Journal of Scientific Exploration, Vol. 9, No. 3, pp. 393–403, 1995 0892-3310/95

Report on the Academy of Consciousness Studies

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Appendix

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Any serious attempt to comprehend the nature of consciousness requires recognition of the multitude of scholarly vectors bearing on the topic. It also benefits from the acknowledgment that all scholarly disciplines, both in their contextual frameworks and their interpretation of information, are themselves products of consciousness rather than inherent characteristics of nature. Thus, the study of consciousness necessitates looking beyond the perspectives and insights peculiar to any specific fields of study to question the fundamental assumptions that underlie their respective representations of reality, the hypotheses that guide their interactions with their environments, and the methods by which they organize and utilize the information thus acquired.

Such a frankly interdisciplinary approach has characterized the efforts of the Princeton Engineering Anomalies Research (PEAR) program since its inception in 1979. The PEAR research staff is interdisciplinary both in its professional skills and in its style of creative interactions, and its study of the role of consciousness in the establishment of physical reality has combined empirical observation with theoretical methods, and pragmatic applications with philosophical perspectives, in mutually complementary dialogues. A similar approach has been employed in a number of PEAR's collaborative programs with colleagues from other departments and institutions. One example is the Princeton Human Information Processing Group, which brings together researchers from several university laboratories to address the topic of human/machine interactions from the perspectives of engineering, cognitive science, psychology, linguistics, and philosophy. This group also offers a team-taught undergraduate course with opportunities for student research projects spanning these various programs. Another such enterprise is the International Consciousness Research Laboratories (ICRL), a small research consortium of scholars from five countries, whose members have well-established credentials in the fields of physics, biology, medicine, anthropology, archaeology, psychology, engineering, and the humanities, and share a common interest in the relevance of their work to the understanding of consciousness. This

group meets semi-annually to exchange individual and cooperative research findings and to explore the theoretical implications of their work. In addition to the high level of intellectual stimulation provided by these meetings, the opportunities to interact in open-minded colloquy with others of common purpose in an environment of mutual respect has been richly rewarding. And, of course, the participation of many members of the PEAR staff in the formation, operation, and resource development of SSE has proved of great mutual benefit.

While these efforts to bridge established disciplinary boundaries have proven quite effective within their own professional circles, they have not addressed the huge number of inquiries received by PEAR and its ICRL colleagues over the years from young and mid-career scholars seeking to learn more about consciousness research and to become actively involved in its study. Given the limited academic options and funding resources available to support such initiatives, it became clear that a broader and more tutorial approach was also needed, one unencumbered by conventional academic architecture and preconceptions, that would provide a forum for a small group of such scholars to engage in incisive exploration of the full range of difficult and controversial aspects of this challenging issue.

The Academy of Consciousness Studies was conceived in response to this interest as an intensive two-week multidisciplinary convocation wherein this theme could be developed in depth, in a fully holistic fashion and from a variety of academic perspectives. Equal emphasis was to be placed on the anomalous, metaphysical, and spiritual facets of the topic as on the more canonical issues of rigorous scientific methodology and comprehensive theoretical modelling. Beyond its educational aspirations, the Academy also set as major goals the provision of professional support and guidance to its participants in designing and carrying out subsequent research within their own related interests; the establishment of an ongoing network of collaborations of the highest scientific quality; and the development of an effective program for communication of this work to the broader scientific community and to the public.

The first Academy of Consciousness Studies was held on the Princeton University campus from June 26 through July 9, 1994, with financial support from the Fetzer Institute. Although the initial plan was to invite some 20 qualified "students" to interact with a "faculty" drawn primarily from ICRL, the overwhelming response to announcement of the Academy, both in quality and quantity, necessitated increasing the number of admissions to 35 and expanding the range of age and experience to include several more senior scholars. Nomenclature distinguishing "students" and "faculty" was replaced with the more generic term, "participants", and the agenda was altered to reflect this egalitarian tone. Even with this increased size, a substantial number of highly qualified applicants still could not be accommodated, and the development of an outreach program to link the participant group with a broader

"Academy Community" remains one of the major priorities for follow-on programs.

The selected 35 invited participants and 11 ICRL members serving as discussion leaders had a mean age of 39, and represented ten countries and 18 different fields of scholarship: anthropology, archaeology, architecture, biology, biophysics, cognitive science, computer science, education, engineering, environmental science, humanities, mathematics, medicine, philosophy, physics, psychology, sociology, and theology. In addition to its high level of professional sophistication, the group embodied an impressive array of experience in a broad variety of artistic and/or metaphysical disciplines. Several months prior to the Academy, these participants were asked to submit brief biographical statements which were compiled and distributed to all members of the group as an initial attempt to establish a sense of community. They were also provided with a selection of preparatory background reading, so that by the time the Academy convened much of the intellectual and interpersonal framework was already in place.

The Academy format consisted of lectures, group discussions, interactive seminars, and laboratory workshops, supplemented by ample opportunities for recreation and personal interactions. Two three-hour formal sessions were scheduled each day, each of which began with a brief presentation by one or more ICRL members on one of the topics covered in the previously distributed reading material. Intense discussions then ensued, with all participants contributing from their own particular perspectives. Pairs of participants with different professional backgrounds acted as scribes for each of the formal sessions, thus preserving at least two different perspectives on each presentation and discussion.

Although evenings were intentionally left unscheduled to provide opportunities for relaxation and socializing, or for informal seminars and small group discussions, these sessions turned out to be at least as intense as the more formal ones. They covered an immense range of topics, and typically continued well into the early morning hours. Many of the participants reported that they found these conversations to be among their most valuable Academy experiences.

The formal program began with a introduction by Robert Jahn, Director of the PEAR program and Dean Emeritus of Princeton's School of Engineering and Applied Science, presenting the history, context, and purpose of the Academy (Appendix). Each of the participants was then given an opportunity to present a synopsis of his or her own background, interests, and perspective on the topic of consciousness. The first week's sessions focused on various experimental and experiential dimensions of the theme; the second week turned more toward theoretical considerations, wherein a number of potential models were considered along with critical assessments of their relative advantages and limitations. The last few days of the Academy were devoted to discus-

sions of pragmatic implications and applications, and plans for continuing the dialogue into the future.

It is virtually impossible to summarize the Academy proceedings in any concise fashion, given the vast breadth and depth of the many formal and informal discussions. The task is further confounded by the ceaseless weaving and reframing of ideas within shifting contexts as the days progressed. At best, we can offer only a brief overview of some of the main themes contributing to the Academy fabric. The formal empirical presentations included the results and current status of human/machine anomalies research; a review of recent developments in bioelectromagnetics research and their implications for an emergent model of consciousness; a tutorial on biophoton luminescence, coherence, and cell communication; discussions of earth light phenomena and archaic ceremonial landscapes; and the history and current status of remote perception research, complete with a group experiment. Other sessions dealt with anthropological, medical, neurophysiological, and cognitive perspectives of the mind/body connection. The theoretical excursions included the implications of vacuum zero point fields, quantum mechanics, nonlinear mathematics, and information theory.

Among the more informal seminars were discourses on education and linguistics; anthropological perspectives on childbirth practices; interpretation of archaeological artifacts; sacred architecture; multiple personality disorders; clinical applications of visualization techniques; and the role of ritual in human culture. Small group discussions covered such diverse topics as music, mathematics, philosophy, environmental issues, the martial arts, spiritual traditions, astrology, computer technology, and more.

Out of all of this emerged a strong consensus that any comprehensive understanding of consciousness would inevitably require extensive multi-disciplinary study, and conversely, that consciousness must become an important component of virtually every domain of scholarship. The pragmatic ramifications of incorporating this view into the prevailing social paradigm via educational initiatives, communication networks, practical applications, and economic incentives were vigorously debated.

Beyond the high level of intellectual excitement that prevailed throughout the entire two-week period, the Academy was notable for the extraordinary interpersonal dynamics that developed over its course and promised many enduring benefits. There was general agreement among the participants that the original goal of generating an interdisciplinary community of scholars had not only been more than fulfilled, but that it would better be described as a family of scholars, given the many close personal friendships that had been established.

These friendships, along with numerous professional collaborations, have been sustained and expanded over the succeeding months. Follow-on accomplishments have included the establishment of an electronic mail network, publication of a newsletter, joint authorship of a book on intuition, develop-

ment of academic curricula, initiation of several research projects, and explorations of a number of possible pragmatic applications. An Academy Steering Committee, consisting of four of the 1994 participants, has been formed to coordinate these and future activities, and to develop plans for expanding the Academy community to involve the several hundred qualified applicants who could not be accommodated in the initial convocation. These plans include the establishment of an interactive communications network, coordination of smaller regional meetings, identification of potential sources of funding for research and academic programs, and the organization of future Academies of Consciousness Studies.

Appendix: Introductory Remarks at First Academy

BY ROBERT G. JAHN

The agenda calls for me to open this first convocation of the Academy of Consciousness Studies with some statement of "purpose", as if a single, overarching goal could be specified. After some thought, I have decided respectfully to decline that assignment, for at least two reasons. First, I believe that every participant has come here for his or her own particular purposes, consonant with individual background, contemporary activity, personality and value system, and that we should not in any way constrain that spectrum of aspirations by attempting to define some composite goal too precisely. But beyond that, I suspect that some portion of each individual impetus may be rather subconscious and ineffable, perhaps somewhat akin to that which impelled the host of widely disparate respondents toward the landing site in Spielberg's "Close Encounters of the Third Kind." We are here because we have been called to serve a purpose that has still to be defined. Indeed, perhaps that is a major portion of our first work together. In any case, allow this mere mortal to waffle on his assignment and simply define our goal to be to meld our individual explicit and implicit purposes into a symbiotic community of interests, understanding and, most importantly, activity.

Since this leaves me with a lot of extra time, let me use it for a briefing on two related aspects — call them "history" and "environment" — which inevitably must condition even our vaguely-defined purpose. A central element in such review must be the evolution of our own Princeton Engineering Anomalies Research (PEAR) laboratory, which was formally established in mid-1979 following a surprisingly successful student project I had supervised for the two preceding years. From the start, the PEAR lab has attempted to deploy the most incisive engineering equipment, computational methods, and theoretical techniques to systematic study of certain consciousness-related physical anomalies. Specifically, we have focused throughout on an array of human-machine interactions, on generation and analysis of remote perception

data, and on development of quantum mechanical models of consciousness-environment interactions.

In its earliest days, the program concentrated primarily on building incontrovertible empirical data bases demonstrating the scale and character of the anomalous effects, per se, but this phase was quickly succeeded by the recognition that a broader role of consciousness in the establishment of physical reality was being demonstrated via these anomalies. With that recognition came an extension of our collegial technical interfaces from those in engineering, physical science, and parapsychology, with which we had began, into the domains of bioscience, neuroscience, and medicine, as well as into the aesthetic communities of philosophy, religion, archaeology, and anthropology. These broader scholarly dialogues proved essential to advancement of our understanding of consciousness, and carried through to the formation of the International Consciousness Research Laboratories (ICRL), a consortium of several research programs in such varied disciplines as archaeology, anthropology, biophysics, engineering, experimental and theoretical physics, medicine, neuroscience, and psychiatry that convenes semi-annually and conducts numerous collaborative research projects among its members.

The most recent phase of PEAR activity has included a menu of responses to continuing pleas from prospective students, visitors, and colleagues from many other fields for some tutorial outreach that would establish a few basics of the business. We have endeavored to address this need via our book, *Margins of Reality*, a number of publications in the *Journal of Scientific Exploration* and other archival journals, a stream of technical reports, and selected television and other media productions. It was in this role that we also appealed to the Fetzer Institute to sponsor this Academy of Consciousness Studies.

The original concept of the Academy was proposed in 1991 by Mike Witunski, a member of the ICRL group. Subsequent planning sessions sketched the size, scope, location, and administration of the first convocation, and a budget was eventually established. The response to the announcement was so far above expectations, in number, quality, and level of experience, that the size of the accepted group was increased from the planned 20 to 35, and the composition broadened to include more senior scholars, as well as younger students. Most of the remainder of our planning process you know first hand from your communications with Brenda — and here we are!

The relevance of "environment" to our undertaking takes on more than one aspect. First, we have chosen to meet in an academic environment — at a university, where by long tradition contemplative study and freedom of inquiry are cherished, respect for different views and customs prevails, and practicality and profitability of application are not primary motivations. It is our hope that similar ethics will protect our discussions here. But we must also recognize the influence of our contemporary cultural environment, which, while less consonant with our efforts, actually makes them more urgent. Few of us

would deny that our present Western culture is strongly conditioned, if not dominated, by modern science, with its sharply dualistic paradigm, its causal, deterministic presumptions, and its reductionistic reasoning. It is a secular science, from which matters of spirit and subjective experience are excluded *a priori*, and which tends to confuse its epistemology with absolute ontology, despite clear warnings from its most revered scholars. Because of its innumerable dramatic achievements, this secular, hyperanalytical, scientific format has infused most of our critical sub-cultures — economic, sociological, political, educational, medical — and may even intrude upon our philosophical, aesthetic, and religious activities. In the first section of *Margins of Reality*, we have tried to trace the evolution of scientific rationale as it pertains to the role of consciousness, from ancient to present civilizations, and to question whether some fundamentally important ingredients may have been lost along the way.

None of this is to advocate rejection of science as an enemy to spiritual insight; rather, it is a plea for the re-inclusion of spiritual dimensions within the scientific purview. As another of our ICRL members, Charlie Laughlin, has put it: "There is no topic that can be fully explained by science; there is no topic that should be immune to scientific inquiry." In a sense, he is echoing an earlier observation by William James:

> The spirit and principles of science are mere affairs of method; there is nothing in them that need hinder science from dealing successfully with a world in which personal forces are the starting point of new effects. The only form of thing that we directly encounter, the only experience that we concretely have is our own personal life. The only completed category of our thinking, our professors of philosophy tell us, is the category of personality, every other category being one of the abstract elements of that. And this systematic denial on science's part of personality as a condition of events, this rigorous belief that in its own essential and innermost nature our world is a strictly impersonal world, may, conceivably, as the whirligig of time goes round, prove to be the very defect that our descendants will be most surprised at in our boasted science, the omission that to their eyes will most tend to make it look perspectiveless and short. (James, 1956)

Science can alternatively be defined as a purpose, a methodology, a body of material, or a group of people. Its purpose — as its Latin root implies — is simply "to know" or "to understand". Its methodology is to invoke empirical observations, theoretical models, and logical deduction to achieve that purpose. Neither of these is inappropriate to the more broadly defined agenda that Laughlin and James suggest. It is from its arbitrary restriction of topics, and the limited perspectives of many of its practitioners that its shortfall arises, and both of these could be readily remedied. In fact, modern science actually contains the requisite seeds of its own reformation within its present formalism. Four such seeds that pop immediately to mind are its growing attention to the science of information; its inevitable reliance on metaphor to convey its meaning; the Copenhagen or observational interpretations of quantum me-

chanics; and the ubiquitous phenomena of resonance. Let us skim these briefly.

Most early science, from the Egyptians through the Renaissance and Enlightenment, tended to focus on the behavior of tangible substance or, in contemporary scientific parlance, on *mass*, its gross mechanics, chemistry, and physical properties. Midway through the 19th Century and well into the 20th, the concept of *energy*, of many forms — mechanical, electrical, thermal, chemical, nuclear, etc. — became more central to scientific and technological endeavor. Most recently, over the past few decades, a third physical currency, *information*, has taken center stage, and clearly will dominate basic science and its applications over the foreseeable future. Superficially, these three physical properties of mass, energy, and information might seem to be quite distinct, but in point of fact, they are demonstrably fungible, with immense consequences. Einstein's identification of the transmutability of mass and energy ($E = mc^2$), has impelled much of 20th Century physics, and its technological, political, and sociological implications can hardly be overstated. A similar transmutability of energy into information, and vice versa, although somewhat more subtle, may well drive 21st Century science and many of its applications.

This entry of science and technology into the kingdom of information brings with it two intriguing problems, neither of which have been adequately acknowledged, let alone addressed. First, there is the self-evident distinction between *objective* and s*ubjective* information. The former, the hard currency of information processing devices of all kinds, is thoroughly and uniquely quantifiable, and ultimately reducible to binary digits. For example, the objective information contained in any given book could in principle be uniquely quantified by digitizing each of its letters and every aspect of its syntactical structure. But the magnitude of subjective information the book presents clearly depends on the native language, previous knowledge, cultural heritage, and prevailing mood of its reader, and thus would seem to defy quantization. Nonetheless, we seem innately driven to attempt some quantitative specification; e.g., we say "This book is more interesting than that one." Likewise, we might attempt to digitize the information displayed by a brilliant sunset or a magnificent waterfall in terms of the prevailing distributions of optical frequencies and amplitudes, but in so doing we would largely fail to convey the subjective beauty of the scene. Nonetheless, we might try to express in some pseudo-quantitative terms how much that vista delighted us. And of course, there is the ageless sweethearts' song, "I love you more than....", or the young child, with widely outstretched arms, attempting to quantify his heartfelt emotion: "Mommy, I love you, *so-o-o* much!". Quantification of subjective information will be a major challenge to the coming science of information.

The problem is considerably compounded by the demonstrated capacity of consciousness to alter both subjective and objective elements of information, as indicated by the PEAR experiments and many similar ones elsewhere. The

most parsimonious representation of our random event generator results, for example, is that the consciousness of the operator is somehow bringing a small degree of order into an otherwise random string of binary digits, i.e., inserting information into it. Thus it now falls to science to represent how consciousness, beyond acquiring and utilizing physical information, can generate it as well.

The second scientific seed that needs to be acknowledged and developed is its heavy reliance on metaphor to convey its concepts and relationships. Most scientific nomenclature has been appropriated from more generalized linguistics, wherein the terms have long been used to convey broader experiential elements than their specialized, analytical, scientific connotations. Terms such as "noise", "energy", "field", and "information" long predate their modern technical application, but now serve as metaphors for particular scientific effects. It is little exaggeration to say that science is a fabric of empirical and theoretical relationships among its metaphors. The problem arises when science confuses such metaphoric epistemology with more absolute ontology, a failing well recognized by many of the more profound scientific thinkers. In Einstein's words:

> Concepts which have been proven to be useful in ordering things easily acquire such an authority over us that we forget their human origin and accept them as invariable. (Einstein, 1949a)
>
> The system of concepts is a creation of man together with the rules of syntax, which constitute the structure of the conceptual systems.... All concepts, even those which are closest to experience, are from the point of view of logic freely chosen conventions, just as is the case with the concept of causality.... (Einstein, 1949b)

or those of James Jeans:

> ...the physical theory of relativity has now shown that electric and magnetic forces are not real at all; they are merely mental constructs of our own, resulting from our rather misguided efforts to understand the motions of the particles. It is the same with the Newtonian force of gravitation, and with energy, momentum and other concepts which were introduced to help us understand the activities of the world — all prove to be mere mental constructs, and do not even pass the test of objectivity. (Jeans, 1943)

or of Jonas Salk:

> By using the processes of Nature as metaphor, to describe the forces by which it operates upon and within Man, we come as close to describing 'reality' as we can within the limits of our comprehension.... In this way, Man's imagination and intellect play vital roles in his survival and evolution. (Salk, 1973)

Once we concede the intrinsically metaphoric character of science, we are free to attempt scientific representation of subjective quantities, seek for law-

ful relationships among them, and attempt their inclusion in more generalized physical models. Such effort is not entirely unprecedented in science. The labeling of the sub-nuclear "quarks" with such subjective properties as "flavor", "strangeness", and "charm" may, at some level, be a concession to their intrinsic ineffability. More profound, and probably more relevant, is the "observational" interpretation of quantum mechanics, which is our third fertile seed.

Neils Bohr and his "Copenhagen" school of colleagues attributed many of the paradoxes of quantum mechanics to the inescapable influence of the "observer" on any observed physical process. From this perspective, a number of the quantum mechanical "principles", most notably the principle of "complementarity", that had originally addressed the ubiquitous wave/particle duality, acquired keenly subjective implications which Bohr clearly recognized and wrote about extensively. From this position, it is not so large a step to extend the "role of the observer" to the "role of the participant", or the "role of the experiencer", and to extend the complementarity principle to conjugate innumerable pairs of subjective/objective properties and processes for a more complete representation of experience. Such extensions of the quantum mechanical metaphor to the general interaction of consciousness with its physical environment is the basis for our theoretical model, as developed in Section IV of *Margins of Reality*.

There seems no fundamental reason why the concept of complementarity needs to be restricted to two conjugate coordinates. Multi-dimensional conceptual spaces may be similarly related and, in a sense, the convergence of the epistemological "vectors" onto our topic that we sketched in Section I of the book could be one such example. This Academy also brings together an array of topical and motivational vectors that can powerfully complement one another within a productive and mutually reinforcing network.

The last, and probably most important, scientific seed we should mention is the well established concept of resonance. All manner of physical systems, whether mechanical, electromagnetic, fluid dynamical, quantum mechanical, or nuclear, display capacities for synergistically interactive vibrations with similar systems, or with their environment. Coupled harmonic oscillators, all common musical instruments, radio and television circuitry, atomic components of molecules, all involve this "sympathetic" resonance, from which strikingly different properties emerge than those that characterize their isolated components.

The most common subjective report of our most successful human/machine experimental operators is some sense of "resonance" with the devices — some sacrifice of personal identity in the interaction — a "merging", or bonding with the apparatus. As one operator put it: "I simply fall in love with the machine." And indeed, the term "love", in connoting the very special resonance between two partners, is an apt metaphor and, remarkably, allusions to even this form of resonance can be found in scientific literature, none more eloquent than that of Prince Louis de Broglie, one of the patriarchs of modern physics:

If we wish to give philosophic expression to the profound connection between thought and action in all fields of human endeavor, particularly in science, we shall undoubtedly have to seek its sources in the unfathomable depths of the human soul. Perhaps philosophers might call it "love" in a very general sense — that force which directs all our actions, which is the source of all our delights and all our pursuits. Indissolubly linked with thought and with action, love is their common mainspring and, hence, their common bond. The engineers of the future have an essential part to play in cementing this bond. (de Broglie, 1962)

"'Love' in a very general sense." Could it be that the human/machine anomalies we are seeing on a laboratory bench are physical evidence of the efficacy of that "profound connection between thought and action"? Could it be that this "common mainspring" is the ingredient missing from modern science that would enable it to encompass the world of the subjective, the world of metaphor, the world of consciousness? And while we are at it, should we not also offer admission to love's sibling, *desire*? Call it volition, call it will, call it intention, whatever, we need scientific acknowledgment of the *proactive* drive of consciousness toward its goal, its need, its vision, its hope. How scientifically apt then would become the revered triad of faith, hope, and love: faith in a proactive capacity of consciousness, driven by hope, and enabled by "love, in a very general sense", that can assemble order from chaos, insert information into random process, and thereby create, as well as experience, its reality.

I hope you have already sensed the faith, hope, and love in our preparations for this Academy, and that you will now contribute to it, and to the new community that will emerge from it, with these same powerful strategies.

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