple inherited epigenetic rule. The epigenetic rule is the Westermarck effect. The adaptive advantage of the Westermarck effect is, of course, that it reduces inbreeding depression and the production of dead or defective children. That relentless pressure is almost surely how it arose through evolution by natural selection.

The value of the consilience program – or renewal of the Enlightenment agenda if you prefer – is that at long last we appear to have acquired the means either to establish the truth of the fundamental unity of knowledge, or to discard the idea. I think we are going to establish it. The great branches of learning seem destined to meet this way, and if so it will be a historic event that happens only once. But of course we must be careful: surprises, even shocking surprises, may occur. What will be the outcome? Human nature is such that we will find out, and probably in a few years. That prospect is what makes future scholarship in all of the great branches of learning, the natural sciences, social sciences, and humanities, so very exciting and worthwhile. Hence it is also why the World Knowledge Dialogue is a timely initiative.

Introduction

Transforming Knowledge into Wisdom

by Moira Cockell, Jérôme Billotte, Frédéric Darbellay and Francis Waldvogel¹

Knowledge cannot exist in the absence of dialogue. Whether at the level of socio-cultural interactions, Internet web design or neurological signaling processes, knowledge accrues through the bi-directional exchange of information across networks of receivers and emitters. Without such dialogue there is no transmission, revision or expansion of knowledge because these are inherently dynamic reflexive processes. All knowledge is thus sterile and ultimately doomed to wither unless it is shared, free to mutate and evolve. And like other living systems, the realm of the mind needs cross fertilization to maintain its vigor. That is why this book marks a milestone in constructive exchange between the physical, natural and human science disciplines.

Near the end of 2008, two hundred and fifty academics met together to initiate a dialogue between peers from the different great branches of learning, as part of an experiment in interdisciplinary bridge-building. The common aim: to explore ways of crossing long-held communication barriers between scholars of the natural/technical sciences and the social sciences, arts and humanities disciplines. The WKD Foundation then commissioned a number of the participants to write articles that explore in more depth some of the issues they discussed together. Willing contributors ranged from young doctoral students to venerable senior figures. The resulting articles vary greatly in subject matter, style, length and overall structure. However what emerges from these sixteen original and highly personal essays portraying multiple facets of the knowledge creation process, is a common sense of purpose and a shared framework of new tools and approaches to interdisciplinary dialogue. The authors have not only taken the time to articulate their own perceptions of some complex problems for a broad audience, they have made an effort to consider things from each other's point of view and have responded patiently

¹ The authors are past and current members of the World Knowledge Dialogue Foundation's Executive Board. See <http://www.wkdialogue.org/>

to questions, suggestions and criticisms from each other. They may not wholeheartedly share each other's opinions or choose to take an identical strategic approach to research, but in their willingness to participate in and contribute to the World Knowledge dialogue Foundation's initiatives, each exemplifies the open-minded spirit that is an essential ingredient of creativity.

Do not expect to find here the blueprints for how to foster innovation, achieve universal harmony or share the fruits of knowledge equitably: Such goals are moving targets and as such there can be no finite way to attain them, strive though we should to get closer. To glean the secret of success you must also read between the lines! Each epistemological approach to understanding the universe and our place in it has its limitations and boundaries. However just as individuals have personal blind spots and see more easily the limitations of others than their own, the same is surely true for the different branches of learning. As individuals, we learn to triangulate around our blind spots, stretch our limits and expand our horizons, by assimilating criticism, seeking advice and recognizing the tension between emotional and rational components of our intellect. The same strategy also applies at the larger scale of the different branches of learning, provided these actively communicate with each other and value constructive criticism as a productive rather than destructive force. Interdisciplinarity in this sense becomes an essential component of a balanced education, not merely a fashionable buzzword for the 21st century or a means to access new sources of funding for one's own favorite research.

We live in times where the structure of human society has become so heavily dependent on science and technology, that some fear the consequences of a growing modern trend towards illiteracy in subjects such as mathematics and the physical sciences, while others bemoan a common perception that the pursuit of scientific knowledge now trumps all the other domains of human intelligence. Those who care to can find evidence of both these polarizing effects among certain groups within larger society. Yet the argument, about whether science, or the arts and humanities have contributed most to the history of human development, is a futile one. It is time for us to stop deriding each other and begin to pool our resources. Thanks to scientific, medical and technological breakthroughs, human society's capacity to live longer, migrate further and exploit more of the resources around it has exploded in the space of just a single lifespan. Nonetheless, we encounter daily reminders that science and technology are not an unmitigated force for good. They are merely tools that we can choose to employ. The choice between use or misuse of such tools depends on maintaining a broad sector of educated society that is prepared to engage in ethical, philosophical and political issues and to accept responsibility for deciding what is done with the knowledge we generate.

The advent of global communication among human beings has not elevated us to the realm of god-like creatures; rather, it has bequeathed us a global responsibility for each other. The individual may make the case for his or her pursuit of fundamental knowledge for its own sake, but if the elite group of society that is academia does not embrace the responsibilities that accompany its place of privilege, it may not endure long as a model.

Table of Contents

	Foreword.....	vii
	by Edward O. Wilson	
	Introduction.....	xi
	Transforming Knowledge into Wisdom.....	xi
	by Moira Cockell, Jérôme Billotte, Frédéric Darbellay and Francis Waldvogel	
Chapter 1	Common Responsibilities	1
	1.1 Public, Relational and Organizational Trust in Economic Affairs.....	3
	by Karen S. Cook and Oliver Schilke	
	1.2 Learning from the Past: How to bring Ethics and Economics in line with the real Nature of the Human Being.....	15
	by Philipp Aerni	
	1.3 Collective Intelligence and Business Enterprise 2.0	31
	by Florence Devouard	
	1.4 Science and the Social Contract: On the Purposes, Uses and Abuses of Science.....	45
	by Sarah Chan, John Harris and John Sulston	
	1.5 Scientific Knowledge Leads to Moral Responsibilities – Case Study Synthetic Biology	61
	by Anna Deplazes-Zemp and Sebastian Leidel	
Chapter 2	Common Goals	73
	2.1 War and Peace: Conflict and Cooperation in a Tropical Insect Society	75
	by Raghavendra Gadagkar	

2.2	Towards Understanding Conflict Elicitation and Conflict Resolution: Challenges for Brain, Behavioral and Social Sciences.....	97
	by Urs Luterbacher, Sebastian Di Iorio and Beth Krasna	
2.3	Academic Prejudice and the Spirit of Humbleness.....	117
	by Edmund Harriss	
2.4	Kachile – Concepts, Tools & Strategies for a Post-Conflict Environment.....	129
	by Ulf Richter	
2.5	Disciplines for the Common Good: From insular to systemic interdisciplinarity	139
	by Filippo Dal Fiore	
2.6	Frontiers Research: Seek, Share & Create	145
	by Henry Markram and Kamila Markram	
Chapter 3	Common Language	163
3.1	Towards a Science of Collective Intelligence.....	165
	by Pierre Lévy	
3.2	Collective Quality: How to design collective standards of knowledge?	197
	by Gloria Origgi	
3.3	Web Science and Reflective Practice.....	205
	by Kieron O’Hara and Wendy Hall	
3.4	Science Blogs in Research and Popularization of Science: Why, how and for whom?.....	219
	by Antoine Blanchard	
3.5	Understanding the Science of Stories	233
	by Noreen Golfman	

Chapter 1

Common Responsibilities

1.1 Public, Relational and Organizational Trust in Economic Affairs¹

by Karen S. Cook and Oliver Schilke²

One of the most significant economists of our time, Kenneth Arrow, argued over three decades ago that trust has implications for the economy as well as the polity. In the current “economic crisis” his words seem prophetic. For Arrow, trust has not only economic value but also sheer pragmatic value. It simply makes life easier. Like Luhmann, Arrow viewed trust as an important lubricant of a social system: “It is extremely efficient; it saves a lot of trouble to have a fair degree of reliance on other people’s word” (Arrow, 1974, p. 23). Note here that the term trust is meant to imply honesty and integrity – that one’s word can be counted on.

Arrow argues that trust not only saves on dyadic transaction costs (the concept Oliver Williamson made famous) associated with individual exchanges, it also increases the efficiency of a system. It enables the production of more goods (or more of what a group values if we focus on public goods) at less cost. But, to carry his economic analysis of trust further, it cannot be simply produced on demand and it cannot be bought and sold on the open market. In his words, “it is not even necessarily very easy for it to be achieved” (Arrow, 1974, p. 36). In fact he was not at all sure how it could be produced in societies in which it does not exist. Reflecting a theme that is central to the subsequent work of Frances Fukuyama (1995), almost two decades later, Arrow argued that one of the properties of those societies classified as less developed economically is the lack of mutual trust (or what Fukuyama and others later came to refer to as generalized trust). The lack of mutual trust makes collective undertakings difficult, if not impossible,

¹ This article has now also appeared in *Corporate Social Responsibility* (2010, Volume 13, Number 2, pp. 98-109).

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since individuals cannot know if they engage in an action to benefit another that the action will be reciprocated. It is not only the problem of not knowing whom to trust, it is also the problem of having others not know they can trust you.

Arrow's discussion of trust and its economic implications is brief, but brings to the surface some of the fundamental problems with treating markets (and prices) as the main mechanism for coordinating the interests of individuals within a society or at least the limits of price as a governance mechanism. The lack of mutual trust, Arrow points out, represents a distinct loss economically as well as a loss in the smooth running of the political system which requires the success of collective undertakings.

The economic value of trust in Arrow's view thus has mainly to do with its role in the production of public goods. Individuals have to occasionally respond to the demands of society even when such demands conflict with their own individual interests. Certainly, trust has been viewed over the decades as central in the solution of what has come to be known as the prisoner's dilemma (and by extension many social dilemmas). The two prisoners captured and placed in separate rooms by interrogators must trust each other enough not to turn state's evidence on their partner in crime. If they do, both end up with the worst possible outcomes, mutual conviction. If they maintain mutual trust and remain silent, in the classic version of the prisoner's dilemma, they go free, obtaining the best possible outcome. Without trust, each defects independently sending them both to jail for the maximum amount of time. A long tradition of experimental work in social psychology and economics provides evidence of the frequent failure of mutual trust under such circumstances (Cook and Cooper, 2003). As Arrow (1974, p. 26) notes: "the agreement to trust each other can not be bought."

Public Trust

The work on collective trust, generalized trust and, more recently what is called "public trust", that followed Arrow's famous essay continues to investigate the role of trust in the provision of public goods and in public life more generally. Without generalized trust many argue that the collective action problems of our day cannot be solved easily. Ostrom and Walker (2003), in their review of the various solutions to collective action problems, provide evidence of this fact. There are many ways in which collective action problems are solved in different contexts, only one of which relies on the assumption that generalized trust works to solve the incentive problems involved. Without public trust many of the institutions that provide the foundations for the smooth functioning of society are weakened at best if not made wholly ineffective. At worst, lack of transparency and perceived incompetence serve as the seedbed of corruption.

Arrow's brief treatment of trust foreshadowed much later discussions of the role of trust in the economy. Perhaps the most widely read in the 1990's was Frances Fukuyama's (1995) major treatise, *Trust: The Social Virtues and the Creation of Prosperity*, on the economic implications of trust. This book investigates the links between social variables such as trust or reliability and various economic outcomes. He goes so far as to argue that there are major cultural differences in economic success that are based on the levels of what he terms "general social trust" in the societies he considers including, Japan, the United

States, China, France, South Korea, Germany, Great Britain, Italy and Russia. He analyzes some of the factors that support such a claim.

If, as Fukuyama argues, the ability of companies to move from large hierarchies to flexible networks of smaller firms depends on the degree of trust and social capital in the broader society, then understanding how trust emerges and how it varies across cultures is important in the effort to analyze what makes for economic success in different settings. Others are concerned less with economic performance and more with the social and political consequences of different levels of trust in various cultures (e.g. Japan, China, Germany, the emerging capitalist societies in the former Soviet Union, and the United States). In the United States, for example, it is sometimes argued that it is the breakdown in community and the trust it fosters that is associated with increased criminal activity, violence and anomie all of which have consequences for economic enterprises in urban areas. Uslaner and Brown (2005) and others have studied the links between general social trust and various indicators of inequality, which has been increasing in the United States as well as in many other countries and has been argued to be at the core of decreasing generalized trust.

Fukuyama (1995) reasons that it is social trust that generates the conditions under which specific forms of organization emerge that facilitate competitive economic enterprise. Arrow (1974) argues that economic productivity is hampered by monitoring and sanctioning, when these are required for managing relations based on distrust. Both arguments are transactions cost arguments. It is the lack of social trust that Fukuyama identifies as the reason that organizations adopt a more hierarchical form. The more flexible networks of smaller firms that engage in exchange require trust. In Fukuyama's words (1995, p. 25): "A 'virtual' firm can have abundant information coming through network wires about its suppliers and contractors. But if they are all crooks or frauds, dealing with them will remain a costly process involving complex contracts and time-consuming enforcement. Without trust, there will be strong incentive to bring these activities in-house and restore old hierarchies." Traditional hierarchical forms of governance are thus viewed as inimical to modern global economic activity resulting in lower economic performance.

It is precisely the ability to be flexible and to form networks of small companies that can be responsive to change that Fukuyama identifies as central to economic growth and prosperity. Cultures that fit this motif are poised for economic success in the global economy. Ironically, he argues that it is precisely those cultures with strong and large families that have lower social trust and national prosperity. Fukuyama (1995) refers to this claim as the "paradox of family values."

Oliver Williamson views trust as having a much narrower role in the economy, treating trust as largely relevant only in the realm of personal relations and not at all in economic relations that he characterizes as laden with opportunism. His work is at odds with much that has been written on the role of trust in the economy. In some respects Williamson has a more "romantic" view of trust, wanting to limit the term to the situation in which calculativeness is suspended. For Williamson (1993) the concept trust loses its meaning if it is not restricted to apply exclusively to personal relations. In his view personal and commercial relations are based on completely different logics involving completely distinct forms of underlying calculus. Other social scientists such as Fukuyama make much broader claims concerning the role of trust in society.

Bradach and Eccles (1989), for example, view trust as one type of control system to be distinguished from price and authority, building upon Arrow's early treatment of governance mechanisms. Reliability and flexibility are important aspects of business relations and Bradach and Eccles associate these characteristics with trust relations. Especially under uncertainty trust becomes an important determinant of transactions as exchange partners seek out those who are trustworthy and likely to be reliable in continued exchange.

In related experimental literature, Yamagishi *et al.* (1998), among others, demonstrate that uncertainty leads to commitment among exchange partners as they attempt to avoid opportunism and potential exploitation or defaults. This same phenomenon is called "relational contracting" in an older literature (*cf.* Macauley, 1963). The tendency to form committed relations and to "lock-in" has some associated opportunity costs since committed exchange partners may not explore new relations that might yield better terms. It is this "stickiness" to certain partnerships often created by trust and commitment that may have significant effects on economic outcomes, especially if there are fundamental changes in the economy such as may be created by new technologies and new or rapidly expanding markets for trade and production. There is also the tendency to stick with exchange partners under conditions of high economic uncertainty and risk, which may lead to missed opportunities when economic conditions change.

Sociologists and anthropologists who study the economy have come to conclusions similar to those of Arrow concerning the role of trust in economic endeavors. Trust, when it exists, can reduce various kinds of costs, including, but not limited to, transaction costs and the costs of monitoring and sanctioning. Granovetter (1985), for example, views economic relations as strongly interrelated with social relations. In this view economic transactions are frequently embedded in social structures that are formed by the social ties among actors. A network of social relations thus represents a kind of "market" in which goods are bought and sold or bartered. In addition, they set the terms of exchange sometimes altering the mode of exchange as well as the content of the negotiations. Trust discourages malfeasance and opportunism in part because when transactions are embedded in social relations reputations come into play. Individuals, he argues, have an incentive to be trustworthy to secure the possibility of future transactions. Continuing social relations characterized by trust have the property that they constrain opportunistic behavior because of the value of the association. Hardin's book *Trust and Trustworthiness* (2002, see also Cook, Hardin and Levi, 2005) portrays an encapsulated interest theory of trust, which is also based on this logic.

Relational Trust

Trust can be defined in relational terms as the belief that the trustee will take one's interests to heart. In the encapsulated interest view of trust articulated in Hardin's (2002) book, *Trust and Trustworthiness* and expanded in Cook, Hardin and Levi (2005), A trusts B with respect to x when A believes that her interests are included in B's utility function, so that B values what A desires because B wants to maintain good relations with A. Other's define trust as the belief that the trustee will not take advantage of one's vulnerability.