
Neuroscience

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From its inception the American Physiological Society (APS, the Society) has provided an attractive forum for neurophysiology and, until recently at least, has counted among its members most of the prominent neuroscientists of North America. The formation of the Society for Neuroscience in 1969 was thus a development of major significance in this last quarter century of the Society's history; neurophysiologists were drawn to meetings of the Society for Neuroscience and away from those of the APS. I will endeavor to trace some of the background to this development, as well as the Society's present endeavors to attract the neurophysiological community back to its meetings.

The Society, of course, has often had to contend with the "departure" of major interest groups (e.g., biochemists, pharmacologists, biophysicists, and general physiologists), but never in such numbers as the neurophysiologists in the 1970s. Actually the first departure was that of the psychologists (11). G. Stanley Hall and Joseph Jastrow, both founding members of the APS, became presidents of the American Psychological Association. Hall was its first president, as well as founder of the *American Journal of Psychology*. There is, however, a certain strength accruing to the Society in these departures of those with widely differing interests—the Society thus retains a clarity of purpose otherwise diluted in organizations that, like the American Psychological Association, seek to accommodate almost any interest and thereby become largely "umbrella" organizations. Had the Society retained such groups as the biochemists within its membership, it would itself have become the federation of societies for experimental biology, or physiology, if you will. Calling it all physiology, however, would not lessen the numbers or confine the diversity of expertise.

There is also a historical irony to the fact that the Society, whose centennial we now celebrate, was itself formed as something of a splinter group from a preexisting scientific society. H. H. Donaldson, a founding member of APS and in addition the organizer of the Society's first scientific meeting (1888) in Washington, D.C.,

described how dissatisfaction had arisen with the Natural History Section of the American Association for the Advancement of Science (AAAS) (5). There were too many amateurs, and meetings were held in the summer rather than over the Christmas holidays. Thus the American Society of Naturalists was founded.

Soon fission began. The Geologists withdrew—next the Physiologists—then other groups, and so the parent Society of Naturalists kept on budding until it was reduced to something like a nucleus without cytoplasm (5).

Despite its propensity for “budding,” the APS has not met that fate and has always remained a complete and thriving entity.

The historical roots of the Society for Neuroscience clearly lie with the “axonologists,” a prodigiously creative group of neurophysiologists, who from 1930 to 1942 met for dinner and discussion at the annual meeting of the APS. Louise Marshall has perceptively limned many of the personalities and events associated with this group (16). Scientifically it was invested with the excitement emanating from rapid developments in electrophysiology, abetted by the new tools of vacuum tube amplifiers, the cathode ray tube, and such discoveries as single-unit activity and the human electroencephalogram. Among the group also were men such as Wallace O. Fenn, Ralph W. Gerard, and Francis O. Schmitt, who sustained active research programs in the biochemistry of nerve.

The interests of this group were undoubtedly reflected in the founding of the *Journal of Neurophysiology* in 1938 by John F. Fulton, Ralph W. Gerard, and Johannes G. Dusser de Barrene.¹ It was the first such journal devoted to basic neuroscience since Clarence Luther Herrick started the *Journal of Comparative Neurology* in 1891. The pace of initiating specialty journals in neuroscience quickened enormously after World War II. First was *Electroencephalography and Clinical Neurophysiology* in 1949 under the editorship of Herbert H. Jasper and W. Grey Walter, a journal sponsored by the International Federation of EEG Societies. The broad focus of this journal and its wide international purview, as noted below, ultimately played a cardinal role in setting the stage for the Society for Neuroscience. Likewise the *Journal of Neurochemistry*, founded in 1956 by a team of ten editors, enjoyed a wide international distribution. In 1959 William F. Windle founded *Experimental Neurology*, and in 1960 this and the four other journals just mentioned published a total of 2,655 pages. By 1983 more than twenty-five journals predominantly devoted to basic neuroscience were publishing well over 53,000 pages annually.

Public support of neuroscience also increased rapidly in this era, as outlined in the commemorative volume of the twenty-fifth anniversary of the National Institute of Neurological and Communicative Disorders and Stroke (9, 23). The APS was fully alert to these developments and indeed vigorously promoted them. The Board of Publication Trustees, consisting of Philip Bard, William F. Hamilton, and Maurice B. Visscher, chairman, made a most productive decision in sponsoring the *Handbook of Physiology* (17). The first three volumes on neurophysiology under the editorship of John Field, Horace W. Magoun, and Victor E. Hall practically defined the field of basic neuroscience (8).

Beginning in 1952 the Society also provided the unofficial home for the "neurophysiology group," who, like their more distinguished predecessors, the axonologists, gathered for talk and imbibition in association with the spring meeting of the Society. In his history of the preceding quarter century, Wallace Fenn gave a synopsis of the origination of this group by T. C. Ruch, L. M. N. Bach, and John Lilly, together with something of its early history (7). A highly successful undertaking, it attracted a large audience each year until meetings of the Society for Neuroscience began to erode its appeal. The effort was abandoned after the Federation of American Societies for Experimental Biology (FASEB) Spring Meeting in Atlantic City in 1973, and the "committee" then in charge, Harry D. Patton, M. G. F. Fuortes, and Karl Frank, turned over their small operating fund to the Society for Neuroscience (15).

The gathering momentum of neuroscience as a discipline was shaped and focused in the late 1950s and early 1960s with great success by Herbert H. Jasper, Horace W. ("Tid") Magoun, and Francis O. Schmitt. Magoun, later joined by his colleagues Donald B. Lindsley and John D. French, initiated a spectacularly successful neuroscience program leading to establishment of the Brain Research Institute at the University of California at Los Angeles, which became the mecca for postdoctoral fellows in neuroscience from all over the world (10). In addition, Magoun chaired the Josiah Macy Foundation Conferences on the central nervous system and behavior. The reports of these conferences, with their richly illustrated historical background, reopening of contacts with Eastern European colleagues, and emphasis on neural correlates of behavior, created a keen sense of excitement and continuity, despite the sometimes unfortunately chaotic nature of the verbatim text (2-4).

Frank Schmitt, a charter member of the axonologists and one of their more versatile members in that he pursued chemical and physicochemical as well as electrophysiological fundamentals of neural activity, organized the Neuroscience Research Program at the Massachusetts Institute of Technology. This became something of a "think tank" for the discipline; the arrangement and consequences of neural activity from molecule to mind were critically examined, and these vigorous discussions were disseminated in a continuing series of publications. An extremely useful outgrowth of this activity has been the Neuroscience Study Programs, the first of which was held in 1966 (18); they now number four in all (19-21). In their ingeniously broad spectrum of topics, these volumes have directed interest into many channels of neuroscience; they stand as lucid summaries of present knowledge. To this scientific treasure has been added also Worden's irreplaceable collection of historical vignettes (24).

Herbert Jasper's role extends far beyond his editorship of the *EEG Journal*. He became the executive secretary, in Paris, of a unique new body of scientists, the International Brain Research Organization (IBRO). IBRO ultimately provided the model, and thereby much of the stimulus, for the formation of the Society for Neuroscience. The first step toward IBRO occurred at a meeting of the International Federation of EEG Societies in 1955 in Marseilles, when Henri Gastaut, the local host, strongly abetted by Alfred Fessard, proposed to his Russian colleagues that the

next meeting be held in Moscow under the sponsorship of the Soviet Academy of Sciences (13). This duly transpired in October 1958, and the outcome was the famous "Moscow Colloquium" (14). Even more significant, however, was the resolution, formulated by I. S. Beritashvili, H. H. Jasper, Henri Gastaut, and V. S. Rusinov, and unanimously passed at that colloquium, to the effect that a formal structure be devised to advance brain research throughout the world. The diligence and skill of Jasper, Fessard, and Heinrich Waelsch were largely responsible for the realization of this conception. While serving as executive secretary of IBRO, Jasper dealt with the sponsorship of UNESCO and, together with Wilder Penfield and F. C. MacIntosh, had IBRO incorporated formally by an act of the Canadian Parliament at Ottawa in October 1961. The bill read in part that the goals of the newly chartered organization were

to foster throughout the world fundamental scientific research contributing to an understanding of the brain, normal and abnormal . . . to develop, support, coordinate, promote and undertake scientific research and education in all fields concerning the brain, and to study the impact of brain research on education, behaviour, and the welfare of man (12).

The membership structure of IBRO was distinctive in that it was divided into various areas of expertise: neuroanatomy, neurochemistry, neuroendocrinology, neuropharmacology, neurophysiology, neuropathology, behavioral sciences, and neurocommunications and biophysics. It thus effected an amalgamation of the many disciplines involved in study of the brain and behavior and in so doing provided the broadly based model later emulated by the Society for Neuroscience.

The group in the United States from which the Society for Neuroscience ultimately arose did not come into being until 1965, and at its inception there certainly was no expectation that it should function to produce a regional imitation of IBRO. Nonetheless, this is what transpired. A Committee on Brain Science was formed at the National Academy of Sciences (NAS) through the National Research Council (NRC) to prepare the United States' contribution to a worldwide IBRO survey of brain research and to review and advise the National Library of Medicine on indexing current literature. The committee sought input from numerous societies with interests relevant to its mission; in so doing it came to recognize the diffuseness of neuroscience, a part of many disciplines but lacking a focus of its own. Thus, by its fifth meeting, in June 1967, the idea had begun to crystallize that a single society along the multidisciplinary lines of IBRO itself might substantially strengthen the many disparate studies of the nervous system. Under the chairmanship of Neal E. Miller, and with the creative talent of Louise H. Marshall, its executive secretary, the committee's deliberations gradually evolved into definitive steps to form such a society. The major, and difficult, question was, What kind of a society should this be?

To this end colleagues throughout the country were contacted by Ralph Gerard, who assigned each a geographical region in which to sample opinion as to the desirability and/or possible structure of a society for the "brain sciences," as it was being called at that time. There was significant sentiment against forming a new

society, one suspects largely from the more established scientists already satisfied with their professional ties. In any event, the idea being evolved initially was that there should be an extensive network of local organizations, much in the style of Sigma Xi, and that the "national group would build upon rather than supersede local groups" (R. Gerard, letter to Doty, 1968).

On Sunday, 25 August 1968 in Washington, D.C., the first day of the XXIV IUPS Congress, Gerard, together with several administrators from relevant government agencies, met with twenty of the regional representatives to discuss what course of action, if any, should be taken. There being obvious concurrence that some national organization for neuroscience was desirable, even though its ultimate format was still only vaguely perceived, Gerard appointed Edward R. Perl to act as chairman of a group to devise, in continuing consultation with as many colleagues as feasible, a specific plan of action. The members of this organizing group were selected by Gerard to be representative not only of geographic locality but of the scientific disciplines involved. Perl was at that time in the Department of Physiology at the University of Utah College of Medicine. Other members of the group were John M. Brookhart, Department of Physiology, University of Oregon Medical School; Robert W. Doty, Center for Brain Research, University of Rochester; Alfred Pope, Biochemistry, McLean Hospital, Belmont, Massachusetts; Vernon Rowland, Department of Psychiatry, Case Western Reserve University School of Medicine; James M. Sprague, Department of Anatomy, University of Pennsylvania School of Medicine; Robert L. Thompson, Department of Psychology, Hunter College, New York; and John E. Wilson, Department of Biochemistry, University of North Carolina School of Medicine.

This group met again on 7 December (Pearl Harbor Day) 1968, again in Washington, D.C., now with purposes much better resolved. It was clear that a national society would meet a number of envisioned needs, among them that of international liaison. Foremost, however, it should promote teaching and research and public understanding. With commendable skill Perl drafted a constitution for the new society that was then circulated to 250 "charter" members of the incipient society for comment and revision. The organizing group next met with the NAS-NRC Committee on Brain Science on 16 June 1969. The constitution was accepted by all, and Neal Miller, as chairman of the Empowering Committee, then declared the Society for Neuroscience formed, with the organizing group plus himself and Ralph Gerard as councillors of the new society. The immediate order of business was the election of Perl as president and Louise Marshall as secretary-treasurer, to serve until their successors might be chosen and qualified. The legal formalities were completed a few days later, 11 July 1969, when the Articles of Incorporation were recorded with the District of Columbia. Temporary office space was given the new society by the NAS, and Marjorie Wilson was recruited as executive secretary, a brilliant choice, as her talent, patience, unwavering dedication, and mature common sense were essential ingredients in the society's success in coping with its explosive growth during the first decade of its existence. By October letters soliciting membership were going out on society stationery.

Much of the initial membership recruitment came via the formation of local chapters, and this has remained a major feature of the Society for Neuroscience in many locales, even though it is largely ignored in others. The appointed Council met on 22 January 1970 to select a slate of candidates for the next officers of the society from the nominations that had been received. Vernon B. Mountcastle agreed to stand for the office of president and was duly elected, together with new members of Council. Ralph Gerard was designated honorary president, and Louise Marshall was named as a special consultant to the Council.

The first meeting of the newly elected officers was held in Atlantic City at the time of the FASEB meetings, 15 April 1970. John Brookhart, a former president of the APS (1965–66) was designated to keep President C. Ladd Prosser and members of Council of the APS informed of the plans and activities of the Society for Neuroscience. The likelihood that the new society would seriously diminish the vigor of neurophysiology within the APS was recognized by all, and with regret on both sides; yet planning went forward without rancor, indeed with cordiality and cooperation. The APS has consistently worked closely with the Society for Neuroscience, and many maintain membership in both societies. The spirit of good will is admirably manifested in the recent reworking of the neurophysiological sections of the *Handbook of Physiology* and in the continuing excellence and openness of the *Journal of Neurophysiology*.² Further important support was provided not long after Mountcastle took office as president of the Society for Neuroscience; it found a much needed home at Beaumont campus, which it has only recently had to leave when it outgrew the space available.

The Alfred P. Sloan Foundation provided a generous grant that enabled the new society to proceed with some confidence. There was, however, an interesting little episode concerning tax law. The grant stipulated that the recipient must have tax-exempt status, which had not yet been obtained. Thus, until this detail was tidied up, the officers of the society had to offer their personal guarantee to replace expended funds in the event the Internal Revenue Service (IRS) took some exception to the society's application. There was a bit of silent relief when the IRS approval came through.

The expenditures did begin to mount, not only for the society office, but also as the first annual meeting was being organized. This meeting, 27–30 October 1971 in Washington, D.C., masterfully arranged by Henry G. Wagner, with Arthur A. Ward, Jr., as program chairman, was a resounding success, with 1,395 registrants. The future of the society was thus assured. It is gradually becoming apparent, however, that this very success may soon become a major problem! Membership has reached 9,500, and there were 8,000 registrants at the 1984 meeting in Anaheim, California, a throng that is leading some to start muttering about meetings being too large and hectic. It would not surprise me to see a decade hence that the neurophysiologists meet in one city and the neurochemists in another—shades of FASEB!

From the beginning the Society for Neuroscience has included many members from Canada and Mexico and is thus in actuality, like the APS, a North American

society rather than a purely national group. The European response to IBRO at first was the formation of the European Brain and Behaviour Society, which was organized concurrently with the Society for Neuroscience. When the phenomenal success of the latter became apparent, however, a much more inclusive group came into being in 1977, the European Neuroscience Association, which is comparable to the Society for Neuroscience in its coverage. The corresponding group in Eastern Europe is Interzmozg (meaning, approximately, "interbrain"), and there are now many other more nationally based neuroscience groups in Japan, Australia, and elsewhere.

As anticipated, the meetings of the Society for Neuroscience did reduce participation by neurophysiologists in the affairs of the APS. Thus, shortly after he assumed the office, President Daniel C. Tosteson appointed a committee, chaired by the late Edward V. Everts, to examine what the Society's course should be in this regard. Their report in May 1974 recommended, among other things, the deliberate strengthening of neurophysiological contributions to the programs of APS meetings (6). This advice was followed. Under the imaginative initiative of George G. Somjen, with enthusiastic and able support from David O. Carpenter and Janett Trubatch, a continuing series of excellent neurophysiological symposia with wide appeal has been mounted at each of the APS meetings, beginning with the 1974 fall meeting. These activities, and the interest they generated, have in turn led to formation of a section on the nervous system within the Society (22), which was officially recognized by Council in April 1978 (1).

The formation of a special section for neurophysiology in effect reflects the continuing growth of the Society and has been followed by the establishment of many other sections of special interest and expertise within the APS. Such a course may be an inevitable consequence of ever-expanding knowledge, for none can pretend to mastery or even detailed comprehension of the almost mythically ingenious procedures currently employed to decipher and manipulate the processes of life. Through it all, physiology as a science seems secure; for whereas chemistry and anatomy discern the foundation and behavior measures the outcome, it is physiology that offers the insight into the daedal coupling, how chemical anatomy yields a behavioral synthesis.

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NOTES

¹ In 1961 this journal was purchased by the Society from Charles C Thomas, publisher, and Yale University, which had acquired its interest as a bequest from the late John F. Fulton (ref. 7, p. 76).

² Purchase of this journal by the APS in 1961 had been motivated in part by a desire to provide for the needs and interests of its neurophysiologist members.

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