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Bulletin of the International Organization for Medical Physics

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President's Message

Dear Friends and Colleagues:

This will be my last "President's Message" in *Medical Physics World*. During the World Congress on Medical Physics and Biomedical Engineering in Rio de Janeiro, Brazil, August 21-26, 1994, Prof. Keith Boddy of Newcastle upon Tyne, United Kingdom, will take office and he will hold it for the next three years. I am very confident that he will take the IOMP activities to new heights with his "vision" and strategic plans which were briefly mentioned in earlier issues. Scores of active medical physicists from all regions of the world are required to carry out the objectives proposed under these plans. Full details will be presented by Prof. Boddy at the Rio Council/General Assembly meetings and I hope a large number will come forward to take up these tasks.

As our Secretary General, Dr. Orton has been reporting IOMP activities in all its aspects in these issues, I would like to dwell on the most important events ahead in the year 1995-96; the celebration of a century of achievement following the discovery of x-rays and radioactivity. Germany, the United States, the United Kingdom and other advanced countries have already announced their dates of the international gatherings and have been preparing for them for a few years now. I urge all developing countries, too, to pick up dates for holding conferences, symposia or educational exhibitions. Let every date be filled with some activity or the other and every media talk about manifold aspects of the ionizing radiations. History of x-ray development and use in each country should be a major theme. Display of antique x-ray tubes and accessories could be another feature. Other activities may include a centennial commemorative postal service stamp, special features and articles for newspapers, magazines, radio, television and other public information channels. Please come up with the dates for the gatherings and let the next MPW issue carry all the worldwide events.

Anticipating a large gathering in Rio and awaiting to meet you.

Sincerely, Udipi Madvanath, Ph.D.

U. Madvanath
President

R. M. Nerem
President

N. Saranummi
President



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Erratum

The previous issue, Volume 9, Numbers 1 and 2 was incorrectly dated as the 1994 issue. It should instead be identified as Volume 9, Numbers 1 and 2, 1993.

Medical Physics in Latin America

A world conference on Medical Physics and Biomedical Engineering is being held for the first time in the southern hemisphere in Rio de Janeiro, Brazil, during August 1994. However, as of now, only six countries of the continent; namely Brazil, Mexico, Colombia, Argentina, Panama, Trinidad and Tobago; have become direct members of IOMP. Physicists in nine other countries are indirectly linked to IOMP through the Latin American Medical Physics Association (LAMPA), which was formed approximately eight years ago. No medical physicists from Nicaragua, Venezuela, Guyana, Surinam, French Guiana, Ecuador and Paraguay have access to IOMP activities and obtain the benefit of IOMP Libraries. I urge medical physicists of the LAMPA and other countries in Latin America to form their own medical physics societies and get affiliated to IOMP. Our Secretary General, Dr. Orton, will be only too happy to help you form societies and assist in any other way. Please Write him.

Udipi Madvanath, President, IOMP

Vice-President's Report

During the 1994 World Congress on Medical Physics and Biomedical Engineering in Rio de Janeiro, Dr. Udipi Madvanath and Prof. Colin Orton will complete their terms of office as President and Secretary General, respectively, of the International Organization for Medical Physics.

From the comparative comfort of the Vice-Presidency, I have been privileged to witness closely their unstinted dedication and Herculean labors in sustaining and enhancing the reputation and activities of IOMP. The General Assembly will be an appropriate forum to elaborate and acclaim their contributions and attainments. However, this contemporaneous issue of *Medical Physics World* provides a timely opportunity to record, on behalf of IOMP members, our gratitude to them. In addition, it is opportune to express our sincere thanks to so many members who have unselfishly and productively given of their time in serving IOMP during the last three years. We must now build on these achievements.

Keith Boddy, Vice-President, IOMP

Editor's Report

The Medical Physics World is now entering its 10th year of publication of what we hope will be a long life. Predicting longevity is a difficult task; sustaining is even harder. On one side is the rising cost of the production and distribution and the other side is the reduction in support from the advertisers. I cannot over-emphasize to our readers to actively acknowledge the support of our advertisers. I would urge all of you to contact the companies in your regions and let them know the benefit you derive from the *Medical Physics World*, and if you are attending the Rio meeting, please visit their booths and express your gratitude.

I am beginning to receive comments from readers and hope to reflect these in the issues to come. Once again, I urge you for suggestions or submission of short notes for publication in *Medical Physics World*.

Regards, Bhudatt Paliwal, Ph.D., Editor
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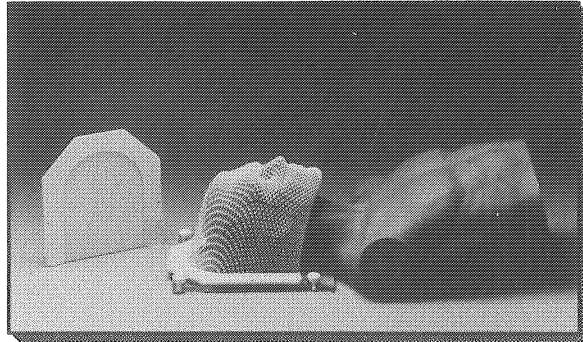
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Events Information should be addressed to Dr. Geoffrey Ibbott. IOMP correspondence should be addressed to Dr. Udipi Madhvanath and Dr. Colin Orton.

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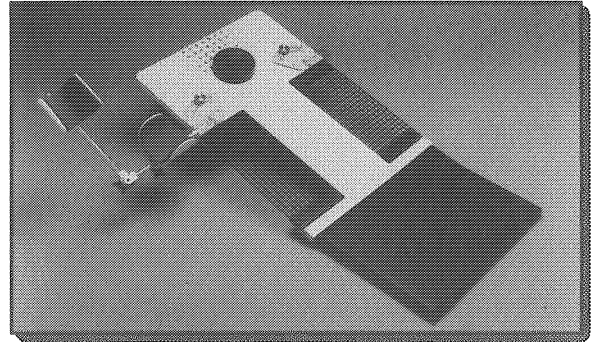
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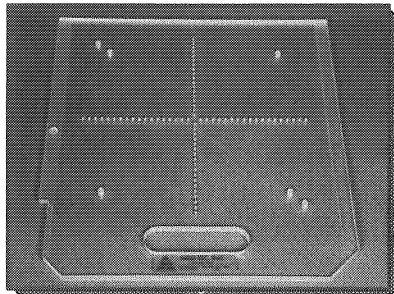
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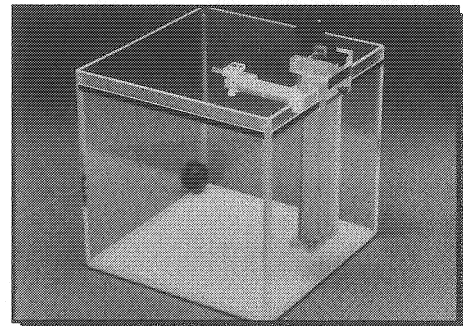
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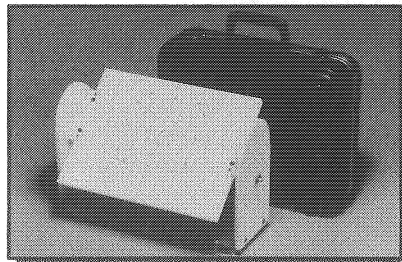
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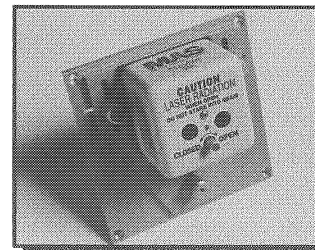
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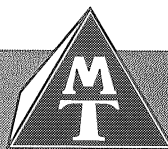
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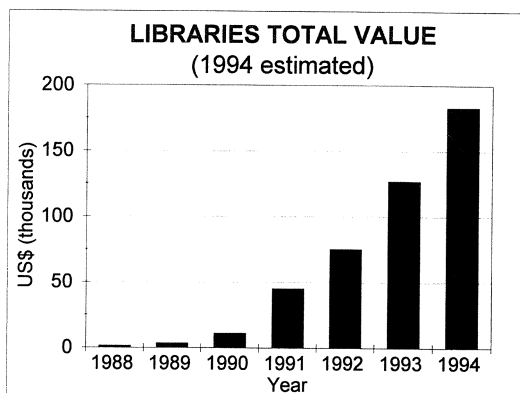
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Secretary-General's Report

RIO MEETING

Since the last issue of *Medical Physics World*, many significant events have transpired. We have co-sponsored two very successful "workshops" (in South Africa and Iran), detailed reports on which appear in this issue. We have significantly increased our Corporate Membership and, partly as a result of this, we have been able to provide significantly more support in the form of Travel Grants to enable our developing country members to send Delegates to the World Congress. Following are details of these, as well as a general review of IOMP achievements since our last World Congress in Kyoto in 1991, probably the most impressive being the growth of our Libraries Program (see graphs), by the end of this year, the total value of the books and journals in our libraries should be close to \$200,000 US, thanks to the outstanding work of our Curator of Libraries, Cathy Warmelink.



TRAVEL GRANTS AWARDED FOR WORLD CONGRESS

Following is a list of IOMP Travel Grants awarded for the Rio de Janeiro World Congress:

Country	Award (US \$)
Algeria	\$ 1,000
Bulgaria	\$ 2,500
Colombia	\$ 1,750
Cyprus	\$ 3,000
India	\$ 7,500
Indonesia	\$ 4,000
Jordan	\$ 2,000
Malaysia	\$ 4,000
Moldova	\$ 3,000
Pakistan	\$ 2,500
Panama	\$ 1,500
People's Republic of China	\$ 5,000
Philippines	\$ 3,000
Poland	\$ 6,000
Russia	\$ 3,000
Thailand	\$ 2,500
Trinidad & Tobago	\$ 1,000
Turkey	\$ 6,100
Venezuela	\$ 2,031
TOTAL	\$61,381

Most of these funds come directly from the IOMP treasury or from the close-out profits of our Medical Physics World office in Detroit, which retiring Editor Richard Maughan specifically requested should be allocated toward travel grants. These profits amounted to over \$15,000 (US \$), of which \$5,000 was sent as start-up money to the new Editor, Bhudatt Paliwal. Dr. Maughan should

be congratulated for his tremendous efforts on our behalf. We are also indebted to several corporations who responded to our request for Travel Grant support. These were: Agfa Gevaert (UK); Amersham International plc (UK); Best Industries (USA); G.E. Europe (France); G.E. Medical (Turkey); Interteknik, Ltd. (Turkey); Siemens Ltd. (India); Siemens Medical Systems, Inc. (USA); Simko A.S. (Siemens, Turkey); TSG Integrations (India); Varian Associates, Inc. (USA).

NOMINATIONS FOR OFFICERS AND COMMITTEE CHAIRS

The Nominating Committee is submitting the following nominees for election at the August 21st First Council Meeting in Rio. (Note: balloting will take place in the order shown below). Vice President: Prof. Xie Nan-Zhu (PRC); Prof. Colin Orton (USA); Prof. Hans Svensson (Sweden). Secretary-General: Prof. Gary Fullerton (USA); Prof. Hans Svensson (Sweden); Mrs. Ann Dixon-Brown (UK). Developing Countries Committee Chair: Dr. M. M. S. Murthy (India); Mrs. Maria A. Sushchikhina (Russia). Education and Training Committee Chair: Dr. M. M. S. Murthy (India); Prof. N. Suntharalingam (USA).

NEW MEMBERS

Congratulations are extended to two new national affiliate: Venezuela and Zimbabwe, which have been elected to membership in 1994, subject to ratification by Council in Rio. This brings IOMP national membership to a total of 55.

Congratulations and thanks also to the following new Corporate Members who have joined the IOMP in 1994: Amersham International plc. (UK); Landauer, Inc. (USA); URDC, Inc. (USA); Med-Tec, Inc. (USA); Eastman Kodak Co. (USA); Medical Physics Publishing (USA); Heustis Machine Corp. (USA); Interteknik, Ltd. (Turkey); Simko, A.S. (Siemens, Turkey); General Electric Medical Systems (Turkey); General Electric, Europe (France); Agfa Gevaert (UK); and Siemens Ltd. (India).

IOMP ACHIEVEMENTS (1991-94)

Membership: Approved new membership for 12 countries (subject to Council ratification in Rio). Increased Corporate Membership by over 50% (from 17 to 26).

Education and Training: Increased co-sponsorship workshops, schools or conferences by over 300% (from 3 to 10).

Developing Countries Support: Increased IOMP travel grants by 50% (from \$42,000 to over \$60,000 US). Provided IAEA with a list of over 50 "visiting experts" and 12 institutions willing to "host" visiting medical physicists. Assisted in the establishment of 10 national medical physics organizations. More than doubled the number of IOMP Medical Physics Libraries (see below).

Medical Physics Libraries Program: Increased Libraries from 26 to 60. Four-fold increase in provision of sets of AAPM publications (from 10 to 40). Agreements with AAPM to provide *Medical Physics* to 35 libraries. Agreement with IPSP to increase (from 10) provision of PMB and Physiological Measurement journals to all IOMP Libraries who request (and justify) it. Agreement for provision of 40 sets of IPSP publications to IOMP Libraries. Agreement with AMPI to provide the new *Journal of Medical Physics* to all IOMP Libraries (with IOMP covering postage costs). Arrangement for donation and distribution of sets of books and/or journal from 100 medical physicists. Four-fold increase in estimated value of journal and book donations (from \$36,000 to \$145,000 US).

Regards, Colin G. Orton, Ph.D.

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Test Tools For Developing Countries

This is the second in a series of articles describing simple devices useful to medical physicists in developing countries. A general description of the Wisconsin Multi-Purpose Radiographic Phantom appeared in the last issue of *Medical Physics World*. Readers are encouraged to submit short articles describing their home-made devices which might be useful for medical physicists in other countries.

Testing with the Wisconsin Multi-Purpose Radiographic Phantom (MPP)

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The figure on the next page shows the components of the MPP and their arrangement on the test plate. (See Part 1 for a description of the test objects). The MPP test plate is placed in an 8 liter plastic container and immersed in a depth of "tissue equivalent" water appropriate for the QC test being performed. For the mammographic QC tests, the container was filled to a depth of 3 cm with water, which is approximately equivalent to a 5 cm compressed breast of a post-menopausal woman.

The basic QC tests for mammography using the MPP are:

1. Minimum size "microcalcifications" (Al_2O_3) specks visible in the image.
2. Minimum size "fibril" (nylon fibers imbedded in dental wax) visible.
3. Minimum size fat mimicking (polyethylene) cylinder visible.

Our test was performed on a good quality dedicated mammographic unit with the following parameters: Kodak MRE films with Kodak MIN-R single-sided screens; a grid with a 5:1 ratio and 117 lines/inch; a 0.1 mm focal spot; 25 KVp; 100mAs and 60 mm FFD. The film was exposed and processed in the usual way. The test film showed all five microcalcifications grains within each of the three groups. The two largest pieces of nylon were well resolved and the smallest was still distinguishable' all three fat-mimicking cylinders could be clearly seen. The result from most mammographic units will generally not be as satisfactory. We suggest that an acceptable level would be the ability to see at least three fat mimicking cylinders, two of the nylon fibers and two of the aluminum oxide groups of specks. For better quality mammographic systems such as the one used, it would be useful to eliminate the largest specks and replace them with grains 0.01-0.03 cm diameter as well as add a fourth nylon fiber of 0.03-0.04 cm diameter.

Basic fluoroscopic QC tests with the MPP are:

1. High contrast resolution using the wire mesh or the focal spot test pattern.
2. Low contrast detectability using the "bone" (PVC) step wedge.

The fluoroscopic tests were performed on a radiotherapy simulator with an image intensifier. The MPP test plate was covered with 9 cm water. For high contrast resolution, the parameters were adjusted to get best resolution. The third mesh with 60 wires/inch should be resolved. The low contrast detectability test was done using the bone step wedge with :60 KVp and 2.0 mA. The image was viewed on the TV monitor. We were able to see all four holes in the first 3 steps. In the 4th and 5th steps we could see 3 holes. The 2mm depth of the holes in the 5th step represents about a 4% change in transmission of the x-ray beam. A modern image intensified fluoroscopic unit should be able to demonstrate some of the holes in the 5th step.

The MPP performs the following basic QC tests on linear tomographic units:

1. Accuracy of the depth of the cut setting from 0.5 to about 7 cm above the table.
2. The high contrast resolution at the center of the cut.
3. The angular swing of the x-ray tube during the exposure.

A piece of plastic of the proper length placed in the bottom of the water container holds the test plate at an angle of about 40 degrees such that the lead numbers are at the proper height above the x-ray table. The lead ruler is placed with high numbers toward the top. The container is filled with water to a height of 8.0 cm. The direction of motion of the x-ray beam must be perpendicular to the wire mesh. A tomographic exposure is made and the film developed. A group of numbers on the ruler will be visible. The level of the cut corresponds to the middle number of this visible group. It should be compared to the set height. The measured height of the cut should be within +0.2 cm of the set height. The thickness of the cut is indicated by the length of the ruler where the numbers are clearly readable. The larger the motion, the thinner the cut. The high contrast resolution at the cut is determined from the images of the wire meshes at the position of the cut. The finest mesh strip which can be seen clearly indicates the resolution. In our case, we could distinguish the wires in the 60 wires/inch mesh. The angle of the fan pattern generated by the metal rod indicates the angle of the tomographic motion. It can be determined within +4 degrees.

Because of space limitations other QC tests such as measurement of the focal spot size and use of the bone vertebra which can be performed with the MPP, were not discussed in this article.

Although the MPP was designed primarily as part of a diagnostic radiological QC kit for developing countries, it is adequate for basic QC measurements in any country. The complete QC kit also contains the simple KVp wedge of Stanton type for determining the KVp to within about 3 KVp, a lead disc with a 1 mm slit which rotates at 1 rps for measuring the exposure time and the Ardran perforated metal test pattern for evaluating film-screen contact. Some of these may be discussed in a later article. For further information, please contact one of the authors at the address shown earlier.

AAPM INTERNATIONAL SCIENTIFIC COURSE/WORKSHOP IN IRAN

The third AAPM Course/Workshop in radiation oncology physics was held successfully in Tehran, Iran during May 22-26, 1994. This effort was co-sponsored by the International Organization for Medical Physics (IOMP) Education and Training Committee. The program was organized by Azam Niroomand-Rad, Ph.D., Chair, AAPM International Scientific Exchange Program and Member, IOMP Education and Training Committee and Azim Arbabi, Ph.D., President, Iran Association of Medical Physicists. This was a highly successful undertaking. The details of the workshop and contributors will be published later.

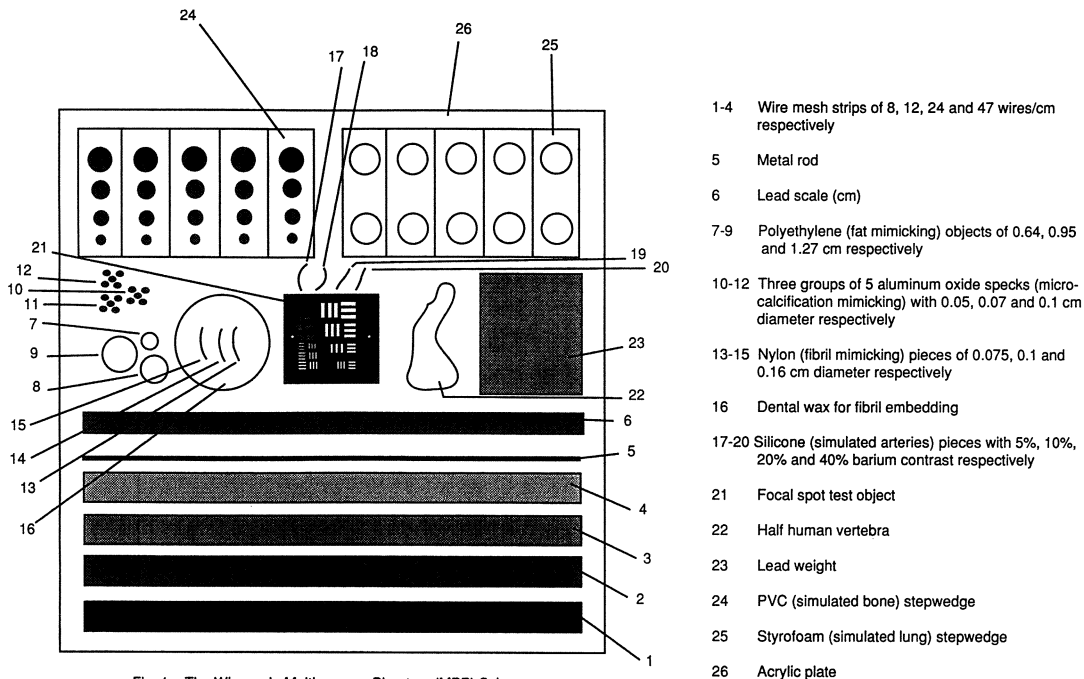


Fig. 1 The Wisconsin Multipurpose Phantom (MPP) Scheme

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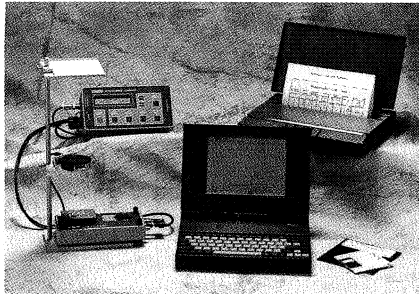
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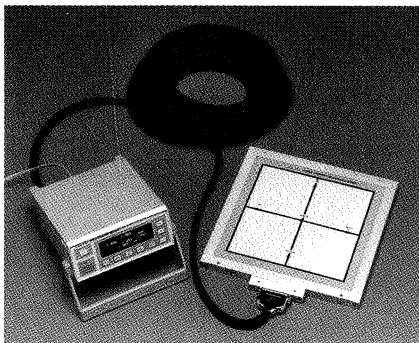
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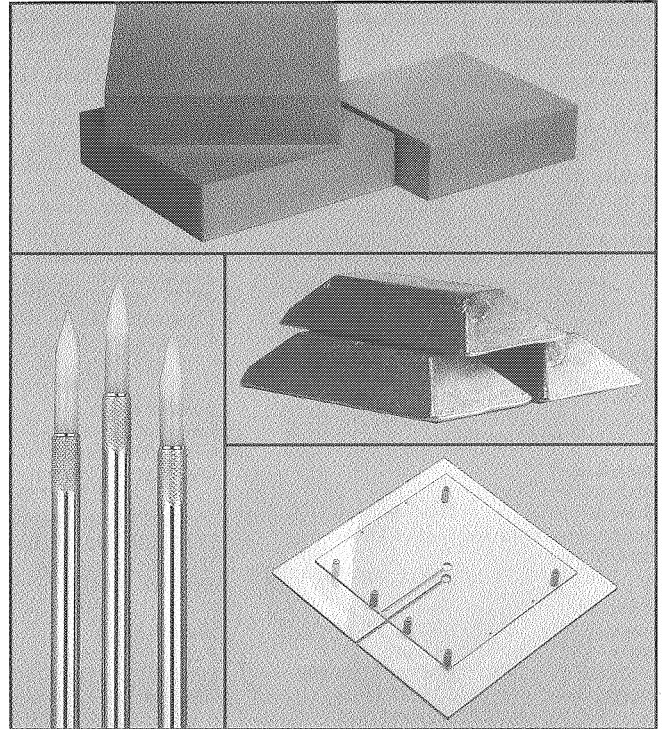


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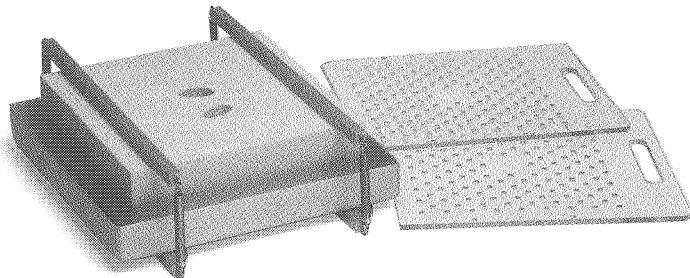
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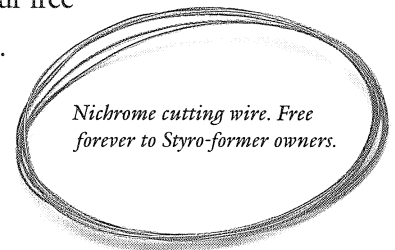
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World Congress Update

Colleagues from 64 countries have submitted their work to this meeting. About 1,900 abstracts have been accepted by the Scientific Committee. The 10 major contributors are from the USA (269), Japan (126), Italy (102), England (91), Argentina (73), Germany (71), India (49), Canada (56), France (53) and Brazil (42). One-third of the papers are in Medical Physics; the others are in Biomedical Engineering with a few that could be classified in both areas. To date 600 registrations have been received and 2,000 participants are expected. The Scientific Committee has invited around 170 researchers on the Medical Physics area to participate in Tutorial lectures, Oral sessions, Round Table discussions. The congress will have about 250 papers presented as Poster presentation in the Medical Physics area. Furthermore, two competitions have been organized, namely the UIPESM Young Investigator and the Latin American Student Competition, where 27 and 19 papers have been submitted on the Medical Physics and Biomedical Engineering areas, respectively.

A number of tutorials have been planned on Sunday, August 21st. These will cover topics such as Brachytherapy, Diagnostic Radiology, External Radiation Therapy, MRI/MRS and Radiation Protection.

Carlos Eduardo de Almeida
Co-President
Medical Physics
World Congress

Laura Rodriguez
Co-Chairman
Scientific Program
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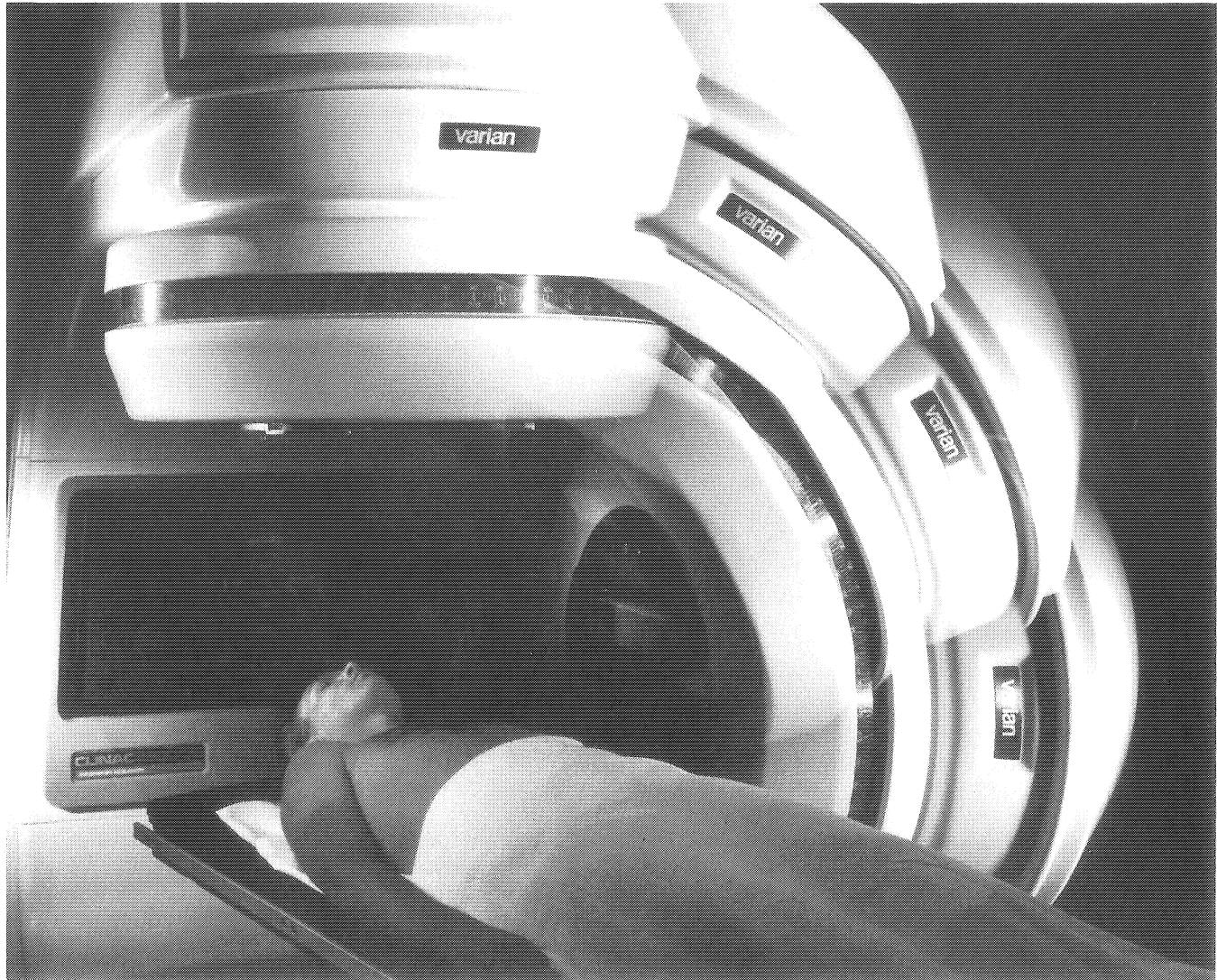
Calendar of Events

24-29 September, 1994: 13th Annual Meeting, European Society for Therapeutic Radiology and Oncology, Granada, Spain. (ESTRO Secretariat, UZ St. Rafael, Department of Radiotherapy, Capucijnenvoer, 35, 3000 Leuven, Belgium).

3-7 October, 1994: American Society for Therapeutic Radiology and Oncology, San Francisco, CA, USA. (ASTRO, 1101 Market Street, 14th Floor, Philadelphia, PA 19107-2990, USA [Tel. 215/574-3180]).

27 November-2 December, 1994: American Association of Physicists in Medicine, Joint Meeting with the Radiological Society of North America, Chicago, IL, USA. (AAPM, One Physics Ellipse, College Park, MD 20740-3846, USA [Tel. 301/209-3350, Fax: 301/209-3399]).

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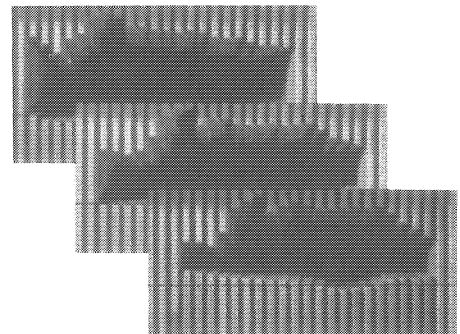
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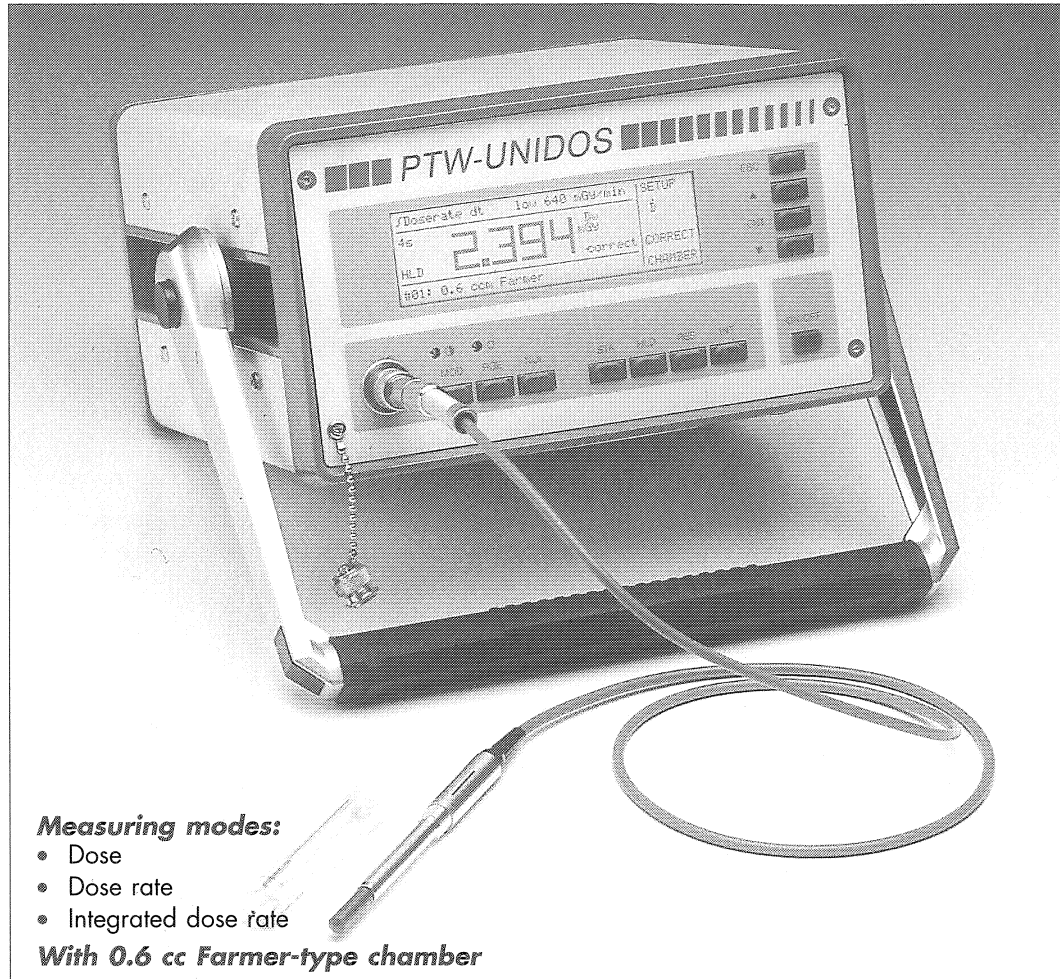
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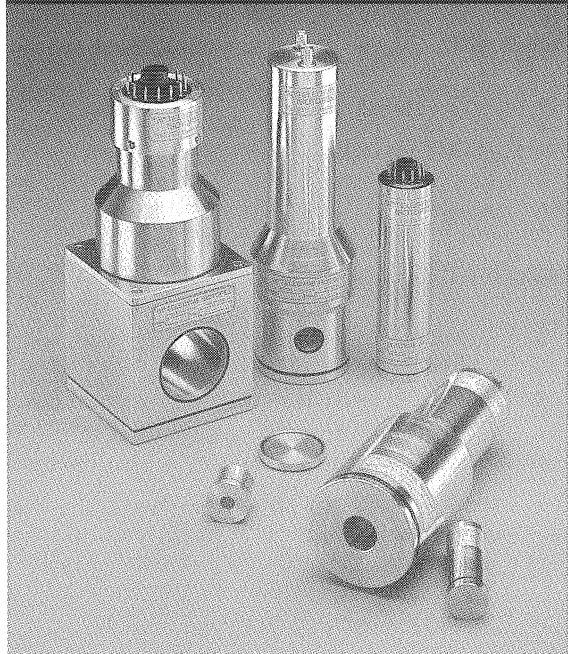
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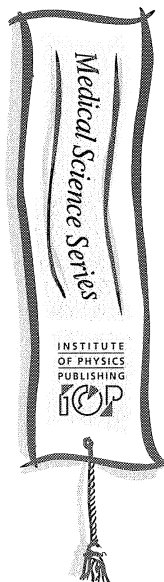
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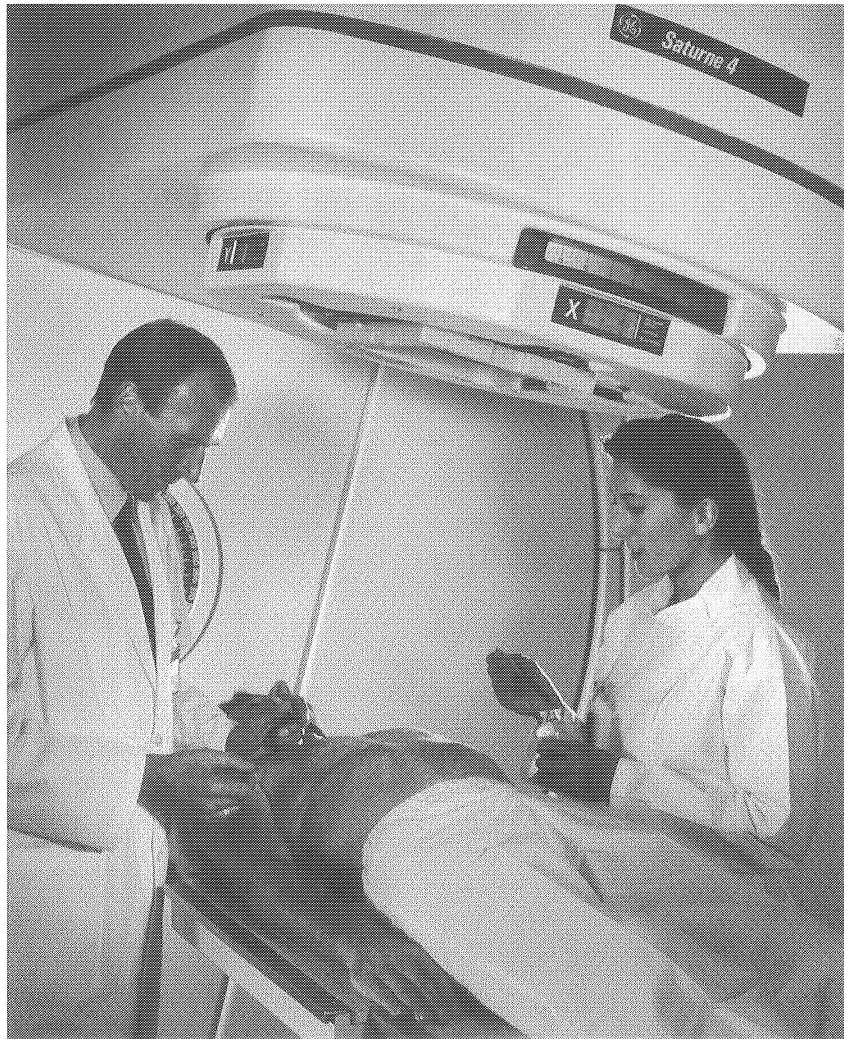
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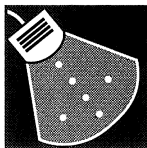
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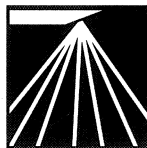
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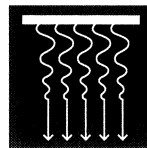
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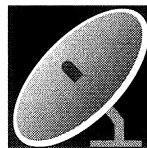
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