Specific Topics

THE AAPM AND THE NCRP
by Warren K. Sinclair

Links between the AAPM and the NCRP have always been based on the natural bond of common interest and many overlapping personnel. Among the manifold activities of the NCRP, medical physics has always had an important place; on the other hand, in the broad responsibilities of a medical physicist, radiation protection is always an important part. Thus, there is the common bond of mutual interest in many scientific areas and goals.

The NCRP as a formal Council is actually younger than the AAPM. Many prominent medical physicists were among the charter members of the NCRP Council when it was Congressionally chartered in 1964. Among them Carl Braestrup, Bob Gorson, John Laughlin, Herb Parker, Edith Quimby, Harald Rossi, Ted Webster, and Marvin Williams—many of whom were or became AAPM presidents.

The predecessor organizations of the NCRP, the National Committee on Radiation Protection and Measurements and, before that, the X-Ray and Radium Protection Committee included many medical physicists. The first 12 or so presidents of the AAPM had all served on the National Committee and its subcommittees. My own service to the NCRP dated back to 1954 when I first came to the United States from Val Mayneord's laboratory in London.

It is not surprising that the links between NCRP and AAPM have not remained quite as close as they were in those earlier years for both organizations. For the NCRP in many of its developing years, the main protection problems were those related to medical applications of radiation and radioactivity, in which medical physicists were intimately involved, so the links were very close indeed. The NCRP has developed over the years a broad national, and even an international, responsibility for radiation protection as a field, and the range of activities in radiation protection have burgeoned far beyond those of the medical applications alone. To cite just one example, NCRP's very useful role in evaluating and recommending the release of Kr^{85} from the Three Mile Island containment vessel one year after the accident (i.e., in 1980) was based on its own anticipatory report (NCRP Report No. 44 produced in 1975) on the properties and health effects of Krypton 85. Such a report was unlikely to be produced in a program confined to medical physics. Another area of national and international importance is the exposure of astronauts and others to radiation fields in space. NCRP has taken the lead in this area and continues to do so. As a result NCRP has pioneered our knowledge of space exposures and space limits to control them. Yet one medical physicist once remarked (in print, in a newsletter) that the NCRP ought not to waste its time on such esoteric problems of interest to very few when it should be providing shielding and other parameters for practical medical physicists to work with. NCRP has endeavored to provide the latter as well in reports such as Report No. 49 even in difficult funding circumstances. It is gratifying that the NCRP and the AAPM are presently working together on two projects. One is a revision of NCRP Report No. 49 and the other is a report on shielding in radiotherapy, which will utilize the therapy material from NCRP Reports No. 49, 51, and 79. NCRP regards these as important collaborations that serve the interests of both

the AAPM and the NCRP and, most importantly, the field itself.

NCRP also has the major and very important role of assessing the science needed for the basis of recommendations on occupational and public exposure limits. These, in turn, form the basis of much radiation legislation. This has necessitated the NCRP including in its Council new expertise such as radiobiology, radiation epidemiology, risk assessment, and so on, in addition to medical and health physics. Some medical physicists with the requisite background and experience, such as Ted Webster, also contribute to this work.

NCRP also has important responsibilities in the field of nonionizing radiation often also important to many AAPM members. Paul Carson, AAPM president in 1987, has been a steady contributor to the excellent work of NCRP Scientific Committee 66 on Ultrasound.

NCRP needs the cooperation and collaboration of the AAPM and the professional expertise of its members. Many of them serve on the Committees of the NCRP and on the Council itself. The upcoming president of AAPM, Larry Rothenberg, has been an outstanding contributor to the NCRP as Committee chairman, Council member, and now on the Board of Directors. NCRP enjoys and appreciates such participation.

Charles Meinhold, soon after taking office as president of NCRP, attended the AAPM annual meeting in 1991 and gave a presentation on the work of NCRP. NCRP personnel are ready to respond to AAPM whenever items of mutual interest occur.

NCRP has also appreciated the funds, which annually have been donated by the AAPM to the NCRP. While not large, these form an important component of professional funding for the NCRP, which helps preserve its independence.

It is the hope and expectation of many at NCRP that NCRP and AAPM will continue to work together on projects of mutual interest and to share professional personnel as opportunity and our programs permit.

RADIOLOGICAL PHYSICS CENTER (RPC) by Robert Shalek

The Committee on Radiation Therapy Studies (CRTS) sponsored by the National Cancer Institute (NCI) had the mission of determining how radiation therapy could be improved in the United States and making funding recommendations. Gilbert Fletcher was chairman. In February 1967, John Laughlin, Lawrence Lanzl (president of the AAPM), Robert Shalek, and Norah Tapley (secretary of CRTS) met with representatives of NCI to consider the need for a physics organization to ensure the reliability of radiation doses delivered to patients entered into clinical trials and what role the AAPM might play. Following peer review of proposals, the AAPM recommended locating a physics center at M. D. Anderson Hospital in Houston with continuing scientific and policy oversight by the AAPM. This entity called the Radiological Physics Center (RPC) proceeded with various quality audit methods including physics review visits to institutions, mailed dosimeters, calculations for benchmark treatments, and review of protocol patient records. Related activities are participation in setting acceptable error limits on doses to patients entered into various trials and making known the findings of the physics reviews and solutions to calculation problems. Laced into these specific activities is a continuous learning and teaching function on the part of the RPC staff. John Laughlin was the first chairman of the scientific and policy committee, which later became known as the Radiation Therapy Committee of the AAPM. Robert Shalek was the first director of the RPC; William Hanson became director in 1985. The National Cancer Institute provides funds for the RPC operations.

In 1968 there were three cooperative groups sponsoring clinical trials involving radiation therapy with a total of 35 participating institutions. By 1973 there were 20 cooperative groups with a total of 200 participating institutions. At about that time membership in the cooperative groups was expanded from mostly academic centers to include community hospitals and other smaller institutions. One of the functions of the six Centers for Radiological Physics (CRP), established in 1974, was to perform similar review for these new and numerous participants in clinical trials. The results from the CRP reviews were forwarded to the RPC for use in evaluation of protocol compliance on individual patients entered into the various studies.

The RPC performs protocol patient evaluation for some cooperative groups, and, in other cooperative groups, the group themselves performs the quality assurance using data supplied by the RPC on radiation machines and intracavitary sources at participating institutions. In 1986 due to funding constrictions, the six CRP centers were closed, and the CRP records were sent to RPC for continuing review. In 1987 the RPC was serving 648 institutions of which about one-half had come via the CRP's; by 1991 there were 841 institutions, and by 1997 there were 1,176 institutions.

It is interesting to note that in the mid 1970's it was assumed that there would be a lesser level of compliance for the physical measurements and calculations ($\pm 3\%$ for machine calibrations; $\pm 5\%$ for dose delivered) at community hospitals than at academic institutions. However, the results from the CRP's indicated that the two groups were very close in these respects.

In the early days of the RPC, measuring instruments, radiation beam calibrations, and strength of brachytherapy sources were major areas of concern. By 1997, more than 95% of all beam calibrations fell within the $\pm 3\%$ criteria; however, even in 1997 about 45% of institutions visited had at least one, or potentially one, situation in which discrepancies compound to exceed the $\pm 5\%$ criteria for fulfillment of radiation dose prescriptions. Ensuring that the patient data entered into clinical trials are as reliable as possible continues to be the primary goal of the RPC, but from time to time the RPC encounters and helps resolve major problems at institutions that may not be directly related to clinical trials.

From the start the RPC embodied a teaching function in explanatory reports and in short courses in radiation measurement and calculation offered twice a year to the public by the RPC director. Also the RPC participates in criticizing and disseminating new techniques as they appear in clinical trials. Some examples of these techniques have been: mantle calculations, calibration of brachytherapy sources on site, total body photon irradiation, intraoperative electron therapy, neutron therapy, stereotactic radiosurgery, eye plaque dosimetry, high-dose-rate brachytherapy, and modulated collimator calculations.

CENTERS FOR RADIOLOGICAL PHYSICS
by Robert Shalek and Mary Ellen Masterson-McGary

In the early 1970's the National Cancer Institute Division of Cancer Control and Rehabilitation was sponsoring a number of clinical trials involving a large number of radiation therapy centers and radiology departments. The question arose as to whether the radiation physics being done at all the institutions was sufficient to assure optimum results. Discussions were held between NCI officials and AAPM leaders, particularly Robert Shalek and John Laughlin. The result was a contract in 1974 from the NCI to the AAPM to set up six regional centers for radiological physics. The contract was administered through a coordination office in Bethesda, MD. Physicists were invited to submit proposals for establishment of centers at their institutions.

The six sites selected (and their Principal Investigators) were: M. D. Anderson Cancer Center, Houston (Robert Shalek); Memorial Hospital, New York (John Laughlin); Allegheny General Hospital, Pittsburgh (Prakash Shrivastava); University of Wisconsin, Madison (John Cameron); University of Washington, Seattle (Peter Wootton); and University of Colorado, Denver (William Hendee). The Denver center was later replaced by the West Coast Cancer Foundation, San Francisco (Mary Louise Meurk). Also, toward the end of the program the contract for the Northeast center was awarded to Yale University (Robert Schulz). Lloyd Bates, a physicist with experience in both radiation therapy and diagnostic physics, was selected as the coordinating officer.

The primary purpose of the regional centers was to perform comprehensive physics evaluations at the hundreds of mostly community hospitals newly accepted into clinical trials. Other objectives included: providing physics support for NCI-funded programs in diagnostic radiology, and serving as a resource for technology transfer to the medical physics community through planned educational programs and individual consultations. Radiation therapy reviews were performed by the CRP's at a new large group of institutions that, for the most part, did not have academic affiliation but were entering patients into clinical trials.

The evaluations in radiation oncology facilities were patterned after the program previously developed under the auspices of the AAMP for the Radiological Physics Center, established at M. D. Anderson Cancer Center in 1968. These included a comprehensive set of measurements performed on site: (1) to assess the accuracy of Cobalt 60, accelerator and betatron calibrations and to compare measured doses with calculated doses under treatment simulating conditions for external beam therapy; and (2) to assess the accuracy of brachytherapy source calibrations and brachytherapy treatment planning techniques. In addition to uncovering and resolving site-specific problems in beam calibration and in the use of treatment planning systems, the program also uncovered and resolved systematic problems with some algorithms on commercial treatment planning computers and in the manufacturer's calibration of some brachytherapy sources. By providing confidential assistance to individual medical physicists and radiation oncologists and by serving the radiation oncology community with its educational programs, the CRP program was recognized as providing a

valuable service to our profession.

A large and important task of the CPR's was the measurement of the dose and the quality of images in mammography screening centers. Chambers for measuring dose from low-energy x-ray beams were fabricated at Memorial Hospital, New York. The results of measurements with these chambers indicated that a substantial number of mammography centers were delivering much more radiation to patients than was required for satisfactory images and that the quality of images was often substandard. Further comprehensive efforts by the CPR's resulted in significant reduction in patient dose, with a concomitant increase in image quality.

Pilot studies were completed for the CT project and the cardiovascular imaging project. Before many institutions could be reviewed in these areas, the CRP centers were closed. At the onset the life of the contract was mentioned as likely extending for about ten years. In 1986 due to funding constraints the CRP programs were terminated; the records of radiation therapy reviews were sent to the RPC in Houston for continuing review.

SUMMARY OF AAPM ACTIONS RELATED TO INCORPORATION

1958 Formation of the AAPM, primarily as a professional society.

1959 Constitution formulated with five objectives. Constitution circulated to membership for approval (*72 yes, 2 no*).

1960 AAPM Board decides that AAPM should have a strong scientific program as well as professional.

1965 AAPM is incorporated as an association with the five objectives. Ted Webster carries out incorporation with the assistance of the Prentice–Hall Corporation.

1966 AAPM becomes an AIP Affiliated Society.

1968 President John Cameron appoints Bob Gorson as chair of an *ad hoc* committee to consider concerns of the AIP and of the IRS with our constitution and validity of its tax-free status. The *ad hoc* committee recommends deletion of items ''B'' and ''E'' and other changes. Their recommendation for the changes advised by the AIP were approved by the Board. Their report is attached. The modified constitution was published in the next annual *AAPM Directory*.

1970 President Jim Kereiakes received confirmation that the IRS now recognized the AAPM as Federal tax-exempt 501(c)(3) organization.

1973 The AAPM becomes a full member of the AIP.

The AAPM Board declines to form a proposed separate society (The American College of Clinical Physicists), but does form an enhanced Professional Council with several committees.

1979 The AIP informed the AAPM that the IRS no longer questioned the AIP's tax-exempt status (*Newsletter*, Vol. 4, No. 3, 1979).

1982 The American College of Medical Physicists (ACMP) is founded as a separate society to concentrate on professional interests of clinical physicists, with the approval of the AAPM.

1990 President Al Smith discovers that the Articles of Incorporation had not been modified in 1968, ''for reasons unknown to us now.'' With legal advice, all of the changes recommended in 1968 were carried out in the filed copy.

CONTRIBUTIONS TO MEDICAL PHYSICS OF PROFESSOR DONALD W. KERST

In 1940, Kerst succeeded in creating a high-energy electron accelerator, which utilized new concepts in the use of shaped magnetic fields for the acceleration and orbital guidance of electrons from a few MeV in energy up to hundreds of MeV. Kerst envisioned research, medical, and industrial applications, and the University of Illinois established a large laboratory under his direction for these purposes. The laboratory accommodated several faculty colleagues who had research projects with the betatron and also graduate students (including H. W. Koch, G. D. Adams, R. K. Clark, J. S. Laughlin, L. H. Lanzl, E. F. Lanzl, and D. Scag). To this group, additional inspiration was contributed by Henry Quastler, radiologist at the Carle Clinic, who carried out pioneer radiobiology studies with high-energy x rays with the Lanzls, and by Lester Skaggs, whose interest was the extraction and use of the electron beam. Three other nuclear physics graduate students, Rosalyn and Aaron Yalow and Jacques Ovadia, became medical physicists later and were also active in the AAPM. Four of these students later became AAPM presidents. H. W. Koch became Director of the Radiation Laboratory of the National Bureau of Standards (NIST) and later Director of the American Institute of Physics; Rosalyn Yalow won the Nobel Prize (see p. 1290); and Aaron Yalow was Professor of Physics at Cooper Union and also active in hospital physics and in RAMPS.

The studies of photodisintegration threshold energies provided a dozen reactions useful for calibration in the 1.5–25 MeV energy range, and for monitoring x-ray and neutron exposure with foil activation. Kerst considered 20-MeV betatrons to have a desirable energy for many applications. Their depth dose distributions produced by both electron and x-ray beams matched human dimensions well, and it was an effective energy for industrial radiography. Plans for a 20-MeV energy betatron modified for medical or industrial application were developed by Kerst and Adams with engineers at the Allis–Chalmers Co.

The Illinois group was further stimulated by the interest and visit of W. V. Mayneord, Head of the Physics Department of the Royal Marsden Hospital in London, who was a pioneer in applications of radiation physics to medical problems. He discussed hospital physics in the U.K. with its organization in hospital departments, the formation of the HPA in 1943, and his belief that the betatron would make it possible for radiation treatment to be applied anywhere in the body and remove the therapeutic limitation of orthovoltages.

Harold Johns and two fellow professors from the University of Saskatchewan visited for a month in the spring of 1947 when the staff were engaged in preparing collimation, monitoring, and instrumentation prior to an actual treatment. They ordered a betatron for their hospital.

A graduate student in physics was afflicted with a glioblastoma, which was unsuccessfully operated in Chicago. Radiation was recommended by the surgeon, and Quastler pointed out that the optimum concentration of the radiation could be achieved with the betatron, dependent on completion of additional collimation, flattening filter, and monitoring technology for planning and application of the 22-MeVP

x-ray beam. In two weeks, the group had completed the necessary additional instrumentation, and a plan was developed which provided for 25 convergent, noncoplanar fields. Although a uniquely high concentration of dose was successfully achieved, the patient died. Experience over the subsequent years has confirmed that glioblastoma is highly radioresistant. The University of Illinois College of Medicine ordered the next available betatron and a research program was carried out there, and in other institutions, to establish the dosimetry for the clinical use of both high-energy x rays and electrons.

Kerst, originally from the University of Wisconsin, returned there to direct a program on plasma research, which resulted in the concept of charged particle storage rings and the feasibility of particle collision studies. He remained highly interested in developments in the medical applications of high-energy beams and was always interested in the work of the substantial number of his former students and colleagues in medical physics.

A BRIEF HISTORY OF THE JOINT TEACHING COMMITTEES OF THE AAPM AND THE ACR: 1961–1987

by Edward W. Webster

One of the primary duties of physicists in Radiology Departments was, and is, the teaching of radiological physics to residents in Radiology and at a higher level to radiological physicists in the course of their training. To promote completeness and high standards of teaching among the rapidly growing numbers of radiological physicists, two Committees with overlapping objectives were formed by the American College of Radiology (ACR) and the American Association of Physicists in Medicine (AAPM) as follows:

1958. The ACR Commission on Education formed a Subcommittee on Education in Radiation Physics for Radiology residents under the chairmanship of Edith Quimby with both Marvin Williams and Ted Webster as members. All three at that time were invited examiners in Physics for the American Board of Radiology.

1961. The AAPM established a Teaching Committee with John Hale as chairman (1961–62) followed by Gail Adams (1962–63) and Ted Webster (1963–68). A syllabus for teaching radiology residents was prepared by John Hale and distributed to all AAPM members in early November 1962.

1963. The ACR and AAPM committees initiated a joint project to collect an organized set of questions in radiological physics for use in training programs for Radiology residents.

1964–68. A large question set of about 500 questions was assembled, discussed, and amended by the following nine joint Committee members: G. Adams, R. Gorson, M. Greenfield, J. Hale, J. Kereiakes, A. McCrea, A. Norman, S. Vickers, and E. Webster. The set was organized with the following 13 sections, each edited by a member of the above joint committee:

(1) Basic Mathematics
(2) Basic Physics
(3) Electricity and Magnetism and X-Ray Circuits
(4) Atomic and Radiation Physics
(5) Units of Radiation Dose and Beam Dosimetry
(6) External Beam Treatment Planning
(7) Basic Physics of Radioactivity and Nuclear Energy
(8) Radioactive Implant Dosimetry
(9) Metabolic Isotope Dosimetry
(10) High-Energy Accelerators
(11) Radiation Measuring Instruments
(12) Diagnostic X-Ray Physics
(13) Radiation Safety: Biological Basis and Physics

1968. F. O'Foghludha assumed the chairmanship of the Joint Teaching Committee and organized the final editing of this original collection.

1970. A 73-page volume of questions and suggested answers with the title, *Problems in Physics for Radiology Residents*, was published by the American College of Radiology.[23]

1973. A second edition with a revised question set together with a teaching syllabus prepared by the joint committee under the chairmanship of A. Feldman was published by the ACR.[24]

1980. A third edition with separate revised syllabuses for diagnostic and therapeutic radiology residents and updated questions, including computerized tomog-

raphy and radiobiology, was published by the ACR.[25] It was prepared by a new joint committee with the following members:

ACR Committee on Physics. N. Baily (chairman), S. Balter, S. Bushong, A. Feldman, R. Gorson, W. Hendee, J. Izenstark, J. Kereiakes, L. Stanton, W. Tuddenham, R. Waggener, E. Webster, and H. Wyckoff.

AAPM Committee on Training of Radiologists. J. Gray (chairman), D. Bassano, K. Doppke, J. Glover, M. Hodara, L. Hubbard, D. Kopp, R. Moyer, T. Padikal, S. Rubin, and T. Villafana.

1987. A fourth edition of the physics syllabus in diagnostic radiology and therapeutic radiology, was prepared in the period 1986–87. The diagnostic section covers 26 topics including, for the first time, ultrasound imaging, magnetic resonance imaging, digital imaging, and the elements of digital computers. There are 580 questions in this section. The therapy section covers 13 topics and includes 513 questions. No answers to these questions are included. Again, this edition was prepared cooperatively between the Committee on Training of Radiologists of the AAPM (chairman, M. Edwards) and the Committee on Physics Education and Training of the ACR (chairman, R. Tanner). P. Sprawls was the overall coordinator of the fourth edition.[26]

THE CANADIAN ORGANIZATION OF MEDICAL PHYSICISTS (excerpted from Part Six, Chapter VI in *A New Kind Of Ray* by John E. Aldrich and Brian C. Lentle)

By 1954 the physicists employed in the seven centers of the Ontario Cancer Foundation had formed an association to advise the foundation and to ''provide collective discussion and action for the advancement of the application of physics to radiation therapy.'' At its first meeting the secretary was instructed to communicate with other physicists working in the medical field across Canada with the intention of forming a Canadian Association of Medical Physicists (CAMP). Since the Canadian Association of Physicists (CAP) was concerned mainly with the interests of academic physicists and the Canadian Association of Radiologists (CAR) was primarily a medical body with little interest by physicians in the problems of their nonmedical colleagues, the recognition medical physicists required was not forthcoming from either of these two well-established organizations.

This situation led to the formation of CAMP in 1955. CAR, with whom the medical physicists worked closely, and CAP were concerned about this independent action on the part of a small group of medical physicists, and both actively worked to absorb this fledgling organization into the more well-established bodies. CAP, in an unprecedented step, decided to set up a division of medical physics, the first of many such limited interest groups in the physics community. This move was accepted by the members of CAMP and the Division of Medical and Biological Physics (DMBP) of CAP was established.

One of the first steps undertaken by DMBP was an attempt at certification of competency in medical physics, thus providing a basis for recognition by government agencies. This action was premature and was not resolved for many years. However, for over 35 years DMBP was the official body representing physicists working in the fields of biological and medical research and application in Canada. Within the limitations imposed by a small population, a very large country, and a variety of employment situations, DMBP did a credible job, both as a scientific and a professional organization. Its most regular function was the organization of scientific meetings on a yearly basis. It was the organization representing Canada at the International Organization of Medical Physics (IOMP) from about 1970 to 1990. It organized the Fourth International Conference on Medical Physics in Ottawa in 1976. In addition it provided many provincial and national committees (for example, Health and Welfare, the Atomic Energy Control Board, and the Healing Arts and Radiation Protection Committee of Ontario) with expert advice, especially on matters of radiation protection.

In 1979 the physicists working in a hospital environment in the fields of radiation therapy, nuclear medicine, and medical imaging (most of whom were members of DMBP) recognized again the need for a peer review process to establish competency in the application of physics in the medical environment. To meet this need the Canadian College of Physicists in Medicine (CCPM) was legally established under a Canadian government charter.

Initially, a well-established medical physicist was admitted to Fellowship in the College on the basis of his or her creden-

tials (including years of experience, peer-reviewed publications, and recommendations from colleagues). The first board was composed of S. O. Fedoruk, A. F. Holloway, H. E. Johns, J. C. F. MacDonald, R. M. Mathieu, and M. E. J. Young. Fellowship is now granted after passing a comprehensive written examination followed by an oral examination.

While the Fellowship was designed to establish excellence in medical physics, by 1983 there arose a need to certify competence in the medical physics specialities. This need was met by the establishment of a Membership category, which can be obtained after a shorter period of experience by passing the written examination only. A Member is expected to attempt to obtain the Fellowship when his or her experience and publication record meet the required standards.

In the mid-eighties the medical physicists once again reviewed their relationship with CAP. After much discussion it was decided to form a separate umbrella organization, the Canadian Organization of Medical Physicists (COMP), combining the scientific and professional role of DMBP with that of the CCMP. The new organization came into being in 1989.

Medical physicists in Canada have close ties with their medical colleagues as well as their university counterparts. Annual meetings have been held with the Canadian Association of Physicists, The Canadian Association of Radiologists, The Canadian Association of Radiation Oncologists, the Canadian Medical and Biological Engineering Society, and the American Association of Physicists in Medicine.

Canadian physicists have also been involved with the organization of important international conferences, including the following:

International Congress of Radiology, Montreal, 1962
International Conference on Medical Physics, Ottawa, 1976
Inter-American Meeting on Medical Physics, Chicago, 1984
World Congress on Medical Physics and Biological Engineering, San Antonio, 1988

In 1998 the COMP is approaching 400 members in size, comprising medical physicists and graduate students working in the areas of medical imaging physics, cancer therapy physics, radiation protection, and medical biophysics, plus Corporate Members who are involved in those areas. COMP represents medical physicists in all sectors: hospitals, cancer centers, universities, government agencies, and industry.

The COMP promotes the application of physics to medicine through scientific meetings and professional standards, and is the Canadian member of the International Organization for Medical Physics. The COMP also continues to have a close relationship with the CCPM, which is the national certification body for clinical competence in physics applied to medicine in Canada. By 1998 over 140 medical physicists had been certified by the CCPM. The two organizations meet annually, in a conference consisting of an educational symposium organized by the CCPM plus scientific sessions of proffered oral and poster presentations organized by the COMP. The scientific journals of the Canadian medical physics organizations are *Medical Physics* and *Physics in Medicine and Biology*.

MEDICAL PHYSICS: HISTORY OF THE SCIENTIFIC JOURNAL OF THE AAPM

EDITORS

G. D. Adams, Volumes 1–5	(1974–78)
E. Siegel, Volumes 6–8	(1979–81)
E. L. Chaney, Volumes 9–11	(1982–84)
F. O'Foghludha, Volumes 12–14	(1985–87)
J. S. Laughlin, Volumes 15–23	(1988–96)
C. Orton, Volumes 24–	(1997–)

The need of members of the newly formed AAPM to have a scientific journal was early recognized. In 1962 Warren Sinclair negotiated an arrangement with J. Rotblat, Editor of the HPA journal, *Physics in Medicine and Biology* (PMB), to have it also designated as the official journal of the AAPM. This worked well, but there was also a desire expressed within the AAPM to have more communication within the membership, not only on Association actions, but on technical developments. Events leading to creation of the *Quarterly Bulletin*, the Journal, and the *Newsletter* have appeared in the summaries of activities during successive presidential terms.

During Lanzl's term, the *Quarterly Bulletin* was authorized with Jim Kereiakes as Editor and was first published in June 1967. Kereiakes arranged for a Cleveland firm to handle publication. Shirley Vickers became Editor in 1969, and was followed by Colin Orton in 1971 as Editor.

In 1971, in response to repeated suggestions of publishing our own journal, the Board appointed a Journal Exploratory Group, which studied many aspects of such an endeavor. Their poll indicated that a majority of the membership favored having our own journal, but the initial financial basis was not evident in the limited treasury. The 1972 Board authorized an editor and also authorized seeking contributions to a ''Founders Fund'' with an eventual goal of $10,000 before publication could start. Although the goal was essentially achieved, use of the Fund has not been necessary since the annual net financial health of the Journal has always been positive.

Finally, the 1973 Board decided that the AAPM should have its own scientific journal and established *Medical Physics* with Gail Adams as Editor. It was founded as an archival, scientific journal published on a bimonthly basis with its own budget and the benefit of the Founder's Fund. Ben Galkin, AAPM treasurer, worked closely with Gail to assist management of the journal. It has always been published by the AIP and has enjoyed strong support from the AIP staff. Similar to the AIP journals, the institutional location of the Editor was, from 1974 through 1996, the address for manuscript submission and editorial procedures. In late 1996, by action of EXCOM and the new Business Management Committee (BMC), manuscript handling activities were transferred to AAPM Headquarters and the editor's office was supported in his institution. The establishment of the BMC does promise more attention to the Journal and support by EXCOM.

The Journal continues the policy of its first editor, Adams, who appointed associate editors to form the Editorial Board. Associate editors and referees assist the editor in the review of manuscripts. A minimum of two independent reviews is ordinarily required.

During the continuing development of the Journal, many different problems and opportunities have been dealt with successfully by succeeding editors to result in a Journal which is useful to the many different interests of members of the AAPM and to medical physicists generally. It has an international audience, and its scope is shown in the topical listing of its contents on the cover of each issue. To emphasize this broad editorial objective, Ed Siegel inserted on the masthead page a sentence derived from our constitution: ''*Medical Physics* publishes articles broadly concerned with the relationship of physics to human biology and medicine.'' Editors have pursued this goal by solicitation of comprehensive review articles on a broad range of subjects, and also by promoting more numerous reviews of books of broad pertinence to the field of medical physics.

All of the successive editors have published historical articles on subjects important to the AAPM and to the field of medical physics. Several of the editors have used the cover innovatively to emphasize the significance of published articles. Ed Siegel, second editor, rendered a significant service to *Medical Physics* when he successfully sought identification of our Journal with the Institute for Scientific Information for analysis and compilation of our citation indices in their publication, *Citation Indices*. As a result, citation indices have been available for the monitoring of *Medical Physics* since 1982.

Vital to any journal is the thoroughness and timeliness of its reviews, which aid the author in his/her revisions. The cooperation of the editors and referees has made possible an impressive record of timeliness for this Journal in this regard. Most authors are prompt to respond to the advice in the editor's disposition letter, and some are aided by the policy of reminders within a limited time period.

Other specific actions taken, or reemphasized, include:

- In the first issue of 1992 the paper stock was significantly improved with a heavier, acid-free paper of increased brightness and opacity, more acceptable for imaging manuscripts.
- Planning started in early 1993 for monthly publication, which was initiated January 1994, and has been maintained since.
- All quantitative indicators of quality, including those which measure citations by authors in other journals, have been favorable as shown in Fig. 205.
- The Journal home page on the worldwide web was initiated in August 1995, and each month carried the table of contents two to three weeks before publication, as well as a list of other future articles, at no expense to the AAPM; the AAPM has acquired a Webmaster and (see Paliwal's term) developed a policy with its Electronic Media Coordinating Committee to take full advantage of technological developments in electronic publishing.

Other recent improvements accomplished in 1997 include:

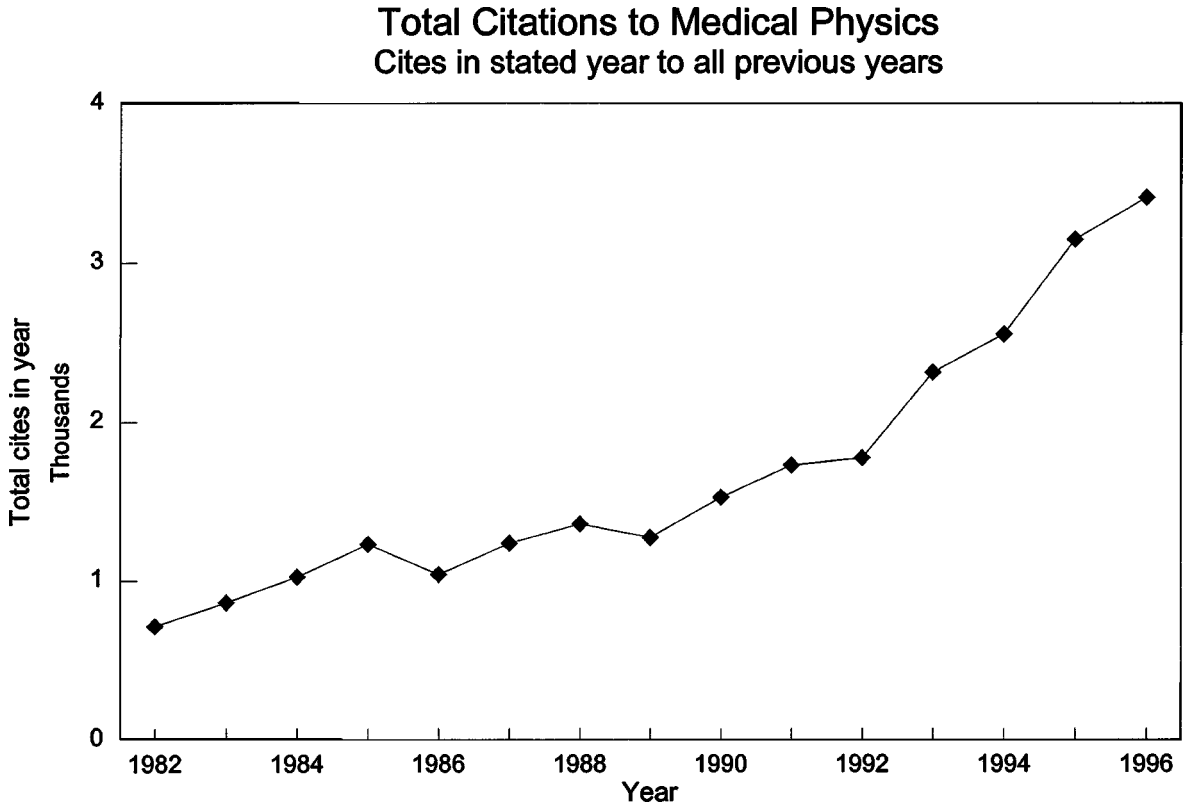

FIG. 205. Total citations to *Medical Physics* (1982–1996).

- The specified use of page charges to encourage conciseness.
- Elimination of blank pages.
- Initiation of a Point/Counterpoint series of debates on controversial issues.
- A continuing education credit program to encourage and reward study of specific ''educational'' articles.
- An annual CD-ROM containing all current articles as well as abstracts of all papers published in *Medical Physics* from 1975 on.

The innovativeness and tenacity of each of the Editors has been exerted by them because of their realization that the Journal is the single most effective entity which represents the AAPM in the scientific and professional world in which each member works.