



Unification in the Social Sciences: Search for a Science of Society

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Abstract

The social sciences have contributed significantly to humanity's remarkable progress over the past two centuries, but the multidimensional crises confronting the world today reflect the need to rapidly move beyond the limitations imposed by the compartmentalization of social science disciplines and the absence of common unifying principles equivalent to those in the natural sciences. Unification of apparently disparate phenomena is a central characteristic of advancing knowledge. Pressing global challenges compel the search for greater knowledge of the unity underlying the diverse fields of social activity, the objective and subjective dimensions of human experience, the role of the collective and individual in social evolution, the action of conscious and unconscious social processes, and the influence of the future on the present. From August 25 to September 6, 2014, the World Academy of Art & Science and World University Consortium conducted two post-graduate courses at the Inter-University Centre, Dubrovnik entitled "Individuality and Accomplishment" and "Toward a Trans-disciplinary Science of Society." These courses explored the interactions and relationships between different aspects of human accomplishment and social development in search of common underlying principles and processes that can provide a foundation for the evolution of a more comprehensive, inclusive and integrated science of society. This article is an attempt to summarize and synthesize some of the rich insights that arose during the presentations and discussion. While the authors accept responsibility for its contents, we would like to acknowledge other members of the faculty who made important contributions to this endeavor: Zbigniew Bochniarz, Janani Harish, Ian Johnson, Roberto Poli, Mila Popovich, Ivo Šlaus and Karl Wagner.

The greatest scientific discoveries have been those which have revealed the relationship between phenomena that long appeared unrelated to one another, revealing the unity behind the diverse multiplicity of forces and forms. Unification is the ultimate quest of

knowledge. The quest for unification has been the source of its greatest discoveries.* Newton reconciled the contradictions between motion and rest by demonstrating that the same laws govern the movement of celestial bodies and objects on Earth. Maxwell discovered that electricity and magnetism are two forms of electromagnetism. Einstein revealed that matter and energy are two interconvertible forms of a single energy-substance. Today Quantum and Relativity theorists search for the ultimate reconciliation between the laws governing the subatomic microcosm and the intergalactic macrocosm.¹

“Division and fragmentation of reality are the governing rules & modus operandi in the social sciences.”

The sense of unity in diversity pervades all the natural sciences. The same laws are applied consistently in different fields. The chemist, meteorologist, zoologist and geneticist apply the same laws of Physics and Chemistry to inanimate and living phenomena, to the earth’s atmosphere and interstellar space, to microscopic bacteria and large mammals. While living beings no doubt exhibit characteristics unknown in inanimate material forms, they consistently adhere to the basic laws of material Nature. In this sense trans-disciplinarity is a fundamental precept in the natural sciences. Moreover, in spite of the compartmentalization of knowledge common to all fields today, the natural sciences are inherently inter-disciplinary. The meteorologist and oceanographer could never dream of excluding the impact of physical, chemical, geological, biological, ecological and astronomical factors from their theories and models.

Yet when we turn to the social sciences, consistency and unification between and across disciplines are a rare exception. The theories governing each discipline exist in airtight compartments, each in its own separate world of principles and phenomena. It is almost as if the political, social, economic and psychological human being were different species, each with its own unique characteristics, rather than multiple roles and fields of expression common to all human beings. With few exceptions, each of the social sciences seeks to understand and describe a particular dimension of social reality with minimum reference to the action or interaction with other dimensions. Micro economic theories assume a set of specific conditions rarely found in the real world and regard all variations as intrusive externalities rather than natural and inevitable facts of the interrelationship between the economic, political, social and psychological dimensions of reality. This tendency reaches its acme in the neoliberal concept of free or unregulated markets, based on the premise that law and regulation are external factors interfering with the normal equilibrium-seeking movement between supply and demand. In reality, few markets – other than the black variety and the underworld – could exist at all in the absence of the legal and regulatory framework that defines and protect property rights and contractual relationships. Moreover, Economics ignores the large non-monetarized part of human activity, all that we people do without exchange of money, the vital core of our existence without which no society or culture could survive and

* Ivo Šlaus, “Need for a New Paradigm in the Social Sciences,” lecture delivered during a World University Consortium course entitled “Towards a trans-disciplinary science of society”, Inter-university Centre, Dubrovnik, Sep 1, 2014. All lectures for the two courses are available online at www.worldacademy.org.

function, which represented around 80% of value added at the time of Adam Smith. Division and fragmentation of reality are the governing rules and modus operandi in the social sciences. “Disciplinary and conceptual boundaries don’t just focus attention; they also inhibit the discovery and study of processes that transcend those boundaries and bias public policy development in certain directions.”²

“The notion of value-free social science artificially divorces us from the living laboratory in which we live and blinds us to the implicit values that frame our perception of reality.”

1. Objectivity and Values in Science

The natural and social sciences differ markedly in one other important respect. Knowledge of reality, the pursuit of truth, has always been regarded as the primary motive and fundamental goal of the quest for knowledge in the natural sciences. The intimate linkage between science and technological progress we now regard as essential and self-evident is a relatively recent phenomenon. Until early in the 20th century, developments in science and technology occurred largely independent of one another. Most technological advances were made by inventors in pursuit of practical applications, rather than scientists in pursuit of knowledge for its own sake. Even today, while huge scientific research budgets are justified by their technological and social benefits, the essential standard for judging the value of scientific inquiry is proximity to truth, not practical application. The fundamental objective of natural science is to arrive at knowledge which is independent of the observer and value-free.

But when it comes to the social sciences, practical application has always been considered to be of primary importance. What is the value of a perfect theoretical model of economy or decision-making if it does not provide guidance for public policy and private enterprise? Although widely regarded as the father of Economics, Adam Smith described himself as a moral philosopher seeking to enhance the welfare and well-being of people, not a scientist in pursuit of universal laws of economy. Natural science is in quest of the immutable, universal laws governing natural phenomena. But the ‘laws’ governing human society are neither immutable nor universal. They are framed and formulated by human beings, based on human perceptions and aspirations, and evolving over time with the evolution of human consciousness and society.

The social sciences necessarily and inevitably represent our human construction of the reality of our own existence, individual and collective. As conscious beings, human beings are purposeful. We create social institutions intended to fulfill certain needs, achieve certain objectives and realize certain values. Our quest for knowledge of society is rightly intended to aid our efforts at self-realization. The assumption of impartiality or objectivity disguises the fact that the quest of social science is purposeful and is valued in terms of its capacity to fulfill human aspirations. The notion of value-free social science artificially divorces us from the living laboratory in which we live and blinds us to the implicit values that frame our

perception of reality. As Carl Rogers said, “at the basis of anything that a scientist undertakes is, first of all, an ethical and moral value judgment that he makes.”³ Social science is and should be judged based on the values human beings seek to realize.

Our identities as human beings are based on narratives shaped by the dominant culture from which they originate. Alberto Zucconi stresses the central importance of narrative to our understanding of ourselves and society and to fashioning a more meaningful science of society. “We need to become aware of how we construe our experiences, our narratives of what we call reality: the relationship with ourselves, others, the world. We need to foster at every level of society awareness of our narratives, of our power and responsibilities for the present and future of humankind and the whole planet. We need to promote a new socially compelling, forward-looking vision of evolution that brings together the worlds of science and spirit, evolutionary theory and developmental psychology. We need an updated recipe for resilience, on how to think, feel and act outside the present obsolete mechanistic box, to become aware of the fact that we live in a complex web of relationships; to be blind to the world of relationships will bring dire consequences.”⁴

2. Complexity in the Social Sciences

These observations are not intended as a criticism of social sciences or to impute their inferiority to the natural sciences. On reflection, it is easy to account for their differences. The natural sciences were established much earlier and have had at least three centuries’ time to explore the realities of interrelationship and interdependence between fields. Moreover, the complexity of the interactions between particles, atoms and molecules are dwarfed in magnitude by the multi-dimensional complexity governing the behavior of conscious living beings. Human actions and interrelations combine the physical complexity of matter with the intricate mutual interdependencies of all forms of life with one another and their physical environment; the social complexity of myriad interactions and interrelationships between human beings, their institutions and cultures; and the psychological complexity of conscious and subconscious thoughts, feelings, attitudes, needs, desires, sensations, and impulses which confront us with the insoluble mystery of our own personalities and of all those we relate to.

A fair evaluation must acknowledge the role social sciences have played in the remarkable achievements of humanity over the past two hundred years. Since 1800 world population has multiplied 7-fold, but at the same time real world per capita income has risen 12-fold, a result of an 84-fold growth in real world GDP. This remarkable achievement cannot be fully accounted for by technological advances alone. Development of the social sciences have contributed immensely to our understanding of political, economic, social systems and the psychology of human behavior and to our collective ability to establish, manage and develop social institutions and policies conducive to the survival, security, welfare, growth, development and evolution of humanity.

* Alberto Zucconi, “Biological, social, psychological and spiritual dimensions of society and individual life” lecture delivered during a World University Consortium course entitled “Accomplishment, Growth, Social Evolution and the Character of Life in Management, History, Psychology and Literature”, August 25th, 2014 Inter-University Centre, Dubrovnik.

3. Need for Trans-disciplinary Social Science

The premise of the World Academy's quest for a New Human-centered Development Paradigm is that the multi-dimensional political, economic, ecological, social and cultural challenges confronting humanity today defy comprehension and resolution based on the prevailing principles and specialized knowledge developed by separate social science disciplines. The persistence and continued aggravation of these challenges are evidence of the need for the evolution of a new paradigm in the social sciences that is more comprehensive, inclusive, integrated, and trans-disciplinary. There is an urgent need to transcend the limitations of separative, compartmentalized knowledge, to build on the knowledge acquired by each discipline by striving to connect and integrate them at a more fundamental level, while preserving the valuable insights each has contributed to social progress. We need to expand the boundaries of each discipline and make them more porous and flexible, while searching for trans-disciplinary principles and processes that unite and unify rather than separate and divide knowledge in each field from that in others.

Transdisciplinarity concerns that which is at once between disciplines, across disciplines, and beyond each individual discipline.⁴ The quest for a trans-disciplinary science of society is based on the conviction that human society and individuality cannot be adequately understood in terms of positivism, reductionism, formalism and naturalism. It is founded on the premise that there are fundamental constructs, forces, processes and characteristics that underlie all social phenomena, knowledge of which can generate greater understanding and more effective action in the real world.

This prodigious task might appear too daunting to contemplate were it not for the fact that significant progress has already been made in recent decades in discovering foundational principles applicable to all fields of human activity. The earliest breakthrough came with the emergence of management as a science in its own right. While focused primarily on applications in business, the role and power of organizational structure, systems, specialization, hierarchy, authority, delegation, communication, coordination, integration, goal-setting, values, strategy, decision-making, planning, social research and human resource development evolved by Management Science are principles applicable to the development of organizations of all sizes and types in all fields of human activity. Management is the study of how organizations combine individual acts to form complex chains of activities and systems and to create complex structures based on specialization of function and hierarchical levels of authority. Organizations coordinate the energies and diverse activities of many people and integrate them within a larger whole. All human activity is governed by the fundamental principles and processes of human social organizations.

More recent advances in Network Science, Cybernetics, Complexity and Chaos Theory and the identification of the principles of self-organization, autopoiesis, and emergence mark important further advances in the evolution of trans-disciplinary theory and process – in spite of their common tendency to regard living and conscious systems as if they were simply more complex forms of mechanical material systems, reducing life and mind to purely material processes. The application of these principles to living systems and to the science of

Ecology demonstrates the integrative power of this wider approach, which is still in an early stage of development.

4. Social Power

A half century ago, former WAAS President Harold Lasswell developed a trans-disciplinary framework for understanding the relationship between social, political and legal processes, reuniting three fields of human activity that are commonly treated separately. Their framework provides insight into the means by which social capacity for accomplishment is institutionalized and distributed as political and legal power for effectuation and enforcement. Winston Nagan's presentations focus on their efforts to frame a comprehensive global social process model describing how human beings seek to realize values through institutions and activities.⁵ The core of Lasswell's conception is the central role of power in human affairs.

Human behavior is purposeful, even when it is intended simply for relaxation and enjoyment. Security, sustenance, wealth, status, power, knowledge, beauty, love and enjoyment, self-realization and spiritual fulfillment are common human pursuits. Maslow defined a hierarchy of needs. Lasswell groups them under eight categories of values which human beings seek to realize – power, enlightenment, wealth, well-being, skill, affection, respect, and rectitude, to which Nagan adds a ninth, aesthetics.

Regardless of the classification, human beings seek to accomplish and society possesses an amazingly diverse range of powers and capacities for accomplishment at the physical, social, cultural, mental, psychological and spiritual levels – most of which we take for granted like the air we breathe. This social capacity grows exponentially from one generation to the next. One need only imagine the challenges earlier generations faced performing simple tasks that we now carry out effortlessly on a daily basis – communicating instantaneously around the world, traveling between cities and continents in the time it once took to go from the farm to the nearest town. Explorers used to travel the globe for years trying to ascertain what lay beyond the horizon. Healers have spent millennia cataloging the nutritional and medicinal benefits of various foods, flowers, and herbs. Today literally the whole world's knowledge is available at our fingertips. The experience and knowledge of the entire human community accumulated over countless generations are freely offered to each new generation in a concentrated and abridged form through education.

Society's powers for achievement are legion. Society has established law and order and extended freedom and rights to billions of people, doubled the human life span and raised the average standard of living twelve-fold in the last two centuries. Rapidly increasing social capacity is evident in all fields – from science, education, healthcare and entertainment to business, governance and the arts. It extends from the local to national to global level and beyond into outer space. It ranges from the capacity for short term immediate gratification to achievements sustained over many centuries – magnificent structures, living constitutions, immortal works of art and eternal wisdom. It encompasses achievements that are physical, social, mental, artistic, and spiritual – the Partheon and the pyramids, the family, community

and nation-state, democratic forms of governance, banking, measurement, mathematical renderings of Nature's secret formulas, insights of geniuses, timeless literature, exalted works of art, cultural and universal values. It traverses all the stages from mere physical survival to expansive growth and increasingly sophisticated levels of development to the continuous evolution of new ideas, institutions and ways of life.

Do all these achievements have anything in common? They all represent diverse expressions of the collective capacity of society for accomplishment. Moreover, the various forms of social power by which they have been fashioned are largely interchangeable. Throughout history, military power has served as a basis for economic expansion, whether through colonial conquest or by providing a protective atmosphere of peace and security among trading partners. The power for transport and communication is readily convertible into productive power. The power of scientific and technical knowledge is applied to generate economic power. Economic strength translates into political power. Broad-based political power provides the capacity for rule of law founded on universal human rights. The legal power to protect property, uphold human rights and enforce justice creates an expansive social atmosphere that releases the energy of people for peaceful, productive progress.

A closer examination reveals that this power exists in several stages and forms. There is the raw capacity or potential of the society for constructive (or destructive) activity, which is fully harnessed only during times of war and severe national challenges, when society exhibits the capacity to dramatically increase its level of activity, as the USA multiplied its capacity to produce trucks, tanks, ships and aircraft during the early 1940s to support the entire Allied war effort. Within a single year America increased its arms production to equal the combined output of Germany, Italy and Japan, and then doubled it again during the following two years.⁶ Through the Green Revolution, India doubled foodgrain production in five years to overcome the imminent threat of famine and achieve food self-sufficiency in the late 1960s. Japan mobilized its institutions and citizenry to deal with the horrendous consequences of the Fukushima nuclear accident. Apart from these exceptional achievements, society performs countless near miraculous actions every day without which modern civilization cannot function – it generates energy, distributes water, educates youth, enforces law and order, produces and distributes goods and services, develops and maintains infrastructure, governs, seeks knowledge, invents, innovates, and creates an endless progression of new ideas, objects, devices, processes, institutions, ideas, artworks, means of entertainment and enjoyment. All these are expressions of society's power for accomplishment.

Not all social capacity expresses in action. Not all of its endowments are equally shared and distributed. Not all social power is made freely available for the betterment of society-at-large. Intervening layers of social authority determine how social capacity is converted into social power and for whose benefit. Once concentrated among a tiny élite aristocracy or military class, today freedom and rights are more widely distributed than ever before. But we still witness extreme inequalities in the distribution of wealth so dramatically documented by Thomas Piketty.⁷ Contrary to the principle that all citizens in a democracy have equal rights and voice, the influence of wealth and corporations over political power is ubiquitous. Nagan shows how law and constitutional principles are interpreted to support the inequity.⁸

The exercise of social authority in the form of political power, money power, corporate power, and social status influences the total social capacity that can be harnessed and how that capacity is utilized. As society advances, it organizes a portion of its total power and channels it through various institutions. Economic institutions such as corporations, commercial networks, monopolies, cartels, labor unions and shareholder bodies organize, magnify and govern the distribution of production, wealth creation and distribution of income. Political institutions including executive, legislature and judicial bodies, political parties, lobbyists, media houses and special interest groups mold public opinion, altering the power of different individuals, groups, organizations and classes to determine the uses and abuses of social power. Constitutions, laws and the institutions that enforce and interpret them define what and to what extent social power is converted into rights, rules and procedures that can be applied uniformly and impersonally to all citizens and activities.

“The potential power of society is not subject to any inherent limits.”

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At any point in time only a tiny portion of the total power of society is converted into political and legal forms. Most of our lives remain unregulated and self-directed and most of the capacities of society remain underutilized. Global unemployment of more than 200 million, levels of underemployment five or ten times greater, technology that is hoarded, markets that are monopolized, public resources that are exploited for private profit are symptomatic of the gross inefficiency of social systems. The very notion of efficiency is narrowly applied at the level of the firm, neglecting the enormous waste and high economic costs to society generated by the misallocation of social power.

Thus the world is confronted by the paradox that vast underutilized social capacities exist side by side with persistent poverty, suppressed rights and unmet needs.⁹ Indeed, the potential power of society is not subject to any inherent limits. There is always scope to enhance the development, expression, organization and application of knowledge, skill, organizational know-how, and technology. Human capital and social capital are potentially limitless resources. The more we develop them, the more they grow and the greater their capacity for further development.

5. Energy Conversion

The development of the technology for social organization lags centuries behind the development of material technologies. A comprehensive, integrated unifying science of society can spur rapid development of this unfathomable social potential. There are indeed common principles and processes underlying and governing the multiple expressions of

human creative and productive potential. Newton's laws of motion explain the behavior of material objects. A change in the motion of an object results from the application of material energy as force. So too, all human activity and accomplishment are an expression and result of the release, direction, channeling and application of human energy. That energy may be the physical energy of a laborer or skilled craftsman, the social energy of the dynamic entrepreneur, entertainer, military or political leader, or the mental energy of the thinker, creative artist, planner, or engineer. In *War and Peace*, Tolstoy referred to the 'spirit of the army', an intangible power that enables an inferior military force to overcome great odds, as the English overwhelmingly defeated an immensely superior French army at the Battle of Agincourt, immortalized by Shakespeare in *Henry V*.

"The mental tendency to divide reality into contrary polar opposites results in a continuous clash between mutually exclusive contradictions that resolve into complementarities at a higher level."

5.1. Directed Energy becomes Force

Human energy is released by human aspiration for accomplishment. The greater the aspiration, the greater the energy released. That aspiration can arise in response to a vast new opportunity or a severe problem. The opening up for settlement of the American West released the aspirations of millions of indigent European immigrants to abandon their homelands and risk their lives in the quest for freedom, cheap land and gold. All living beings release and mobilize great bursts of energy in response to life-threatening challenges. That explains why remarkable accomplishments issue from severe catastrophic challenges. The American Civil War was the first mechanized modern war in history with devastating impact on the people and the country, yet it was quickly followed by America's emergence as the pre-eminent economic power in the whole world. Similarly, two horrendous, life and property destroying world wars in the 20th century were followed by the most dramatic surge in prosperity and social welfare in human history.

Human energy is directed through by our knowledge, goals, values and beliefs. The intensity of energy released and the effectiveness with which it is focused depend on the quality of that knowledge, the type of goals and the nature of values we seek to realize. Truth is reality. The human mind does not possess truth. It does not know reality. It possesses ideas, perceptions and conceptions that seek to represent truth. It relies on language, definitions and abstract mental symbols which present images and impressions of reality, not reality itself. Even an exact photographic image is only a two-dimensional image, not the living thing it portrays. Our minds analyze and view these mental constructions through the framework of social constructions and psychological perspectives that determine our particular point of view and interpretation of reality.¹⁰ Thus, the debate between proponents of free markets and regulated markets framed by implicit differences in beliefs and values is presented as logical differences and incompatibilities. In truth, no markets are truly free and none fully regulated.

The mental tendency to divide reality into contrary polar opposites results in a continuous clash between mutually exclusive contradictions that resolve into complementarities at a higher level.¹¹ Capitalism and Socialism were never the stark contraries they were represented as until the 1930s when the USA, the most capitalist nation in the world, embraced socialist welfare principles during the New Deal. China began introducing elements of capitalistic competition into its Communist economy in the 1970s. Today no market system can survive that does not incorporate a significant degree of socialist policy and vice versa. Freedom and equality are complements, not irreconcilable opposites.

“Everything needs its opposite for its existence. The indivisible, whole being that the Individual is, is made complete when he accepts and integrates all aspects of his personality, realizing in the process that contradictions are complements.” – Carl Jung

5.2. Force Organized Acquires Power

The power generated by energy depends on the way in which it is focused and directed. Sufficient solar energy falls on the earth every day to meet all human needs now and in the future, but only a tiny portion of that energy is collected and directed for productive purposes. Raging rivers are storehouses of enormous energy, but only when a river is dammed, the energy channeled through sluice gates into high velocity flows and is transformed into electrical power by turbines is that energy made available for productive purposes. Energy when directed becomes Force. Force organized becomes Power. The technology of a hydroelectric power plant is a mechanical form of organization. Political parties, market places, financial institutions, factories, and educational institutions are social forms of organization that focus and direct human energy and pass it through a variety of processes that transform it into productive power of one form or another. Organization magnifies the Energy it transmits by Integration. It also creates greater opportunities for the growth and development of specialized knowledge and skill among people.

Society can be viewed as a gigantic hydroelectric power project that harnesses a tiny portion of the potential energy of its members, focuses and directs it, channels it through organized structures and activities in pursuit of social goals. What is true of societies is also true of the organizations and institutions of which they are composed and the individuals who are its members. The same principles apply at all three levels. Countries and companies vary enormously in their capacity to release, focus, direct, channel and express the energies of their people for productive purposes. Autocratic forms of organization can compel a minimum level of performance, but have never proven capable of inspiring their individual members for peak levels of sustained accomplishment. Sooner or later internal friction, conflict and suppressed resentments rise to the surface and undermine the organization.

Over time humanity has evolved more and more effective forms of organization more capable of positively motivating and directing human energy. Alberto Zucconi describes a core set of the people-centered strategies which societies and organizations apply to empower their members – democratic relationships, equal rights and opportunities, delegation of

authority to instill a sense of responsibility, transparency, knowledge sharing, and empathy.* For all its limitations and deficiencies, America has excelled in the capacity to generate a social atmosphere that provides a high degree of freedom and encouragement for the development and expression of individual initiative. High energy companies such as Apple, Google and Intel remain perpetually dynamic and creative for the same reason. In spite of its evident shortcomings and inequities, the market economy combining cooperation with competition has so far proven to be the most effective form of organization yet evolved for the production and distribution of goods and services, but ample scope exists for eliminating its distortions and excesses.

Human accomplishment is based on relationships between people. Nature produces on the land. Human beings produce by entering into constructive relationships with one another. Society is an infinitely complex field in which human beings relate to one another in pursuit of security, wealth, well-being, affection, knowledge and other values. Ivo Šlaus reminds us that human beings are the ultimate source of all resources. “Anything becomes a resource only when its potential value is recognized by the human mind.”† Further, human capital and social capital are inexhaustible in potential. He describes the self-augmenting character of human capital through a formula relating its development with political, economic, social (education, health) and natural factors. Human capital refers to the unlimited potential to enhance the knowledge, skills, capacities, attitudes and values of the individual for more effective relationship. Social capital encompasses the enormous power of social organization for coordination, specialization, planning, delegation, authority, hierarchy, standardization, integration and value implementation.

Language, money and the Internet are three of the greatest social organizations so far developed to enhance the capacity of human beings to relate, interact and coordinate with one another for mutually beneficial purposes. Language is a networking tool that makes possible exchange of ideas, information, intentions and transactions between people and organizations. Money is a networking tool that facilitates the exchange of products, services, forms of wealth and power. The Internet is the first truly global social system capable of facilitating and coordinating interactions between billions of people instantaneously with a high degree of individual freedom, empowerment, capacity for customization and personalization. It connects horizontally and integrates vertically all nodes, levels and types of social activity within a single global network. These organizations not only channel social energy, but through complex feedback loops continuously increase the total social energy released and directed.

The evolution of the Internet has spurred rapid advances in our understanding of networks, as a highly sophisticated form of social organization. In reality, networks are as old as humanity itself. The market is a social network that brings together buyers, sellers, financiers and transporters. Cities are networks that concentrate the most advanced capabilities of

* Alberto Zucconi, “Power, empowerment and disempowerment”, lecture delivered during a World University Consortium course entitled, “Toward a Trans-disciplinary Science of Society”, Inter-university Centre, Dubrovnik, Sep 2, 2014.

† Ivo Šlaus, “Human Capital”, lecture delivered during a World University Consortium course entitled “Towards a Trans-disciplinary Science of Society”, Inter-university Centre, Dubrovnik, Sep 3, 2014.

civilization on a single location to optimize access and interrelationship. Zbigniew Bochniarz cites research on the power of industrial clusters and city networks on climate change to illustrate the important role played by networks in the process of social development.* Banks such as Visa and Mastercard cooperate to compete by providing credit card transfers to billions of people through millions of merchants and tens of thousands of banks. Each bank retains its autonomy and competes for business with other members of the network, yet all benefit from the operation of a shared global information and money transfer system that achieves high speed and efficiency and minimum cost to banks, merchants and customers.

Figure 1: How Energy is Converted into Accomplishment



5.3. Consciousness and Organization

Sri Aurobindo depicts human social evolution as a progressive dance between rising levels of consciousness and rising levels of organization. “Life evolves through growth of consciousness. Consciousness evolves through greater organization and perfection of life: a greater consciousness means a greater life.”¹² Human Energy directed becomes Force. Force organized becomes Power. Power expressed through knowledge, skills, positive attitudes and values is converted into productive results.

The enormous investments made by modern society to enhance the knowledge, productive skills, social attitudes and cultural values of its members have contributed as much to the progress of the past two centuries as the development of miraculous new technologies.

* Zbigniew Bochniarz, “Social Development as Network Dynamics: An Economics Perspective”, lecture delivered during a World University Consortium course entitled “Towards a trans-disciplinary science of society”, Inter-University Centre, Dubrovnik, Sep 5, 2014.

Investment in human capital is the most powerful lever for enhancing the individual and collective capacities of humankind for higher levels of development and further evolutionary advancement in all fields of accomplishment. Skills function like the billions of tiny transistors on a silicon chip that govern how infinitesimal quanta of energy are directed and combined together to perform complex functions at incredible speed. Every human act is composed of innumerable physical, social, perceptual, mental and psychological skills. Each tiny circuit has the power to aid or obstruct accomplishment.

6. Personality – The Psychological Microcosm

The process of energy generation and conversion at the social level has a precise counterpart at the level of the individual as well. The social process depends on the aspirations, knowledge, values, goals, institutions, skills and attitudes of the collective. The individual process depends on their counterparts at the level of individual personality. Society is an infinitely complex macrocosm. Personality is an equally complex microcosm of ideas, concepts, beliefs, attitudes, values, opinions, and skills organized and coordinated by multiple layers and levels of psychological structures – superficial manners, conscious behaviors, subconscious character traits and deeper capacities for creativity, originality and uniqueness. As the modern democratic welfare state is the most successful collective form of social structure thus far created, the formed individual capable of independent thinking, judgment and action on internalized values rather than conformity to the collective represents the most complex, sophisticated organization of human consciousness yet to evolve.

Energy is the driving force for accomplishment at the level of the individual as well. Highly accomplished individuals tend to be those who exhibit a high level of energy and channel that energy into an intense laser beam-like focus to accomplish the goals and values they seek to realize. Their personalities act as coordinating centers to organize their energy, knowledge, values, skills, capacities, actions and relationships to achieve maximum results with minimum expenditure of time and energy. Teddy Roosevelt, Churchill, Mahatma Gandhi, Balzac, Beethoven, Victor Hugo, Tomas Bata, Bill Marriott, Tom Watson and Steve Jobs are among countless legendary examples of personal energy converted into focused intensity for high accomplishment.

Personality is the link between the individual microcosm and the institutions of the social macrocosm. Individuals access social power by identifying with the aspirations and affirming the values of the collective. The failure of the Knickerbocker Trust of New York in 1907 precipitated a severe financial crisis that threatened to destroy banks and securities markets throughout the USA. At the time there was no government banking oversight system with the power or responsibility to control the situation. The government remained a passive and helpless witness to the rapid deterioration of market confidence. Finally it turned to the only man in America who was widely considered capable of effective action – J. P. Morgan. Morgan was a wealthy industrialist and banker like many others, but he was distinguished by a sterling reputation of trustworthiness and reliability which were the most prominent characteristics of his personality. Morgan appealed to the social need for reliability and stability.

When the New York Stock Exchange was on the verge of closure, Morgan managed to cajole the bankers into collective action and the crisis was contained. He appointed six analysts to identify which banks were sufficiently solvent to be saved. He called on other financial institutions to contribute to a voluntary pool of finances to support institutions that could be salvaged. Even the US government contributed \$25 million to the private pool. Morgan defused the financial crisis by his remarkable negotiating skills and the immense trust placed in him by bankers and the general public. After the crisis had subsided, the US Government established the Federal Reserve System to institutionalize the powers and role Morgan had played to quell the panic. The personality of an individual was institutionalized as a system that eventually acquired the knowledge and power to maintain high levels of stability and public confidence in the US financial system. Individual personality and social culture are interdependent expressions of a unified reality.

“The search for impartial truth came to be regarded by many as synonymous with the study of objective forms of reality.”

7. Reuniting Subjectivity & Objectivity

The further evolution of the social sciences requires efforts to identify unifying concepts and processes that transverse disciplines and function similarly in multiple dimensions. Reunification is especially necessary to restore the proper relationship between three dimensions of reality which were obscured during the triple reign of positivism, reductionism and materialism: the reunification of the subjective and objective dimensions of social reality, the reunification of the individual and collective dimensions, and the reunification of the three dimensions of time within an inclusive vision of human causality.

Social science needs to reunify the objective and subjective aspects of human existence that became increasingly divorced during the hey-days of 20th century scientism. The source of the rift is not difficult to understand. The scientific method evolved during the Enlightenment as an impartial, objective means of validating truths of natural phenomena freed from the distorting influence of the physical senses, personal belief, superstition, religious dogma, preference and prejudice. It proved ideally suited for a study of material objects and processes that lent themselves to external observation and analysis. But over time the focus of early science on the study of external objective manifestations of reality gradually morphed into the notion that only phenomena which can be studied objectively can be approached rationally and scientifically. Eventually many scientists began to speak and act as if the subjective dimension were somehow less real than the objective. Two separate meanings of the word ‘objectivity’ became confused. The search for impartial truth came to be regarded by many as synonymous with the study of objective forms of reality. The study of subjective forms of reality was confuscated with the distorting and unscientific notion of personal preference and prejudice. That which is not observable as an object came to be regarded as somehow less real than external material things. By a strange alchemy of logic, a mud pie,

plum pudding, chemical reaction or electrical impulse came to be regarded as more ‘real’ than Plato’s *Dialogues*, Lincoln’s idealism or Gandhi’s belief in non-violence.*

The reality of the subjective permeates all dimensions of human existence and must occupy a central place in all valid social theory. Franklin D. Roosevelt was inaugurated as the 32nd President of the United States on March 1933 in the midst of a financial crisis of unprecedented magnitude. Since the onset of the Great Crash in 1929, more than 6000 American banks had closed and the national economy was in the midst of a panic. All over the country, depositors were lining up at their banks to withdraw their life-time savings before their banks also collapsed. Even the financially strongest bank could not withstand such huge sudden surge in demand for return of deposits, so the panic was self-fulfilling. Long before the nascent Federal Reserve had acquired sufficient knowledge or power to provide unlimited funds to support the banking system in 2008, there was no known economic or political remedy for a panic of such proportions.

The objective situation seemed hopeless. FDR was not an economist, but he had shrewd insight into the underlying social and psychological basis for economic institutions. He understood that the panic was not an objective problem of economic management, but a subjective problem of trust. In his inaugural address, he pronounced his famous dictum “We have nothing to fear but fear itself.” Five days later he addressed the nation on radio in the first of his famous fireside chats. He explained in simple language that the rich natural resources, enormous industrial infrastructure, and skilled hardworking labor force, which had made America the world’s wealthiest nation, were still in place. The problem resulted from a loss of public confidence in the banking system. He appealed to American native self-confidence, pride, courage and trust and made an outlandish proposition. He called on the people to go back to the banks and redeposit their hard-earned savings. He instituted a host of legislative and administrative measures to restore public confidence in the banking system. When the banks reopened the following Monday, the tide turned and the panic gradually subsided.

Roosevelt intuitively understood what social science often overlooks – that the entire objective edifice of a nation’s economic, political and cultural institutions and activities rests on intangible, but all-powerful, subjective social and psychological foundations. FDR’s management of the crisis is one of countless events in history that illustrates the singular difference between conscious human behavior and the behavior of inanimate objects and subconscious forms of life. Subjective reality may play a relatively insignificant role in lower forms of life that can be ignored, but in human behavior the subjective and objective dimensions are inseparable aspects of a single reality.

No social science can be complete or effective that partitions the objective and subjective aspects of social reality, as if they are separate realms of existence that exist and can be studied independently from one another. Valid economic and political theory and practice can never be divorced from sociology, anthropology and psychology. The psychology of the

* Dramatic advances in neuroscience and psychopharmacology have recently led to an alternative approach to eliminate the divorce between subjective and objective experience by reducing all psychological phenomena to their chemical and nervous manifestations in the body. The correlation between physiological and psychological factors proves there is an interrelationship but is far from sufficient to establish causality.

individual can never be fully understood without reference to social and cultural context. In his actions as well as his understanding, FDR applied a remarkable combination of subjective powers – superb communication skills and exuberant personal charm – to stop the panic of 1933. The same strategy, the same speech delivered by another president with a different perception and different values may very likely have led to very different consequences.

The true relationship between subjectivity and objectivity in human affairs does not lend itself to this radical approach. *All human accomplishment represents an objectification of the subjective components of reality.* All human creation is founded on subjective truth. The aspiration of the scientist for knowledge, the moralist for integrity, the artist for beauty, the engineer for precision, the craftsman for perfection, the child for love, the entrepreneur for wealth, and the political leader for power are all-powerful forces that have driven the rise of civilization over the millennium. A science bent on explaining away every subjective human experience as the consequence of objective chemical and electrical processes must eventually give way to one which restores the subjective dimension to its rightful place as the ultimate determinate and prime mover in human affairs.

8. Reuniting the Individual and the Collective

The divorce in social sciences between subjective and objective phenomena is closely related to a second disunity between the individual and the collective. The science of material Nature and lower life forms is the science of types. Particles, atoms, molecules, minerals, stars, solar systems, galaxies, unicellular organisms, plants and animals fall into categories and subcategories that can be distinguished by their observable characteristics. In each case science studies the common characteristics of the type. Every diamond may possess some unique attributes, but the atoms and particles of which diamonds are composed are remarkably uniform and indistinguishable. Ascending the scale to complex forms of life, we observe greater differences and disparities between individuals of the same type, as every pet owner knows from personal experience, but science focuses on the similarities and mostly ignores the differences. While ancient history was normally recorded in terms of the lives of outstanding individuals, the modern approach to historical analysis and contemporary events places much greater stress on the action of broad tendencies and statistical trends, than unique individuals and events.

Applied with incredible success with regard to non-human subjects of study, the same approach has been applied by the social sciences to categorize societies, classes, groups, institutions, social processes and activities by generalized type and to apply statistical measures to describe the shared behaviors of groups. In practice, this approach encounters serious methodological and practical problems.

Foremost among these is the problem of the Individual. What would have happened to the banking American crisis in 1933 had Herbert Hoover been re-elected for a second term? Would the Cold War have ended in 1989 if Mikhail Gorbachev had never been elected as President of the Soviet Union? Would the North have won the American Civil War and constitutionally abolished slavery in 1865 if Lincoln had not been the president during this

period? Would Britain have defeated the Nazis in the Battle of Britain had Churchill not been chosen as its leader? Would Apple Computers have ever been founded or would it have recovered from its progressive decline during the 1990s to become the most valuable company in the history of the world had Steve Jobs not lived or had he not returned a decade later to the company from which he had been summarily ejected in 1985?

Attention to the central importance of the individual and his uniqueness has recently reemerged, as Ivo Šlaus points out. Nassim Nicholas Taleb's book *Black Swan: The Impact of the Highly Improbable* emphasizes the inordinate significance of highly improbable, high impact, unpredictable events in human affairs. Taleb observes that statistical measures of normal behavior have been inadequate to anticipate the most important events in human history, such as the onset of World War I, the Great Crash, the End of the Cold War, the invention of the World Wide Web, 9/11, Fukushima, the 2008 financial crisis. He concludes from these observations that human existence is inherently uncertain, like the behavior of subatomic particles, an appealing premise since it implies a sort of unity between the human and material microcosm of quantum particles. Taleb's thesis is a useful reminder that human life cannot be wholly understood in terms of generalizations and statistics, but his interpretation of events does not take fully into account the role of conscious individuality in human affairs.

The human individual is distinguished from every other species of living and non-living life form by the enormous variation and uniqueness of its individual members. Within our species there are wide disparities between the degree of individual or unique characteristics exhibited by different people and the degree of individuality or individuation is increasing over time. Our individuality is evolving. The formed individual – variously described by leading humanistic psychologists such as Goldstein, Maslow, May, Murray and Rogers – is the self-actualized, self-realized person who by a process of individuation assimilates the rich experience of life and internalizes it as a unique organization of aspirations, knowledge, perceptions and values. According to Rogers, the human organism has an inherent “actualizing tendency”, which aims to develop all capacities in ways that maintain or enhance the organism and move it toward autonomy. Individuality is that which does not depend on social authority or tend toward social conformity for its own sake; it is the capacity for original inspiration, creativity, and uniqueness of expression. Zucconi cites prominent characteristics that emerge by the process of individuation: self-awareness, authenticity, trust in oneself and others, a sense of purposefulness and direction, creativity, leadership qualities, a deep capacity for affiliation and communication, adaptability, flexibility, self-regulation and maturity.*

No matter how successful the exclusive concentration on shared characteristics may be when applied to other fields of natural science, a science of society cannot ignore the significant differences in knowledge, skill, motivation, aspiration, action and achievement that distinguish members of our species and their influence on the life of the collective. A symbiotic relationship exists between the human individual and social collective. Mila Popovich

* Alberto Zucconi, “Personality and individual accomplishments”, lecture delivered during a World University Consortium course entitled “Individuality & Accomplishment”, Inter-university Centre, Dubrovnik, August 28, 2014.

calls for a sense of responsible interconnectedness. “Always keep in mind the relational nature of individuality – the correlation between the micro and macro scale – the co-creative relationship among individuals, individuals and their environment as well as the human embodied and embedded system within the greater cosmic system.”*

Society is the repository of the accumulated knowledge, skills, values, laws, customs, institutions, activities and behaviors of past generations made accessible to every new member to varying degrees. We acquire our language, ideas, beliefs, attitudes, habits and values from the societies to which we belong. The behaviors, attitudes and values that characterize our personalities are molded by the social institutions with which we relate, as Zbigniew Bochniarz points out.†

At the same time, the individual is the catalyst for all social change. As Margaret Mead observed, “Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has.” All social innovation, invention, discovery and creativity can be traced back to one or a few individuals who seek to push beyond society’s current boundaries. The explorer, adventurer, entrepreneur, inventor, public leader, original thinker and creative artist are the source of innovations that propel the evolution of society. Progress of organization and society ultimately depends on the development of each of their individual members. The individual develops by raising his consciousness and organizing his personality at a higher level. The highest stage of organization of personality is what we mean by individuality. The formed individual is the catalyst for raising the consciousness and organization of society.

It is evident to most people that Apple Computers would never have invented the Macintosh, iPod, iPhone or iPad had it not been for the work of a single individual, Steve Jobs. But in most cases we do not perceive the relationship between the personalities and actions of individuals and the social institutions that govern the social collective. In fact, all our social institutions can be traced back to the ideas, values and actions of creative individuals. As chief of the Continental Army, George Washington had such a firm belief in the need for subordination of military to civilian authority that he submitted to the authority of the Continental Congress even when Congress left its soldiers without food, clothing, shoes and ammunition to survive the harsh New England winters and wage war against the British. When the war was finally won, most Americans were highly suspicious of central authority and reluctant to empower a federal government to rule over the states. They unanimously elected a reluctant Washington as the first President because he was the one leader who had demonstrated beyond doubt his commitment to civilian democratic rule. So little did he crave for power that he accepted only on condition that he would be relieved of responsibility within two years. When told that Washington wanted to return to his farm after winning independence, his bitter enemy King George III replied incredulously, “If he does that, he

* Mila Popovich, “Restoring order and care: The Role of Human Relationships in Individual and Social Development”, lecture delivered during a World University Consortium course entitled “Towards a trans-disciplinary science of society”, Inter-University Centre, Dubrovnik, August 28, 2014.

† “Institutions are patterns of social activity that give shape to collective and individual experience.... Institutions form individuals by making possible or impossible certain ways of behaving and relating to others. They shape character by assigning responsibility, demanding accountability, and providing the standards in terms of which each person recognizes the excellence of his or her achievements. Each person’s possibilities depend on the opportunities opened up within the institutional contexts to which that person has access.” Robert Bellah, et. al., *The Good Society*, 1991, p. 40.

will be the greatest man in the world.” For 230 years since then, the US military has subordinated itself to the elected government. Washington’s personal values became embodied as the values of the nation.

Social institutions are an objectification of the consciousness of individuals. Individual personality and social culture are interdependent expressions of a unified reality. Our vision of social reality is based on an erroneous separation of consciousness and force. Like Descartes, we view social institutions as impersonal seats of power functioning autonomously and beyond our power to control. We fail to perceive the consciousness of human beings that underpins and supports that exercise of power and therefore feel helpless. This perception is so prevalent that politicians, lawyers and judges act as if law is created by legislatures and interpreted by judges independently of the will of the people. In reality, law is a codification of public conscience founded on what the public endorses and is willing to accept, even when governing power is a colonial or authoritarian government. Mahatma Gandhi demonstrated this truth by a single act of civil disobedience that shook the foundations of the British Empire. In April 1930 he called on Indians to violate law taxing the manufacture of salt by marching to the sea coast and making salt. Tens of thousands rose to his call. More than 60,000 were arrested, but Gandhi had demonstrated to all concerned the obvious fact that no foreign power could rule India if the Indians were unwilling to accept foreign rule. Indian Independence was achieved by altering the attitude of millions of Indians to reject its position as the jewel in the crown of the British Empire.

Twenty-six years after India became free, a middle aged black woman in Montgomery, Alabama refused to obey a local law imposing racial segregation on public buses. Arrested and fined \$8 for her crime, Rosa Parks’ example inspired thousands of citizens to boycott the public transport system until the law was abolished the following year. A local clergyman named Martin Luther King was inspired by the enormous power of her actions to launch the American Civil Rights Movement. Rosa’s role illustrates the bridge between the generation of new law at the micro level and its gradual expression at the macro level. Laws, public policies and social institutions are expressions of the social consciousness, whether by consciously determined intention or reluctant passive submission. The individual who perceives that truth possesses the power to re-establish the connection between the apparently impersonal social system and the personal values and aspirations of its members. Such an individual possesses the knowledge and therefore the power to change the world.

Human beings have a marked propensity for creating marvelous new inventions and then becoming slaves to their own creations. Thus, today we feel helpless before the governments, technology and financial systems created to serve us. The sense of fatalism that pervades public attitudes about unrepresentative political systems, corruption, unfair public policies and unsustainable economies arises from a flawed understanding of the true relationship between individual consciousness and collective power. A science of society for the 21st century can empower humanity to reclaim control of institutions that have gotten out of control, restoring the connections and providing the theoretical and practical support needed to heal the breach.

9. Unification of Time

Causality in the physical sciences moves in only one direction, from past to future. Past actions have future consequences that often appear inevitable, such as the path of the apple as it falls from the tree to the ground. The future in the physical sciences is something that does not exist yet, so it cannot possibly impact on the present. Events in the present depend only on the forces set in motion during a preceding interval of time.

But time behaves somewhat differently for conscious human beings. For us the future already exists in the form of our aspirations, expectations, imaginations, perceptions, hopes and fears. Unlike rolling stones and falling apples that are propelled by the past into a future course, human beings are moved to act in the present according to their anticipation of future outcomes. The expectation that banks would fail motivated millions of Americans to rush to their banks before it was too late, setting in motion a self-fulfilling prophesy. The dream of creating a computer that would empower creative individuals motivated Steve Jobs to invent something that did not previously exist. The aspiration for freedom and self-government motivated the American colonies to revolt and fight for independence. The faith in the power of non-violence espoused by Mahatma Gandhi led Indians to win their freedom without waging war. Modelled after the natural sciences, theories of causality in the social sciences depend inordinately on the consequences of past events and tend to ignore or minimize the role of future expectations, even in instances where it is intuitively obvious that perceptions of the future are a critical determinant of present behavior.

The flaw in this paradigm is made evident by a well-documented history of flawed projections by ‘experts’ considered to be most qualified to predict the future based on their knowledge of past and present achievements. Among the most notable and amusing, Lord Kelvin’s observation in 1883 that “X-rays will prove to be a hoax”; the comment in 1946 by the famous American movie producer, Darryl Zanuck, “Television won’t last because people will soon get tired of staring at a plywood box every night”; IBM founder Tom Watson’s assessment in 1943 that there would be a world market for about five computers, the advice by famed entrepreneur Michael Dell to Steve Jobs on his return to Apple in 1996 to shut down the company and give the money back to the shareholders; and then Microsoft President Steve Balmer’s estimation in 2007 that “There’s no chance that the iPhone is going to get any significant market share. No chance.” Note that these efforts to project the future based on past experience and present knowledge relate to social and economic trends, not merely technological advances.

Roberto Poli cites recent evidence from psychology, anthropology, sociology, and economics that indicates that the importance of future anticipation in the social sciences is gaining recognition. He and a group of associates are striving to establish a discipline of Anticipation that has potential applications to all fields of social science. “A better and more complete understanding of anticipation and its effects will improve theories and models of individual and collective human behaviour and its consequences. The benefits will thus assist those who are explicitly seeking to understand and design ‘the prepared society’, to make more effective

and sustainable use of technologies, to create more inclusive democracies and to explore the boundaries of human endeavours.”¹³

Human behavior is the product of subconscious and conscious perceptions and forces that are influenced by past events, present perceptions and future possibilities. The reunification of these three dimensions of time into a triple time vision will mark an important contribution to the emergence of a trans-disciplinary science of society.

10. Ways of Knowing

This discussion of the present status and future development of social science returns repeatedly to the central importance of our instruments of knowledge in determining the validity of our quest for truth. In the natural sciences, we rely to a large extent on instruments that extend remarkably the reach of our senses from the microscopic infinitesimal to the macroscopic infinite. But the social sciences cannot take refuge in mechanical and electronic instrumentation, no matter how powerful or impressive. The reality we are striving to comprehend is not material. It is social and psychological. The objects of which it consists are invisible to both the eye and instrumentation. We cannot see our thoughts, feelings, beliefs, values, sentiments. We cannot even see our social institutions and culture, only expressions and symbolic representations of them. The bond between a married couple may be symbolized by a wedding ring, but to the naked eye they are simply man and woman.

The one essential instrument we possess for the study of our individual and collective humanity – indeed for the study of all reality – is the power of the human mind and consciousness. Our capacity to effectively utilize that power of knowledge depends very much on understanding its characteristics, modes of operation and its limitations. As is the consciousness, so is the power. Limited knowledge means limited power for accomplishment.

The future of science requires that we focus much greater effort to understand the workings and limitations of the human mind. Foremost among those characteristics is the tendency of mind to divide reality into parts and relate to each part as if it were an independent whole, which is the basis for reductionism and the division of disciplines that now limit the evolution of social science. This divisive tendency also accounts for our habit of perceiving reality in terms of mutually contradictory opposites such as objective and subjective, individual and collective, overlooking the fact that contradictions can be resolved into complementarities at a higher level. Mind by its very character has the capacity to affirm any perspective as true or false.*

Mind also has an opposite tendency to aggregate assemblies of parts, mistaking the sum of those parts for the whole, as many regard society as simply a sum of its members, rather than a complex living social organism. In addition mind thinks in symbols to represent reality and often mistakes the symbols for the reality itself. Thus, we tend to forget that money is only a symbol for productive capacity and public trust, not a thing in itself of any inherent value. So too, we overlook the common tendency of mind to analyze reality based on

* “All human thought, all mental man’s experience moves between a constant affirmation and negation; there is for his mind no truth of idea, no result of experience that cannot be affirmed, none that cannot be negated.” – Sri Aurobindo, *The Life Divine*.

premises that pre-determine the conclusions we come to, such as the current quest for the chemical substances that determine human behavior.

Finally, we should not overlook the evidence that the greatest scientific discoveries have arrived by processes other than the normal rational mental faculty we pride on as the essence and mainstay of science – processes such as insight and intuition which we barely understand and rarely even try to study scientifically. The testimony of great thinkers and scientists is irrefutable. As Kant observed, “All human knowledge begins with intuitions, proceeds from thence to concepts, and ends with ideas.” Einstein stated it this way: “The intellect has little to do on the road to discovery. There comes a leap in consciousness, call it intuition or what you will, and the solution comes to you and you don’t know why or how.”¹⁴ We must always keep in mind that the pursuit of science itself is entirely a human activity with its own sociological, cultural, mental, psychological and spiritual dimensions.

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