

A PRESCRIPTION FOR GENERATING A NEW PARADIGM IN THE CONTEXT OF SCIENCE AND THEOLOGY

by *Francis O. Schmitt*

Abstract. Many centers are now active in the study of the interaction between science on the one hand and theology on the other. Suggestions are made as to how such study might be furthered. The central proposal in this paper is based on the author's experience in founding and, over many years, operating the Neurosciences Research Program (NRP). The "faculty" of this group were highly competent in many fields of science and were able to deal with many of the major issues. It is here further suggested that if an NRP-like organization were established, capable of productively interacting with both science and theology, it might well generate new concepts and possibly a new paradigm in this context.

Keywords: consciousness; mind-brain problem; neuroscience; science; spirit; theology.

We live in a world characterized by an ever-increasing, autocatalytic development of new concepts and projects. Some are good—for example, the improvements in health sciences and providers and the enormous development of information processing, which almost instantly informs the public of ongoing events; some are bad—e.g., the continued production, although at a reduced rate, of the implements of warfare, the dangers of overpopulation, ecological devastation, and many other threats. Although through science and technology much has been learned about the factors required for humankind's continued survival on this planet, the

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project here proposed could directly address the survival problem.

My life has been characterized by a major professional interest in science, particularly the life sciences, but also in religion and theology as a lay participant in numerous conferences and committees. These matters are set forth in detail elsewhere (Schmitt 1990). My special scientific interest generated in college and in medical school was the brain and central nervous system as investigated at the molecular level as well as at higher levels, including the organismic.

In the 1950s, my experience led me to believe that a rather drastic change may be imminent in this field, and that I might be able to play an active role in the process. As an Institute Professor at MIT I had no administrative or teaching duties and was able to concentrate my efforts on work of special interest to me and my group. This permitted me, after much thought, to develop a project in the early 1960s that would later be called the Neurosciences Research Program (NRP) (see fig. 1). Little did we realize in those early days of the project that this would lead to the establishment of a new discipline that would expand explosively and become one of the most active and productive of all the life sciences.

The major mission of the NRP was to facilitate the intellectual interaction between scientists eminent in relevant disciplines in a collaborative effort to discover what physical and chemical processes occurring in the brain and central nervous system produce memory, consciousness, and intellectual and emotional processes. In short, the mission was to discover whether, by taking thought, it is possible to discover the brain mechanisms of thinking and other higher brain functions. There would, of course, be clinical payoffs in the prevention and treatment of diseases such as Alzheimer's syndrome, schizophrenia, manic-depressive psychosis, amyotrophic lateral sclerosis (ALS), and other disorders of the nervous system that impact on behavioral processes. And, in addition, by developing a better understanding of the biological basis of human nature it would be possible to increase the prospect for survival of the human species and indeed of all life on this planet.

I. NRP AS A MODEL OF COLLABORATIVE CONCEPTUAL RESEARCH

Until the mid-fifties the major research interests of myself and my colleagues had been to understand the organization and function of the nervous system, including the brain at the systemic and at the molecular levels. To investigate the ultrastructure of these tissues

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Fig. 1.

required expert application of polarization optics, X-ray diffraction, and electron microscopy, all of which had become available to us at MIT. We published numerous papers in this field. However, to understand the organization and functioning of the central nervous system, particularly the brain (the most complex of any system known to science), it became apparent to me that it would be

necessary to utilize information from many disciplines in addition to my own field, molecular biology.

In the 1940s, at universities, medical schools, and research institutions like the Rockefeller Institute, there was, traditionally, little interdisciplinary interaction (the “closed door” principle). However, I felt strongly that the problem before us would require a new format, namely an organization that would foster the meaningful interaction of experts from many heretofore “separate” scientific disciplines, and of an interdisciplinary, interuniversity, and international scope. In the early 1960s I felt that the time had indeed come when such a project might be organized.

This potential project was discussed with colleagues at MIT and with fellow members of the National Academy of Sciences. Preliminary investigations showed that highly qualified scientists would participate, and that considerable funding was required. My notions were still unclear, but my previous experience with the Intensive Study Program in Biophysics in 1958 (Oncley 1959) served as a model on which to devise this yet more complex program.

In January of 1962, the scenario of how to initiate this project became clear. The chronology of the “crash-formation” of what I officially called the Neurosciences Research Program (NRP) was impressive (Schmitt 1990, 214). I had known Ralph Waldo Burhoe since 1947 when he was appointed Executive Officer of the American Academy of Arts and Sciences. In the early 1960s he and I participated in meetings organized by chaplains at MIT for the discussion of topics such as “Religion and Science in Lutheran Perspective,” “Evolution and the Christian World View,” and others. Meanwhile, the academy had vacated its original downtown building in Boston and moved to the Brandegee House in Brookline, a suburb of Boston. When I was searching for a place that might adequately house our newly established NRP, Ralph kindly showed me the quarters at the Brandegee House that were not occupied by the academy and might be available to our fledgling NRP. To accomplish this transition required much negotiation at high levels of authority.

After NRP had moved into Brandegee House, Ralph helped in various ways, for which I was grateful. During these years he had ample opportunity to observe the manner in which the NRP had rapidly developed. He also observed how bringing together topflight scientists from many disciplines, from here and abroad, and stimulating their intellectual interaction, resulted in the development of new concepts that could not, in such a short time, have been achieved by any of the scientists individually. Ralph became aware

that it was the development, by these interacting scientists, of *novel concepts* that would spark the neuroscience revolution soon to come.

Since 1964 Ralph Burhoe has been in Chicago, where he was able to pursue his lifelong interest in the interaction of science with religion and theology. There he founded *Zygon: Journal of Religion and Science* and was a founder of the Chicago Center for Religion and Science.

A quarter of a century later, it was with some surprise that, on 20 November 1990, I received a letter from Ralph in which he asked me to participate actively in work being done at the Chicago Center for Religion and Science. The specific task was to suggest ways of applying to the problems posed by his Center the methods I had previously developed and applied in founding the NRP.

After I had received Ralph's letter and had been in communication with Philip Hefner, director of the Center, I decided that before I made any decision about Ralph's request I would make a brief inquiry into what had recently been done in the investigation of "science and theology." To my surprise, I discovered that already much interest had been developed about the meaningful interaction between science and theology, and that a number of centers had been established in this country and in Europe in which to accomplish this goal. The leaders in the development and operation of some of these centers have excellent credentials in science, particularly in physics and chemistry and, of course, also in theology. I had discussions over the telephone with the leaders of some of these groups, which reinforced what I had read in brochures that I had received.

These discoveries, together with correspondence with Phil Hefner, as I had come to know him, heightened my interest in the work being done in the Chicago-based center. This triggered some independent thinking of possible ways in which I might make a useful contribution to this field. This included my holding a meeting at MIT of prominent theologians in the Boston area to "test the waters" in the matter of science-theology.

Ralph Burhoe's request was indeed a big order. I thought about it a great deal and decided to be realistic about the minimal requirements needed to address this challenge adequately. The proposed project, the establishment of an NRP-like program, would of necessity be expensive; it would require considerable time to organize and develop, and it would have to be appropriately housed and funded.

When NRP was founded, a friendly philanthropist who had looked into our project carefully advised me to plan at a sufficiently high level to make success of the venture very probable. I think a similar

statement may be made about the proposed NRP-like project in science and theology. Its cost would certainly be high, and commitment by the founder and staff would have to be great.

At the present stage of the project, I could probably most effectively help by citing factors that I found helpful in organizing and operating its progenitor, the original NRP. This is not presented as an exact model; however, it may indicate a minimal level of operation below which such a project would probably not succeed.

The following are brief characterizations of some major factors that were important for the success of NRP. They should be considered seriously as components of a possible NRP-like project in science and theology, a project that could produce a world center and a paradigm for a community of scholars in what might thereafter, like neuroscience, expand explosively worldwide. The time appears to be right for action.

SPONSORSHIP OF NRP. In a large academic undertaking such as NRP, sponsorship by a well-known university or research institution is important. This would facilitate subsequent applications for funding by federal or private agencies. In the case of NRP, I deeply appreciated the fact that MIT agreed to sponsor all the activities of NRP both in this country and abroad.

CREATION OF AN INDEPENDENT FOUNDATION. Also valuable in many ways was the establishment, shortly after NRP's founding, of an independent foundation, the Neurosciences Research Foundation, Inc. (NRF). The NRF received funds from other foundations and from a small coterie of generous and supportive individuals. Importantly, the NRF provided funds for purposes that could not appropriately be paid from funds received from public agencies such as the National Institutes of Health and the National Science Foundation. The NRF also provided start-up funds for NRP projects for which larger funds would later be sought from such public agencies.

APPROPRIATE HOUSING. Here are listed a few of the features of the Brandegee House that were found to be very helpful in developing and operating the NRP. These might be important also for the NRP-like project here under discussion.

A Lecture Room. The lecture room seated about forty persons and was equipped with a podium and a microphone so that lectures could be recorded on tape for review at any time. Abutting the lecture room was a small space from which slides could be projected on the screen.

A Dining Room. The dining room was large enough to accommodate about forty persons. The use of caterers obviated the need for a kitchen and kitchen staff.

A Library. The library consisted of a three-room suite that housed books and journals, and also the library staff.

A Few Small Rooms. These were for particular staff, secretaries, etc.

ASSOCIATES. The “faculty” of NRP were called Associates; when NRP was fully established there were thirty-six Associates. It was important for the functioning of NRP, not only that the Associates should be of the highest scientific caliber, but also that, in the aggregate, they should be multidisciplinary. That this was indeed the case is shown in fig. 2. Major disciplines, e.g., physics, chemistry, and biology, are shown at the tips of the triangle; biophysics, biochemistry, and physical chemistry are indicated at intermediate positions on the triangle. The circular spots represent where, in this model, a particular Associate’s major competence was located.

Thus, if an individual was, at least to some extent, competent in physics, chemistry, and biology, the circle representing this Associate would be in the middle of the triangle. The fact that the spots are widely dispersed within the triangle shows that the Associates were indeed multidisciplinary. At the side under the heading “Disciplines Represented” are listed the individual disciplines as well as the number of Associates that were in each discipline. Figure 2 was actually made when NRP was in an early phase of its development and there were only twenty-seven Associates; if it had been made somewhat later the multidisciplinaryity of the group would have been demonstrated even more strikingly.

As a group, Associates met twice each year at what we called Stated Meetings; these were attended only by Associates and top staff members. Associates could also attend Work Sessions and Intensive Study Programs of interest to them, as I shall shortly describe.

This arrangement for Associates, in which they come to NRP meetings and thereafter return to their home institutions, is to be contrasted with what is frequently called the think tank mode, in which individual scholars go for extended periods of time to a center that provides facilities for them to write manuscripts, read relevant literature, and occasionally mingle socially with other scholars. A well-known example of this type is the Center for Advanced Studies

MULTI-DISCIPLINARY NRP ASSOCIATES

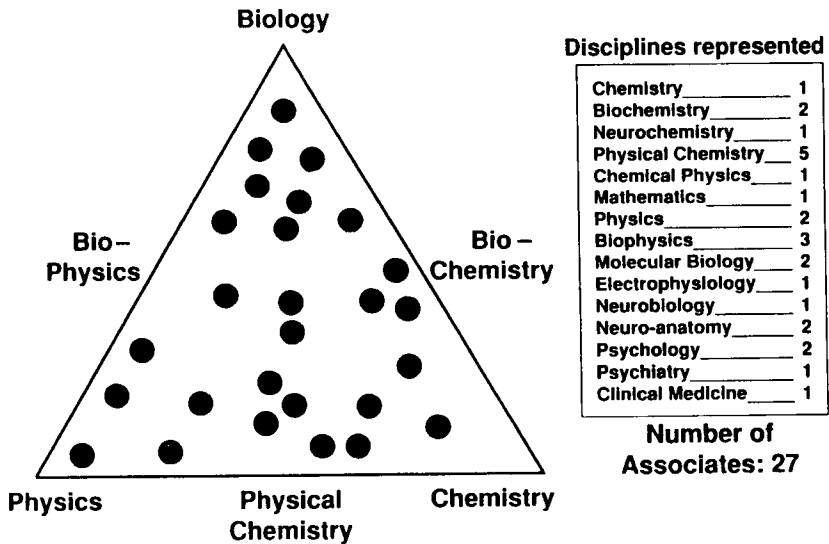


Fig. 2.

in Behavioral Sciences at Stanford University. This is for scholars who are oriented toward their own specific type of study and will devote a year to it at the center. Another example in the general domain of behavioral science is the Center for Theological Inquiry at Princeton.

At NRP on the other hand, the commitment of Associates was an ongoing one; at NRP meetings they gave lectures and engaged in vigorous discussions with fellow Associates. They brought much information obtained during their careers at their own universities or institutes and were themselves enriched by the new ideas and concepts discussed at NRP meetings. They also then brought back new information to their groups at their own institutions. Such two-way information flow was important to the Associates and was vital for the functioning of NRP.

PROFESSIONAL STAFF. The following is a list of the professional staff positions at NRP and basic responsibilities of each.

Director of Communications. The major task of this staff member was the supervision of the flow of information in the various meetings and publications. This required participation in planning sessions, Work

Sessions, and Stated Meetings. The staff member was also helpful in preparing occasional reports required by public funding agencies.

Librarian and Manager of Publications. We were fortunate to have a very substantial library, which required much of the librarian's time. Included among the librarian's tasks were management of publications and supervision of the publication of manuscripts originating from Work Sessions, Intensive Study Programs, and related activities. The librarian also interacted with the presses that printed NRP's publications, thus minimizing the time needed for publication.

Administrative Officer. The purpose of this position was to provide general supervision and management of all operations, fiscal and scientific, and to assist the chairman of NRP in various ways.

Program Director. The most important task of this staff member was to supervise the identification of subjects of importance to the development of knowledge in the field of neuroscience and that might be dealt with in Work Sessions and Stated Meetings. This individual had to be a neuroscientist with considerable experience and an ability to conceptualize scientific activities already in progress and to project to new areas of investigation that might become fruitful.

Writer-Editors. These staff members understood the publication process and how to edit manuscripts written for publication by Work Session chairpersons. Each writer-editor had experience and was knowledgeable in at least one of the major fields of concern to NRP. There were three writer-editors; hence editorial expertise was always available.

Audiovisual Technician. Ideally, this individual should have knowledge and experience in tape-recording lectures and discussions, projecting illustrations, and photographing and printing lantern slides and other illustrative materials used by speakers and recorded on audiotapes at all NRP meetings.

TYPES OF MEETINGS. The types of meetings that were held at NRP are outlined and described below.

Stated Meetings. The Stated Meetings of Associates were usually charged with much intellectual excitement, thus providing an atmosphere in which much "interthinking" could occur. This highly

informed input from experts in different fields catalyzed the synthesis of new concepts, which was the reason so many busy, world-class scientists were willing to travel long distances and devote much of their time to attend Stated Meetings as well as Intensive Study Programs. Indeed, many of the Associates took advantage of their freedom to attend, not only Stated Meetings, but also other NRP meetings.

Work Sessions. These were not comparable to the myriad symposia, workshops, and meetings developed worldwide by scientists or by publishing companies eager to extend their coverage of scientific fields. They were unique in their purpose and organization, a fact affirmed, not merely in letters from participants, but also by the judgment of peers based on published materials.

Because Work Sessions were expensive in time, energy, and money, they were never dealt with offhandedly; rather, they were done with much thought and planning. A maximum of six Work Sessions per year could be held and published. Therefore, each session had to represent a conceptual area of major interest to NRP. Knowledge of the current literature and telephone calls to authorities on particular subjects led to development of a list of candidate subjects for Work Sessions. Frequently, in-house conferences of the professional staff were held to discuss the relative merits of subjects that the program director had compiled, or of any ideas for subjects that were contributed by staff members. When consensus was reached that a particular subject might qualify for a Work Session, it was made the subject of a one-day planning session.

For this purpose, four or five scientists were identified who were experts in different aspects of the subject under consideration. The planning session was chaired by the program director or by myself as chair of NRP. Each of the invited scientists was asked to describe in ten minutes his or her views on whether the proposed topic should be a candidate for a full Work Session. After all of them had presented their views there was a thirty-minute discussion period, first among the invitees, then among all those present. The question was then put as follows: "On the basis of this evidence, should NRP devote a Work Session to this subject?" Unless the vote was negative, one of the five planners was then asked to chair the Work Session and to prepare the proceedings for publication in the *NRP Bulletin*. When a consensus was reached about the subjects to be put on the proposed agenda the names of additional scientists in this country and abroad who could best cover each of the respective subjects were then determined. Over the telephone, these individuals

were then asked whether they would agree to come for the three-day Work Session and to give a presentation on the assigned subject. Almost all of those asked agreed to come.

The thoroughness of this planning procedure was one reason NRP meetings and publications were so highly regarded. Indeed, in many cases these planning sessions were more interesting to the participants than the Work Sessions themselves.

The chairperson of the Work Session, who was chosen at the planning session, was responsible for communicating, through NRP facilities, with the participants of the planning session to develop and refine the agenda. NRP center staff helped with form letters, clerical work, and mailings, and with procedures found from prior experience to be important for the success of Work Sessions, e.g., preparation of a tentative assignment for each participant, formulation of important questions to be put before the meeting, preparation of position papers, and collection of relevant references and reprints.

The writer-editor who had been assigned to a particular Work Session then supervised and coordinated the extensive communicative exchange between participants and the chairperson of the Work Session. The totality of this input was then used by the chairperson to prepare a manuscript for the final report that would be published in the *NRP Bulletin* (see fig. 3).

As soon as possible after the details of the upcoming Work Session had been determined, participants were asked to furnish by mail their own reprints and references pertinent to their presentations. These reprints would be studied by NRP staff in preparation for the meeting and were put on display during the Work Session for the edification of participants and staff.

Work Sessions began with a reception and dinner, after which participants assembled in the lecture room. The usual NRP format and desiderata were then explained. This evening session was designed to set the stage for the subsequent two days of hard work; problems of subject definition and other communication hurdles were dealt with at this period of postprandial congeniality, leaving the agenda uncluttered by scientific misunderstandings, thus assuring effective action on the morrow.

An example of the importance of such preliminary evening sessions stands out vividly in the memories of all who attended one particular Work Session, which was on the subject of schizophrenia. This led to much discussion, sometimes heated, because it was difficult even for Associates who, as psychiatrists, were experts on the subject, to come to a consensus about such basic matters as the inherent nature of the disorder. However, at about 10:30 P.M. a

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BRAIN CELL MICROENVIRONMENT

A Report Based on an NRP Work Session

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Fig. 3.

working agreement had been hammered out. If this preconference session had come as the first paper of the conference on the next morning, it would have put the success of the entire Work Session in jeopardy.

All sessions were taped and all lantern slides used by speakers and discussants were photocopied; this was a great help in writing the final manuscript. Communications staff, resident scientists, the program director, and the NRP chairperson attended all Work Sessions. Participants who were asked to provide a lecture were expected to share their insights concerning interstitial and boundary areas and, very importantly, to suggest new types of experiments that might provide useful data. For the last afternoon session a concerted effort was made to develop group "interthinking" which, on favorable occasions, blossomed into new syntheses unlikely to have been achieved by any of the participants as individuals. The thoroughness of these procedures is one reason NRP meetings and publications were so highly regarded. Even today one seldom finds so much preparation, by such highly qualified scientists, in the arrangement of scientific meetings. *Such successful sessions expressed the essence of NRP, its essential raison d'être.*

Intensive Study Programs. Perhaps even more important and ambitious were the four Intensive Study Programs (ISPs) that were held in 1966, 1969, 1972, and in 1977, all on the campus of the University of Colorado in Boulder; they were from two to four weeks in duration. In addition to the scientific value of the ISPs, many professionals relied for years on ISP publications for information about specific subjects in neuroscience.

To each of the four ISPs fifty "fellows" were invited. These were in general young postdoctoral scientists who had a high record of performance and were highly recommended. They were very carefully selected by a highly competent special committee of Associates. In the four ISPs there was a total of 200 fellows, many of whom later achieved high academic posts and became leaders in their fields.

NRP PUBLICATIONS. A major function of NRP was to receive scientific input from Associates and from participants in Work Sessions and other NRP meetings, and to publish it in the *NRP Bulletin*¹ (see fig. 3). This journal was widely read, not only by some thirty-five hundred subscribers, but also by the rapidly increasing numbers of interested neuroscientists here and abroad. Information about a wide range of subjects considered to be included in the newly established discipline, neuroscience, was obtained from Work

Sessions, each of which was concerned with a specific subject.

The proceedings of the ISPs were published in four large volumes (averaging more than 1,000 pages each), which came to be known as "The Big Books" of neuroscience.

II. A FEW EXAMPLES OF SUBJECTS RELEVANT TO SCIENCE AND THEOLOGY THAT MIGHT BE EFFECTIVELY ADVANCED BY THE ACTIVITIES OF AN NRP-LIKE ORGANIZATION

THE NATURE OF "SPIRIT"—THEOLOGICAL AND SCIENTIFIC ASPECTS. "Spirit" is a concept basic to many religions, yet there is little understanding of what it is. In the Trinitarian Christian tradition, for instance, although the notion of the Holy Spirit, or the Spirit of God, is ancient and pervasive, over the centuries there has been much controversy over what it really means. To quote the internationally known historian of theology, Jaroslav Pelikan: "Whenever theological reflection has been obliged to come to terms with the nature of Christian experience, the underdeveloped state of the doctrine of the Holy Spirit has continued to manifest itself" (Pelikan 1988).

There has been much discussion over many years about an aspect of psychology called parapsychology. This includes two types of phenomena: (1) psychokinesis (PK), in which an object or physical system is said to be caused to move by the direct influence upon it of a mental command; and (2) extrasensory perception (ESP) which includes telepathy, the perception of another person's thoughts and emotions; precognition, the acquisition of information advanced in time; and clairvoyance, the acquisition of information from locations inaccessible by known sensory channels (Jahn and Dunne 1987). In his treatise on the Holy Spirit, DeWar (1959) suggests that "prophecy as understood in the Old Testament is rooted in clairvoyance."

I have for some years thought that the field of parapsychology might prove to be a fertile subject for a Work Session of the NRP type. Actually, a Work Session on that subject was held by NRP in September of 1963 and some of the then leaders in the field participated; however, because it was considered premature in the field, it was not published.

It would seem that these diverse concepts have to do with "psychic," not normally perceived, phenomena. It is interesting to note that the Society for Psychic Research was established in London in 1882, and many great scientists and scholars of that time were

members. Several years later the American Society for Psychical Research was established in Boston under the leadership of William James and Simon Newcomb. (For more interesting facts on this matter see Jahn and Dunne 1987, 38-39.)

To date, scientists have no accepted explanation for the physical nature of these phenomena. However, highly competent scientists consider at least some of the phenomena to have been definitely proved.

The degree to which the problem of "spirit" will play a significant role in the interaction between science and religion or theology remains to be demonstrated, but it would be very interesting to see how an NRP-like organization might now deal with it and what eventual conclusions might be reached.

CONSCIOUSNESS. For more than two thousand years, philosophers, and nowadays psychologists, psychiatrists, and neuroscientists, have tried to define and characterize consciousness as well as to investigate the effect upon it of change of state, e.g., sleep, wakefulness, hypnosis, action of drugs, narcotics, etc. The literature on this subject is very large, as are the biases, opinions, and theories of investigators and essayists.

Jahn and Dunne's recent pioneering and scholarly book entitled *Margins of Reality* (1987) has as its subtitle *The Role of Consciousness in the Physical World*. In addition to furnishing much technical data obtained in their Princeton laboratory, the authors also provide a comprehensive historical review of consciousness. Interesting to me was their effort to characterize the types of research results they have for years been recording as anomalous. Cases of anomalous physical effects, such as the particle-wave complementarity, are well known to physicists.

Jahn and Dunne conclude that they have demonstrated that human consciousness can interact with physical devices and other aspects of the environment, and that it is possible "to obtain information not transmissible by known physical processes." They also expect to "transpose quantum wave mechanics to the affairs of consciousness by establishing metric properties by which the anomalous processes of consciousness might be quantified."

It is interesting that Jung, who, like Freud, is known to have studied the conscious and the unconscious mind, referred to many of these phenomena as anomalous; ideas of the unconscious were thus developed that are now considered important in modern clinical psychology. Jung also collaborated with the famous Viennese physicist Wolfgang Pauli, who was the author of the "exclusion

principle." Moreover, Pauli believed that "the only acceptable point of view appears to be the one that recognizes both sides of reality, the quantitative and the qualitative, the physical and the psychical, as compatible with each other and can embrace them simultaneously" (Jahn and Dunne 1987).

If Jahn and Dunne succeed in showing that psychic anomalies and physical anomalies represent two aspects of reality, then a community of scholars engaged in collaborative conceptual research—that is, an NRP-like organization in the domain of science and theology—would undoubtedly give high priority to consideration of these findings. This, in turn, might lead to the establishment of a new paradigm and a new community of scholars.

THE MIND-BRAIN INTERACTION: THE CONCEPT OF DOWNWARD CAUSATION. Downward causation (Szentagothai 1984) is a concept that suggests that conscious (mental) processes are an operative *force* changing the function of the neurophysiological neuronal network so as to achieve that which was ordered by the mind. R. W. Sperry (1980) is fully committed to this cognitive "mentalist" concept, adoption of which would, in his opinion, prove to be a convergence between science and religion. Religion, in Sperry's usage, would be a liberal one that does not rely on dualistic or supernatural beliefs (i.e., almost all major religions and perhaps theology itself). Sperry's brain-mind model considers the mental effector to be a "conscious mental psychic *force*." But nowhere has it been demonstrated that indeed a downward physical force could influence the functioning of very specific and complex neuronal circuits in the brain.

It seems reasonable to suggest that this general subject would be a timely one for an NRP-like organization to evaluate. In addition to multidisciplinary Associates, this group would doubtless include physicists, statisticians, psychologists, parapsychologists, and neuroscientists, as well as theologians and philosophers. They would investigate the matter in the format of a Work Session which would be published promptly to keep their colleagues and the interested public informed.

III. HOW AN NRP-LIKE ORGANIZATION MIGHT MEDIATE BETWEEN SCIENCE AND THEOLOGY/RELIGION

Publications addressing the subject of "science and theology" frequently do so by contrasting the respective methodologies of science and theology and by indicating instances, such as Darwinian evolu-

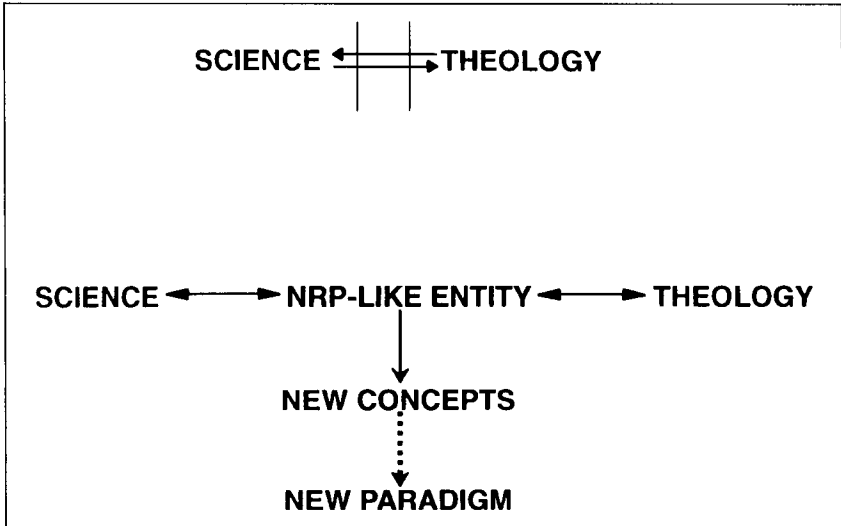


Fig. 4.

tion, in which advances in science required alteration of certain theological and religious tenets. However, for present purposes, I should point out that most of the publications that have come to my attention are written in the past tense. From my experience with NRP I would suggest that, for this project, it would be more appropriate to think in the future tense, e.g., how an NRP-like organization might be capable of developing new concepts which, in time, might evolve as a new paradigm in the context of science and theology (see fig. 4).

Religion, like science, is constantly undergoing changes; some are alterations of traditional beliefs and others are perhaps substantively different. This is illustrated by the current resurgence of religion in formerly Communist countries, especially in what was formerly the USSR, where atheism was the official "religion"; the Russian Orthodox religion had been banned. But religious freedom now exists, not only in Russia, but also in other independent democratic states. A very informative paper that deals with this subject is that of the librarian of Congress, James H. Billington (1991), delivered at the American Philosophical Society in April 1991. The rapidly changing world situation that he describes would seem to increase substantially the timeliness of the proposed NRP-like project.

The original NRP was unique and ahead of its time. With all its panoply of Associates, staff, excellent facilities, and adequate funding, NRP was capable of producing valuable scientific contributions and, most importantly, a new discipline, neuroscience. I make bold to predict that if an appropriate NRP-like organization were to be formed to deal with science-theology issues, given good leadership, adequate space, and funding, it might, like the original NRP, be very powerful in the generation of new concepts and, indeed, possibly, of a new paradigm. This is the essential message of this paper. I might even hazard a guess that such an advance might alter basic principles of both disciplines, science and theology, perhaps profoundly.

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