InterACTIONS

CANADIAN MEDICAL PHYSICS NEWSLETTER
Le BULLETIN CANADIEN de PHYSIQUE MÉDICALE

Contrasting Flows

COMP OCPM

A publication of the Canadian Organisation of Medical Physics and the Canadian College of Physicists in Medicine

http://www.medphys.ca

CANADIAN COLLEGE OF PHYSICISTS IN MEDICINE
LE COLLÈGE CANADIEN DES PHYSICIENS EN MEDECINE

45 (3) juillet/July 1999

About our Cover

Contrasting Flows: Those readers with good memories will recognise these images – from the 1998 Young Investigators Symposium. The upper – maximum intensity projection – image shows a rabbit's vasculature imaged using a new MR contrast agent (Gadomer-17), an agent that reduces the T1 relaxation rate of blood and remains within the vascular space. The lower – maximum intensity projection – image shows a conventional "time of flight" image acquired for the same rabbit. The upper image was formed from 12 **coronal** slices (1 mm thick) and took 71 seconds to acquire. The lower image was formed from 132 – 1.5 mm **axial** slices and took 495 seconds to acquire. Use of contrast agents allows blood to be imaged directly. Direct imaging of blood eliminates several problems that are found with flow-dependent methods such as signal loss due to slow or recirculating flow, and better enhancement of small, in-plane blood vessels. This is important for diagnosing vascular abnormalities such as aneurysms or stenoses. Gadomer-17 is also considered a breakthrough because is remains within the vascular space. Other contrast agents, such as the most widely used agent, gadolinium DTPA, extravasate out of the vessels into the tissues, reducing vessel contrast in the images. Note that contrast agents can sometimes be "too much of a good thing". Both the arterial and venous side of the vasculature is enhanced in the upper image making identification of some vessels more difficult. However, current MR machines can scan fast enough that arterial phase angiograms can be created while injecting the contrast agent, similar to the process used for digital subtraction angiography. It appears likely that MR imaging will play a much larger role in angiography procedures, in the future.

Images courtesy of Sharon Clarke, Robarts Research Institute and Department of Medical Biophysics, University of Western Ontario

The Canadian Medical Physics Newsletter, which is a publication of the Canadian Organisation of Medical Physicists (COMP) and the Canadian College of Physicists in Medicine (CCPM) is published four times per year on 1 Jan., 1 April, 1 July, and 1 Oct. The deadline for submissions is one month before the publication date. Enquiries, story ideas, article submissions, and advertising submissions can be made to:

P. Munro, London Regional Cancer Centre
790 Commissioners Road East
London, ON N6A 4L6
(519) 685-8600 x53317;
FAX (519) 685-8658
pmunro@lrcc.on.ca

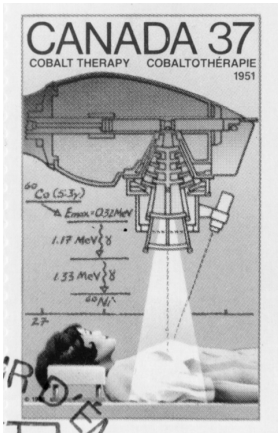
Please submit stories in Publisher 98, Word 6.0, Word 97, or ASCII text format. Hardcopy submissions will be scanned to generate an electronic document for inclusion in the Newsletter.

Advertising Rates

	1/4 page	1/2 page	1 page	Addn. pages
Member	$75	$100	$125	$75
Corporate Member	$100	$125	$150	$100
Non Profit Organisation	$125	$175	$200	$125
Corporate Non-Member	$275	$275	$325	$200

InterACTIONS 45 (3) juillet/July 1999

Inside this issue:



Cobalt-60: A Canadian Perspective Part 3: London, Ontario and the "Peacetime Bomb"……..……..**64**
Peter Munro

Message from the COMP Chair:

The conference was very successful: we had 258 participants registered, there were 59 oral presentations, 35 posters, and 2 workshops In addition, we had our largest commercial presence yet – 28 companies ...

It hardly seems possible that a year has passed since I wrote my first message as the Chair, but I guess the rapid passage of time is yet another sign of my advancing years! With the completion of the Sherbrooke meeting, I can breathe a sigh of relief and spend some more time on my "real" job. The conference was very successful: we had 258 participants registered, there were 59 oral presentations, 35 posters, and 2 workshops. In addition, we had our largest commercial presence yet – 28 companies exhibited at the meeting and several sponsored additional events. Despite the somewhat more luxurious facility than most COMP members are used to, we may even realize a small profit on the conference. I would like to thank a few people who were instrumental in the success of the conference: Roger Lecomte and Renald Lemieux did an excellent job on all of the local arrangements including the tours and social functions, Paul Johns and Claude Foucart were responsible for enlisting the valuable corporate participation, Jean-Pierre Bissonnette and Gilles Beaudoin produced very professional proceedings of the meeting, Chris Thompson and Renald Lemieux organized an interesting symposium on Thursday, Brighid McGarry maintained her usual composure in handling all of the submitted papers and registration, and, finally, John Schreiner accomplished the difficult task of organizing the judging of the Young Investigators Symposium and the posters.

I am very pleased to announce to the members of COMP that we have filled the part time position of executive director. At the annual general meeting in London in 1998 the membership endorsed the plan to establish this position and a search committee was established comprising Paul Johns, myself, and John Schreiner, the incoming president of CCPM. We received applications from three strong candidates and interviewed all of them in Ottawa at the end of May. The successful applicant is Brighid McGarry whose name most of you will recognize as the current provider of secretarial services to COMP and CCPM. Brighid also holds a full time position as executive assistant to several committees of the Alberta Land Surveyors and has provided executive and administrative support to several professional organizations in the past. I am very confident that Brighid will fulfil the responsibilities of executive director and I look forward to working with her in the coming years. I believe that her appointment marks the beginning of a new era in the development of COMP and provides the support we need to grow as an organization. One unfortunate result of Brighid's "promotion" is that she will no longer be able to provide the excellent secretarial support we have become accustomed too. Her first task as executive director is to find a successor and I know she is already hot on the trail of a few prospects!

In the days preceding the scientific sessions in Sherbrooke all of COMP's various committees met. You should find detailed annual reports of their activities elsewhere in this newsletter. The TG 51 committee (which I have mentioned in previous issues) held its first meeting under the able guidance of Erv Podgorsak. He tells me that a final report will be submitted to the executive prior to our meeting in November. I would like to conclude this message by thanking two members of the COMP executive who have completed their sentences and are stepping down. Peter Raaphorst served as Councillor for Professional Affairs and his tenure has seen the successful completion of many tasks including the writing of generic job descriptions and "role and function" statements. These have already proved useful to many of our members and their employers. Dave Wilkins was elected to take Peter's place and I welcome him to the executive. The president of CCPM for the last four years, Peter Dunscombe, has also finished his term and with it the opportunity to sit through marathon COMP executive meetings. Peter was instrumental in establishing a new working relationship between COMP and CCPM which has served the members well. I am sure the new president of the college, John Schreiner, will

(Continued on page 78)

Message from the CCPM President:

The Annual General Meeting of the College in Sherbrooke saw the conclusion of my term as President. John Schreiner took over the reins and he will be outlining the plans for the future in the next issue of Interactions. Brenda Clark was selected by the Board as Vice-President and thus, barring unforeseen circumstances, she will take over from John as President at some future time. The AGM also saw Gino Fallone's departure from the Board after eight years of service. For the last several years Gino has been the College's Chief Examiner and we all owe

Gino a debt of gratitude for his commitment to this onerous but essential role. Ting Lee takes over as Chief Examiner. Filling the vacancy created by Gino's departure from the Board is Katharina Sixel from Toronto – Sunnybrook.

On leaving the Presidency I would like to acknowledge the help and support I have received over the years from many sources. The College and COMP have succeeded in establishing a very collaborative relationship in recent years and, particularly in a relatively small community such as ours, pooling our resources will enable us to move forward more quickly and efficiently. I would like to thank the Chairpersons and Executive members of COMP for their support over the last few years. The Board of the College, during the period of my involvement, has functioned as a very mature team. The meetings have been productive and with their lighter moments. It has been a pleasure working with all the past and present members of the Board. And, finally, I would like to thank you, the members and fellows of the College, for your support over the years. It has been an honour and a privilege to serve in this capacity and it's an experience I wouldn't have missed for the world.

Peter Dunscombe

I would like to thank you, the members and fellows of the College, for your support over the years. It has been an honour and a privilege to serve in this capacity and it's an experience I wouldn't have missed for the world.

WesCan 1999

By Darcy Mason
Cancer Centre for the Southern Interior, Kelowna, BC

WesCan '99 was held March 25-27,1999 in Kelowna, B.C. "WesCan" is short for "Western Canada Medical Physics conference", and includes all persons involved in Medical Physics work: i.e. technical staff (machine shop, electronics), therapists, treatment planners, students, commercial reps, physics assistants, and medical physicists. This year, about 70 people attended, with a good representation throughout most of those job areas.

The first day consisted of a Dosimetry Symposium, in 4 sessions, held at the cancer centre. The Dosimetry Symposium was intended as an opportunity for practitioners of dosimetry to get together and exchange ideas. Below, I briefly outline the contents of these sessions. There are several web pages containing much more detail on the WesCan web site at http://cancercentre.com/wescan. This site will remain active for several months to allow viewing of these documents.

Session I: Weeks before WesCan, participants had been sent a survey requesting information about their treatment planning equipment and practices. Session I reviewed these results and touched briefly on the issues which would be discussed more fully in the subsequent sessions.

Session II reviewed procedures that people are using for treating common sites. The treatments of the prostate and of the breast were the main focus of the session. To assist the discussion, four speakers spoke on various aspects of these treatments and used their short presentations to lead into discussion. Thanks to our discussion leaders **Brad Murray** (Edmonton), **Cheryl Duzenli** (Vancouver, now Fraser Valley), **Kevin Gillund** (Kelowna), and **Daphne Walrath** (Calgary).

Session III was set up to allow participants to move around the Centre and to see some of the facilities at the Cancer Centre for the Southern Interior. The "stations" were the CT-simulator, the Cadplan treatment planning system, the monitor unit calc program, and the portal imaging with PIPS/Elekta iView.

The theme of Session IV was "Is the complexity worth effort?", referring to the increasingly complex treatment planning, delivery, and verification technologies and their associated workload changes. Two "volunteers" had been recruited before the conference to present opposite sides of this issue, regardless of their personal opinion. **Patrick Cadman** ("Yes") from Saskatoon, and **Bill Ziegler** ("No") have to be commended for the excellent and lively arguments they presented. CCSI Radiation Oncologist **Harold Lau** spoke on the impact of the new technology on Radiation Oncologists, and Fraser Valley's **Sarah Kristenson** spoke on the impact on Dosimetrists. Again, details are available on the web site.

The Friday and Saturday sessions were held at the Prestige Inn in downtown Kelowna. The Friday morning session consisted of papers submitted for the student competition. The cash award ($300), and a place in the WesCan archive, went to **Anita Berndt** (Manitoba Cancer Treatment and Research Foundation) for "An 8-channel Detector for an Ir-192 Brachytherapy Source Based Computed Tomography Scanner", co-authored with S. Rathee, D.W. Rickey, and J.Bews (abstract is available on-line).

Next followed our two invited speakers. **Jean Pouliot** (Centre Hospitalier Universitaire de Québec, Quebec City) spoke on "Permanent Radioactive Implants For The Treatment of Prostate Cancer". **Matt Schmid** (Allan Blair Cancer Centre, Regina) spoke on "High Dose Rate Brachytherapy Implants For the Treatment of Prostate Cancer". Thanks to both these speakers for enlightening us on the different issues involved in these alternative approaches to prostate brachytherapy.

Next, we had the 8 submissions for the Technical Paper competition. This is held to promote attendance by non-physicists and non-students. The award was won this year by **Colin Ladyka** (Allan Blair Cancer Centre) for the presentation "Some Aspects of Performing QA on Digitally Reconstructed Radiograph Software", co-authored with B. Ziegler.

Finally, the regular scientific sessions followed, with a total of 12 presentations covering a wide range of topics.

Special thanks to our corporate sponsors: Varian Oncology Systems, Siemens Canada Limited, Nucletron Corporation, Wellhofer North America, Elekta Canada, Picker International Canada, Theratronics International, Huestis Medical, Donaldson Marphil (MedTec), and Hilferdine Scientific.

At the end of the meeting, some business was discussed, including the location for the following year, during which Saskatoon volunteered. Looking forward to WesCan'00 (WesCan2000?, W2K?) in Saskatoon!

Crise en Radiotherapy
Et si les médecins suivaient les patients aux États-Unis

By Arthur Curtin-Savard
Redlands, Californie

Editors Note: This was a letter to the editor sent to Le Devoir, a Montreal newspaper, on the 9th June, 1999. It gives an idea of the conditions of employment for medical physicists in the province of Quebec.

La radio-oncologie est actuellement en crise au Québec. Un bon nombre de patients doivent désormais attendre plus de huit semaines avant de commencer leur traitement de radio-oncologie, ce qui est médicalement inacceptable. Tous les spécialistes vous diront qu'afin d'optimiser les chances d'une guérison, les cellules cancéreuses doivent être attaquées rapidement, avant qu'elles se multiplient et prennent racine ailleurs dans le corps. La Société canadienne de radio-oncologie considère raisonnable un délai maximum de quatre semaines pour le début d'un traitement; aux États-Unis, la grande majorité des patients commencent leur traitement dans les deux semaines suivant leur première consultation en radio-oncologie.

Pour remédier à cette situation, la ministre de la Santé, Pauline Marois, a proposé quatre mesures devant être mises en place dans les prochaines semaines: l'achat de quatre nouveaux appareils de traitement, la disparition du plafond de rémunération des radio-oncologues, un appel à l'aide auprès des radio-oncologues à l'étranger ou à la retraite et l'envoi de 50 patients par mois dans des cliniques américaines, sur une base provisoire. Les deux premières mesures méritent d'être fortement applaudies. Il faut cependant espérer que l'application de la dernière soit de très courte durée car elle coûtera aux contribuables québécois entre 15 000 et 17 000 $ par patient, soit dix fois le prix d'un traitement au Québec.

Un autre élément moins visible du problème actuel est la pénurie de physiciens médicaux. Comme l'a dit le Dr Bahary dans un entretien accordé au Devoir (le 28 mai 1999, page A10), «c'est bien d'avoir les appareils, mais il faudra aussi le personnel pour les faire fonctionner».

L'importance du rôle des physiciens en radio-oncologie est sous-estimée. Leur travail, principalement de nature technique et scientifique, ne les amène que rarement à interagir directement avec les patients. Leur fonction première est de voir au contrôle de la qualité des traitements et au développement de nouvelles techniques et procédures qui améliorent l'efficacité de ceux-ci. La pénurie de physiciens médicaux et le manque de ressources financières incitent les hôpitaux du Québec à embaucher des candidats ayant un degré de formation inférieur, insuffisant pour travailler avec confiance dans le domaine hautement spécialisé de la radio-oncologie. Une erreur de compréhension ou de manipulation dans le contrôle de qualité d'un appareil de traitement entraînera la surdose (ou la sous-dose) de tous les patients qui seront traités avec cet appareil. Pour ce qui est des projets de développement ou simplement de l'implantation de nouvelles techniques, le manque chronique de personnel qualifié oblige les départements de radio-oncologie à les laisser de côté ou à les reporter éternellement.

Le Québec doit se faire plus attrayant afin de s'assurer la présence des professionnels dont il a besoin. Le salaire initial des physiciens médicaux au Québec est de l'ordre de 40 000 $ CAN. Aux États-Unis, les mêmes professionnels extrêmement en demande là aussi, se font offrir entre 60 000 et 80 000 $ US, sans compter des avantages attrayants: contribution généreuse de l'employeur au fonds de pension, frais de relocalisation, assurance médicale et dentaire, accès à de superbes installations sportives, paiement des cotisations professionnelles, budget ample pour la formation continue et les conférences. Le reste du Canada aussi offre des conditions beaucoup plus invitantes que le Québec.

Les finissants des programmes universitaires québécois n'ont pas besoin de se faire offrir tout à fait les mêmes salaires que ceux offerts par le riche voisin du Sud afin d'être intéressés à demeurer au Québec. Voici à cet effet une anecdote personnelle.

En avril 1998, au moment de terminer mes études au doctorat en physique médicale à l'université McGill, trois offres d'emploi me sont présentées, dont deux provenant d'hôpitaux américains et l'autre d'un hôpital de Montréal. Désirant demeurer au Québec, je tente alors de négocier ce que je considère à l'époque un salaire minimal acceptable. Au lieu des 45 000 $ offerts, je demande 50 000 $. Les échelons salariaux du ministère de la Santé ne permettant pas une telle hérésie, j'ai donc décidé de dire adieu à la ville que j'aime et de tenter l'aventure aux États-Unis.

Les salaires au Québec doivent être déterminés par la loi de l'offre et de la demande. Cela aurait le double avantage de prévenir les pénuries dans les secteurs en croissance et d'inciter les jeunes Québécois à étudier dans des domaines qui leur permettront de gagner leur vie.

En somme, si la ministre Marois peut accepter de débourser de 15 000 à 17 000 $ par mois pour les 50 patients qui seront envoyés au États-Unis, comment peut-elle refuser de donner de 15 000 à 17 000 $ par an de plus aux physiciens médicaux du Québec? Ils ne sont que 50 eux aussi! Mais Mme Marois, si vous n'avez pas de quoi bien les traiter, vous n'aurez pas à les envoyer aux États-Unis: ils y seront déjà!

Cobalt-60: A Canadian Perspective
Part 3: London, Ontario and the "Peacetime Bomb"

By Peter Munro

Note: This is the third of a four part series describing the development of, and initial clinical experiences with, ^{60}Co sources for radiation therapy.

The author would like to thank all of the people to contributed to this article including Mrs. C. Woodward of the London Regional Cancer Centre library who helped track down many of the references and Dr. John MacDonald and Mr Bill Dixon for their helpful conversations about the early days of Cobalt-60 teletherapy.

Opening Ceremonies

On 12 November 1951, at the War Memorial Children's Hospital in London, Ont., a new machine for the treatment of cancer was unveiled. Physicists, cancer researchers, top government officials, local community leaders, and many members of the general public attended this event (see Fig. 1). These included **Mr Arthur Ford**, the chairman of the Ontario Cancer Treatment and Research Foundation (who official "opened" the unit), the **Honourable Dr. Mackinnon Phillips**, Ontario's Minister of Health, the Right-Honourable **Mr. C.D. Howe** (federal minister of Trade, Commerce and Production), **Dr. C.J. MacKenzie**, the president of the National Research Council of Canada, **Mr. W.J. Bennett**, the president and managing director of Eldorado Mining and Refining (1944) Limited, **Dr. J. Nickson**, a radiation oncologist from the Sloan Kettering Institute in New York, and the executive board of the OCTRF.[1,2] The new device, officially known as the **Model A Eldorado ^{60}Co** treatment machine, was dubbed the "**Cobalt Bomb**" or the "**Peacetime Bomb**" by the popular press.[3-5]

Beginnings

Unlike the Saskatoon ^{60}Co project, which was a research and development project to evaluate the utility of ^{60}Co for radiation therapy, the London ^{60}Co project was a commercial venture spearheaded by **Eldorado Mining and Refining (1944) Ltd**. In 1946, **Roy F. Errington** was hired by Eldorado Mining and Refining as the manager of their Commercial Products Division, which marketed and sold radium - a by-product of the company's uranium mines. The management of Eldorado had became concerned about the long-term prospects of radium as a commercial product because of its high cost and the limited funds available for its purchase by hospitals. While Errington was initially charged with the task of developing markets for radium, it became clear to Errington that developing and marketing radioisotopes would become a matter of "self-preservation or at least job preservation".[7] Errington was familiar with **Prof. W.V. Mayneord's** discussions on the potential of ^{60}Co as a replacement for radium and he seized on the possibility of selling radioactive cobalt to hospitals and cancer centres. In 1949, Errington and his chief assistant **Mr. Donald T. Green**, an engineer/scientist, travelled by car to Chicago to promote the idea of a ^{60}Co teletherapy unit with a Dr. Hummon.[6] On the way, they decided to stop in at what was then called The Ontario Institute of Radiotherapy, Victoria Hospital in London, Ontario. This was not as surprising as it might first appear, because at the time the Institute was the second largest treatment centre, in terms of patients treated, in the province and thus one of the larger cancer centres in the country.[1] In London, Errington and Green met **Dr. Ivan Smith,** the head of the cancer clinic, as well as a surgeon and a pathologist. [Being of similar temperaments, Smith and Errington struck up a friendship that ultimately ensured that first Eldorado ^{60}Co unit ended up in London.] Both Dr. Smith and Dr. Hummon were quite enthusiastic about the potential of ^{60}Co teletherapy [^{60}Co had only been used for brachytherapy up until that time] and so Errington decided to go ahead with a project to develop a teletherapy device. Upon his return to Ottawa, Errington requested $7000 from W.J Bennett, the president of Eldorado, which he used to found the development division that ultimately designed and constructed the Eldorado A ^{60}Co unit.[7]

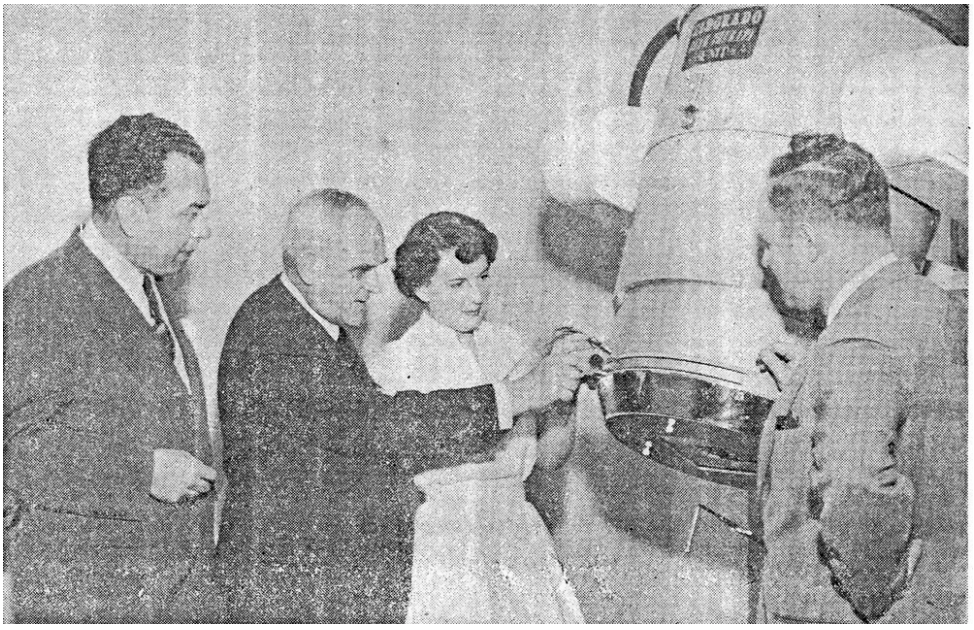


Fig. 1 L to r: Dr. Ivan Smith, Right Honourable C.D. Howe, Miss Joyce Lawson, and R.F. Errington examine the Eldorado ^{60}Co unit.

The Ontario Institute of Radiotherapy, London

Much has been made of the efficient decision-making process that highlighted the Saskatchewan purchase of their ^{60}Co

unit. Such was not the case in Ontario. Dr. Ivan Smith sought advice from top cancer researchers, consulted with the board of trustees at the his own institution, consulted with colleagues at the University of Western Ontario, and consulted with **Dr. Ethlyn Trapp** of the newly formed National Cancer Institute of Canada.[6] Furthermore, he headed a committee formed by the Ontario Cancer Treatment and Research Foundation (and consisting of **Dr. Norman McCormick**, **Dr. Richard Weaver**, and **Mr. Jack Brown** – a physicist in London) to "investigate and report on the advisability of supervoltage equipment for one or more of the eight provincial radiotherapy centres".[8] Because of this more bureaucratic decision-making process, it was not until the 15 March, 1950 that the OCTRF announced that it would purchase a ^{60}Co unit from Eldorado, to be placed in The Ontario Institute of Radiotherapy, Victoria Hospital in London, Ontario. And it was not until the 11 May 1950 that an official order was placed with Chalk River for the ^{60}Co source.[6]

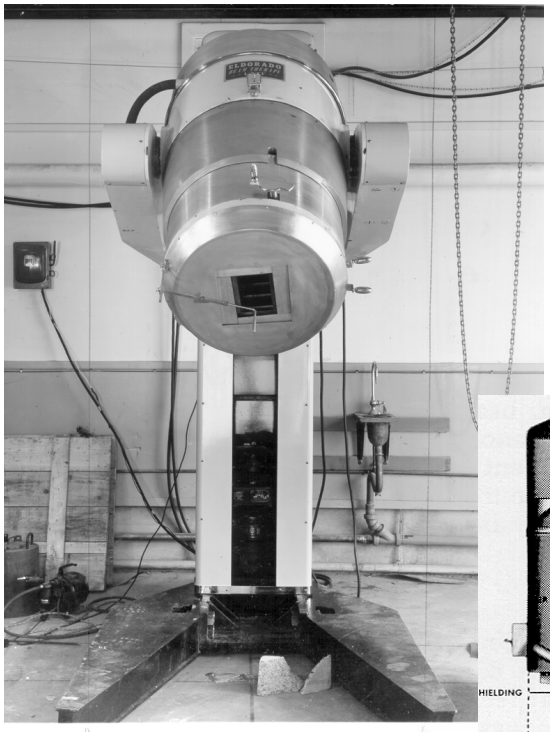
The Eldorado A Unit

The design of the ^{60}Co unit was developed by physicists at Eldorado Mining and Refining (1944) Ltd. lead by Errington and characterised by physicists in the Radiology Branch of the National Research Council in Ottawa lead by **Dr. Adair Morrison**. The main credit for the design has to go to Donald Green, the technical leader of the Eldorado group. The resulting design was considerably different from today's ^{60}Co units (see Fig. 2). The source was located in a steel-lined lead cylinder approximately 22 inches in diameter and the source was located above a conical chamber that was filled with mercury. A small compressor generated pneumatic pressure that quickly (5 seconds) pumped the mercury into a reservoir above the source, permitting the ^{60}Co gamma radiation to reach the patient. Turning off the compressor allowed the mercury to return to the conical chamber. The Eldorado unit could deliver field size ranging between 4x4 and 20x20 cm^2 (at 100 cm), the unit was mounted on a pedestal on which the head could be raised and lowered, the head could be angulated over a range extending from 5 degrees above the horizontal to 10 degrees beyond the vertical (angular range of 105 degrees), and the unit had fixed cones and adjustable apertures that allowed the treatment distance to vary between 50-100 cm from the source.[9] The unit also used a plastic pointer to position the patient at the correct position and distance from the ^{60}Co source. Furthermore, the source design itself was quite different. Rather than use small (1 mm diameter x 1 mm long) cylinders of ^{60}Co typical of today's sources, the source for the first ^{60}Co unit consisted of wafers that were approximately the diameter and thickness of 25 cent coins – 2.5 cm in diameter and 0.5 mm thick.[1,10] In all 25 wafers were used to generate the first kilocurie ^{60}Co sources.[10] Once the design was finalised, Errington and Green approached **Mr. T. R. McLagan**, the general manager of **Canadian Vickers** in Montreal, to construct the first unit. In contrast to the detailed and successful design process, construction of the first unit was less successful – the unit was costly and poorly built. Citing that Canadian Vickers "quality of work … was to say the least disappointing" Eldorado set-up their own machine shop and thereafter constructed all subsequent ^{60}Co units.[7]

One of the important design considerations was how to handle a high activity source when loading and unloading the unit. This was one area that Canadian's demonstrated their ingenuity. The US Atomic Energy Commission had believed that kilocurie ^{60}Co sources would not be feasible[14] and indeed Mayneord's original idea of ^{60}Co teletherapy had only conceived of low activity (<100 Ci) sources.[13] When John MacDonald went to the U.K. for training [at the time the OCTRF had an unofficial policy of sending physicists to the U.K. to gain experience in radiation physics] one of the highlights of his trip was an invitation to explain to Mayneord how kilocurie radiation sources were handled.[13]

Date	Event
1946	R.F. Errington hired by Eldorado Mining and Refining (1944) Ltd.
1949	R.F. Errington and T.D. Green embark on car trip to promote the idea of a Cobalt-60 teletherapy
15 March 1950	OCTRF approves purchase of Cobalt-60 unit for the Ontario Institute of Radiotherapy, London
11 May 1950	Purchase order placed by OCTRF for Cobalt-60 unit
June 1950	Source for London unit placed in NRX reactor at Chalk River
Aug. 1951	Measurements of the isodose distributions from the London Cobalt-60 unit made at NRC by Cy Garrret, John MacDonald, Bill Dixon, A. Fish, and A Morrison
6 Oct. 1951	Cobalt-60 unit arrived in London, Ont.
27 Oct. 1951	**First patient treated using the new unit**
12 Nov. 1951	Official opening of the new treatment unit
April 1952	First patient treated by the new Cobalt-60 unit dies
20 May 1952	Toronto Telegram reports the treatment of Eva Peron in London
July, 1952	Coronet – a popular American magazine – publishes an article entitled "C-bomb Halts Cancer!"
Oct. 1955	The first source change occurs for the London Cobalt-60 unit
27 April 1962	Dr. Ivan Smith dies suddenly at his home following a scientific conference
Aug. 1963	The first London Cobalt-60 unit is decommissioned

Table 1 Chronology of events surrounding the Eldorado ^{60}Co teletherapy unit.



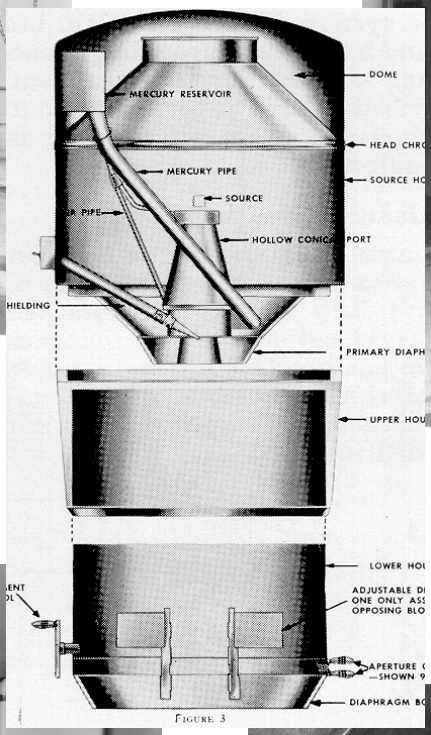
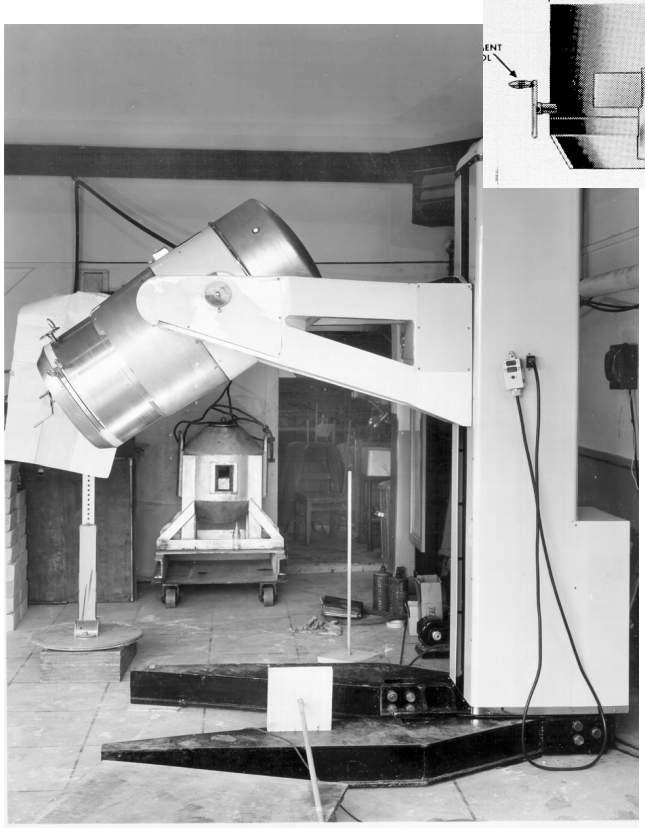


FIGURE 3



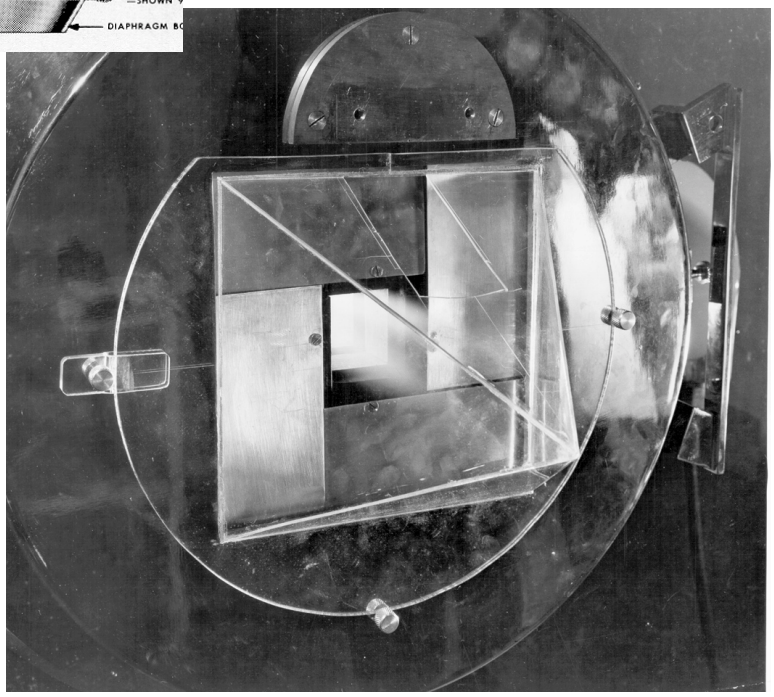


Fig. 2 The anatomy of a ^{60}Co teletherapy unit. Clockwise from upper-left: front view, oblique view, close-up of the head/beam localizer, and side view. The centre figure is a schematic diagram of the Eldorado unit showing the mercury shutter and collimator design.

NRC and Beam Characterisation

Much has been made of the fact that the London ^{60}Co unit was used so quickly for patient treatments after its installation. One reason for this was because the beam characteristics were measured well before the unit was shipped to London. Physicists at the Radiology Branch of the National Research Council were closely involved in the development of the Eldorado unit and made extensive measurements of its penumbra and isodose characteristics. Indeed, the first ^{60}Co depth doses and isodose distributions were measured in late 1950 by **Mr. Bill Dixon** of NRC using a low activity (50-100 Ci) prototype source.[11] These measurements, which were made with ion chambers (see Fig. 3) and radiographic film, were essential to optimise the source and collimator designs. The kilocurie ^{60}Co source was delivered to NRC in Ottawa and installed in the Eldorado unit at the end of July, 1951. In August 1951, **Dr. John Macdonald** went to the NRC as an observer to oversee the measurement of the radiation beam characteristics for the OCTRF. Most of the actual measurements, including the first ^{60}Co isodose curves, were made by **Mr. Cyril Garrett**, **Mr. A. Fish, Mr. Bill Dixon,** and others.[12] [It was due to illness of Mr Jack Brown – the London physicist – that John MacDonald became involved in the ^{60}Co project. Brown had been sent to England to learn about the duties of a radiation physicist and while there he had contracted tuberculosis. Due to his illness, he was unable to commission the ^{60}Co unit and John MacDonald was seconded from The Ontario Institute of Radiotherapy, Toronto to help with the commissioning. [13]] Once the measurements had been made the unit was ready for delivery, but delays in room construction prevented the unit from being shipped to London until the 6 October 1951. Surprisingly, the Eldorado unit was not housed in the same building that housed The Ontario Institute of Radiotherapy, but across the street in what was then known as the War Memorial Children's Hospital. The room consisted of 8" "thick concrete block walls, a lead lined ceiling and a sandbagged outer wall. The operator was protected by another ½ inch of lead along one concrete wall and the patient was viewed through a six inch lead glass brick mounted at the operating console.[2] The original schedule called for treatments to start by the 12 October 1951 but it was not until the **27 October 1951 that the world's first patient** was treated using ^{60}Co gamma-rays in London, Ontario.

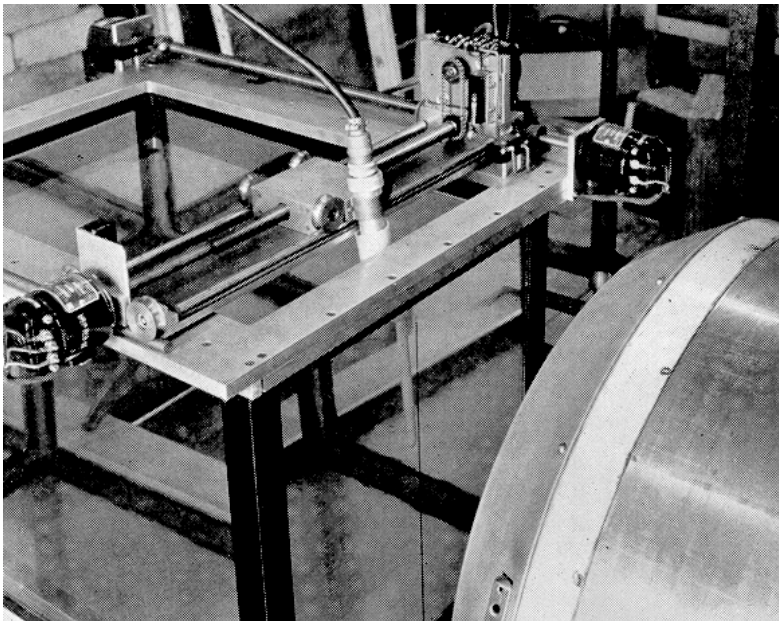


Fig. 3 The NRC set-up used to measure the first ^{60}Co depth doses and isodoses in 1950-1951 (with permission from ref 12).

Public Excitement

News of the first treatment and the subsequent official opening of the ^{60}Co unit vaulted London, Ontario and The Ontario Institute of Radiotherapy, Victoria Hospital onto the world stage. Reports were made in major newspapers and magazines such as Time (PeaceTime Bomb), Saturday Night (Life-Saving Atomic Bomb), Science News Letter (Cobalt 60 "Bomb" for Treating Cancer Patients), and Reader's Digest (Cobalt 60 – Poor Man's Radium). The following nine months saw much excitement. The unit operated 16 hours per day, and in the first nine months of operation the unit treated 223 patients with the average treatment lasting three weeks.[1] Thus, the unit was able to handle 15 new patients per week. This proved to be far less than the demand, partly due to two events. On 20 May 1952 the Toronto Telegram reported that Eva Peron, the wife of Argentinean dictator Juan Peron, had been flown to London, Ontario to receive ^{60}Co therapy. This announcement rekindled interest in ^{60}Co therapy and the London clinic. [It should be emphasised that there is no evidence that this story in the Toronto Telegram had any truth. The rumour probably started because of the Argentinean ambassador had visited Eldorado and had tried to purchase a unit to be installed in Argentina. Eldorado officials convinced him that there were no ^{60}Co sources available, but as a courtesy he was invited to the opening ceremonies on 12 Nov. 1951. It was probably his unexpected presence at the opening ceremonies of the London ^{60}Co unit, as well as the knowledge of Eva Peron's illness, that lead to the Toronto Telegram article.[13]] The second event was the publication of a sensational article entitled 'C-Bomb Halts Cancer!' in the July 1952 issue of a popular American magazine called Coronet.[15] Unlike most of the more balanced articles published about ^{60}Co therapy, this article claimed to give accounts of patients who had undergone miraculous cures because of the new treatment. The article had elements of truth because it included snippets of an interview with Dr. Ivan Smith. Following the publication of the article, enquiries for treatment flooded in. In July alone over 1,000 people had to be turned down for treatment and over the entire 1952 calendar year that number increased to more than 3,000 people.[6] Dr. Ivan Smith had to resort to publishing a letter in the London Free Press in an attempt to dispel some of the myths fostered by the Coronet article.

Clinical Activities

In the early 1950's, people trained in therapeutic radiology were not common in Canada - even Dr. Ivan Smith was not a

radiation oncologist. Thus, many qualified staff came from the U.K. or were sent to the U.K. for training (see Fig. 4). The first radiation oncologist in the London clinic was **Dr. Frank Bately** who trained at the Holt Radium Institute in Manchester, England, the first radiographer was **Miss Joyce Lawson**, a radiographer who was from Glasgow, Scotland, the first registered nurse to work with the Coblat-60 unit was **Miss Elaine Marshall,** and the two physicists in the London clinic at the time were Mr Jack Brown and **Dr. Roger Inch** [who eventually became known for his development of spheroids]. And even though these staff had relatively unsophisticated tools, the treatments had a lot of similarities to current treatments. Figure 5 shows how patient treatments were delivered in the early days of ^{60}Co therapy.

Final Thoughts

Over time publicity about the Eldorado ^{60}Co unit in London faded as more units were delivered to centres in the USA and Canada and as other treatment technologies were developed. Nevertheless, ^{60}Co treatment units played an important role in radiation therapy and profoundly influenced the role of physics in medicine. By 1986, there were an estimated 2400 ^{60}Co treatment units in active clinical service - a far cry from the small market (~10 units) that General Electric marketing people had predicted in the 1950's.[14] In addition to its clinical contribution, ^{60}Co treatment units also helped establish the role of physicists in medicine. Because of the need to calibrate ^{60}Co machines, because of the potential that the units created for more complex treatment plans, and because of the need for people skilled in the generation and delivery of complex treatment plans, physicists became an essential part of the medical landscape. And as diagnosis and treatment prescription became equally important, imaging physicists also started to make big contributions to medical practice. Thus, ^{60}Co teletherapy played an important role in fostering the field of medical physics.

References:

1. Annual Report of the Ontario Cancer Treatment and Research Foundation, 1951 pp. 26-33, 39
2. London Free Press, "Top Leaders at Opening of Weapon" 13 Nov. 1951
3. Time, "Peacetime Bomb" 19 November, 1951
4. Saturday Night, "Life-Saving Atomic Bomb" 3 November, 1951
5. Science News Letter "Cobalt 60 Bomb for Treating Cancer Patients" 24 November, 1951
6. D.R. Martell "Canada's Peace Bomb: The Advent of Cobalt Radiotherapy in London, Ontario" (unpublished research report)
7. R. Bothwell, "Nucleus: The History of Atomic Energy of Canada" (University of Toronto Press, Toronto, 1988) pp. 130-137
8. I.H. Smith, J.C.M. Fetterly, J.S. Lott, J.C.F. MacDonald, L.M. Myers, P.M. Pfalzner, D.H. Thomson "Cobalt-60 Teletherapy" (Harper & Row Publishers, New York, 1962) pp. 1-2
9. T.D Green and R.F. Errington "Consideration in the design of a cobalt-60 beam therapy equipment" J. Canad. Assoc. Radiol. **3(1)**: 20-24 (1952)
10. H.E. Johns "Physical characteristics of the radiation on cobalt-60 beam therapy" J. Canad. Assoc. Radiol. **3(1)**: 2-6 (1952)
11. W.R. Dixon, F. Fish, and A. Morrison "Preliminary depth dose and isodose measurements for cobalt-60 teletherapy unit" J. Canad. Assoc. Radiol. **2(1)**: 12-13 (1951)
12. W.R. Dixon, C. Garrett, and A. Morrison "Radiation measurements with the Eldorado cobalt-60 teletherapy unit" Brit. J. Radiol. **25**: 314-318 (1952)
13. Dr. John Macdonald, telephone conversation, 11 June, 1999
14. R. Robison "The race for megavoltage" Acta. Oncologica **34(8)**: 1055-1074 (1995)
15. A. Fromer "C-bomb halts cancer!" Coronet **32:** 22-26 (1952)

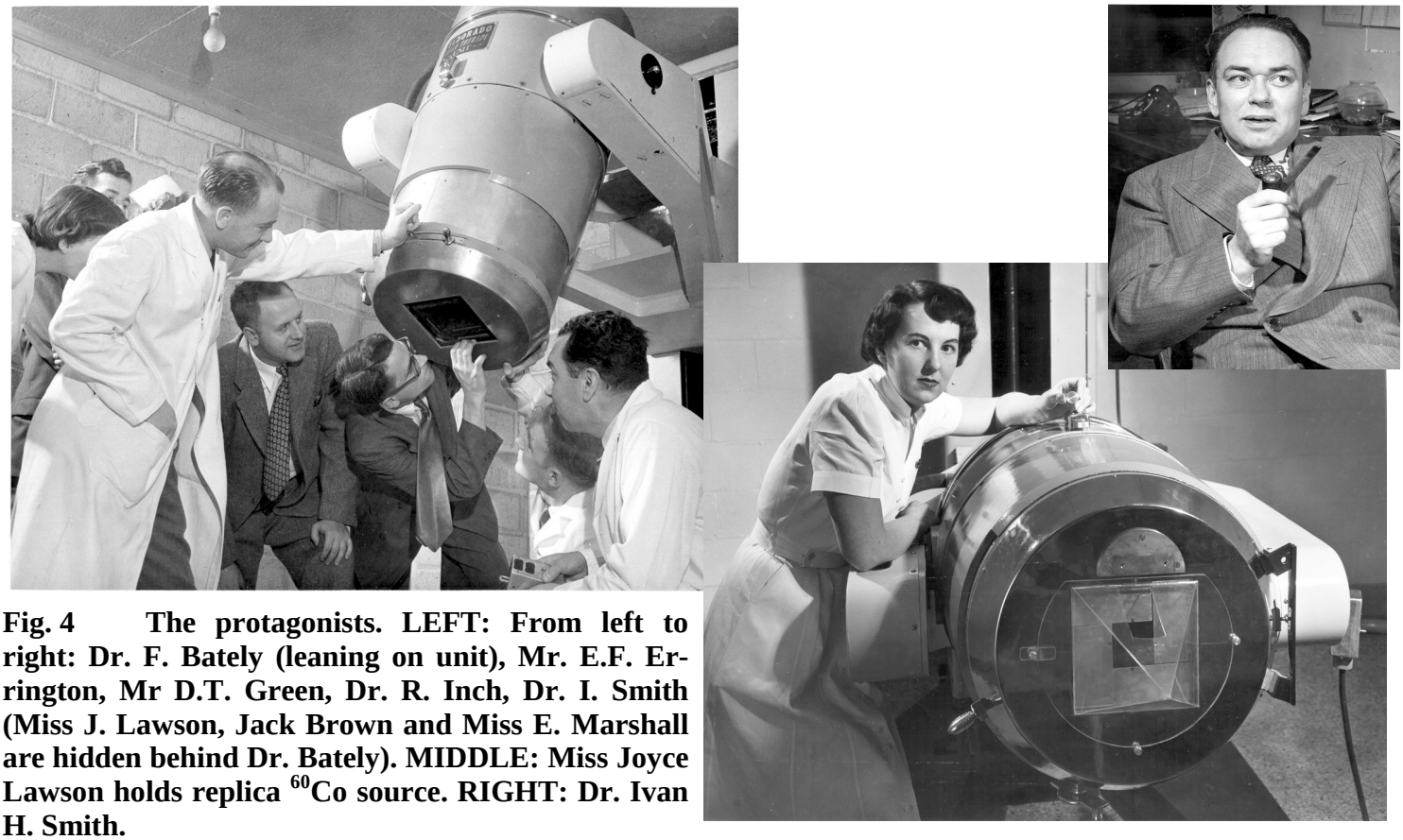
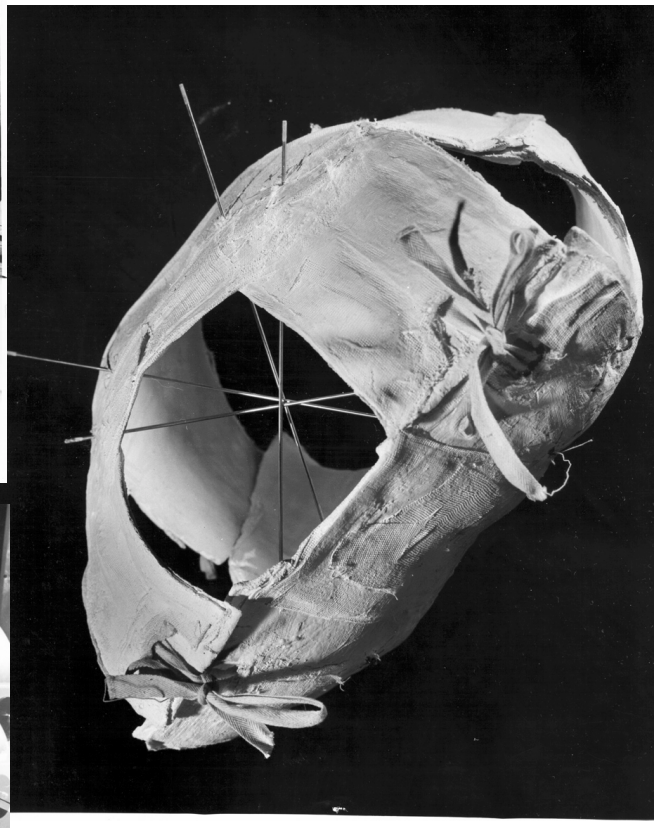
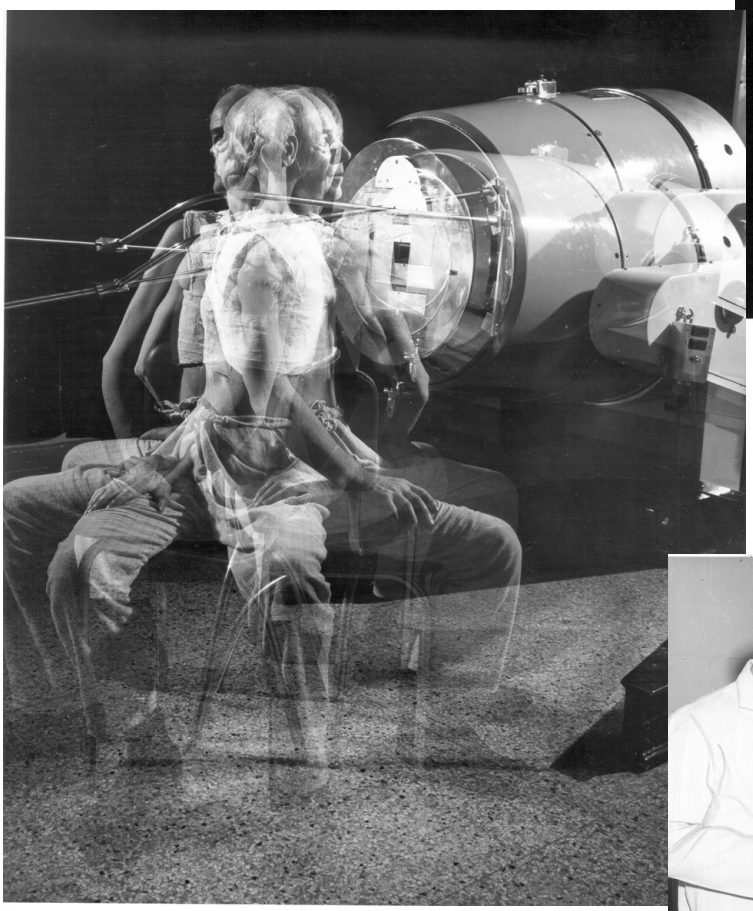


Fig. 4 The protagonists. LEFT: From left to right: Dr. F. Bately (leaning on unit), Mr. E.F. Errington, Mr D.T. Green, Dr. R. Inch, Dr. I. Smith (Miss J. Lawson, Jack Brown and Miss E. Marshall are hidden behind Dr. Bately). MIDDLE: Miss Joyce Lawson holds replica ^{60}Co source. RIGHT: Dr. Ivan H. Smith.





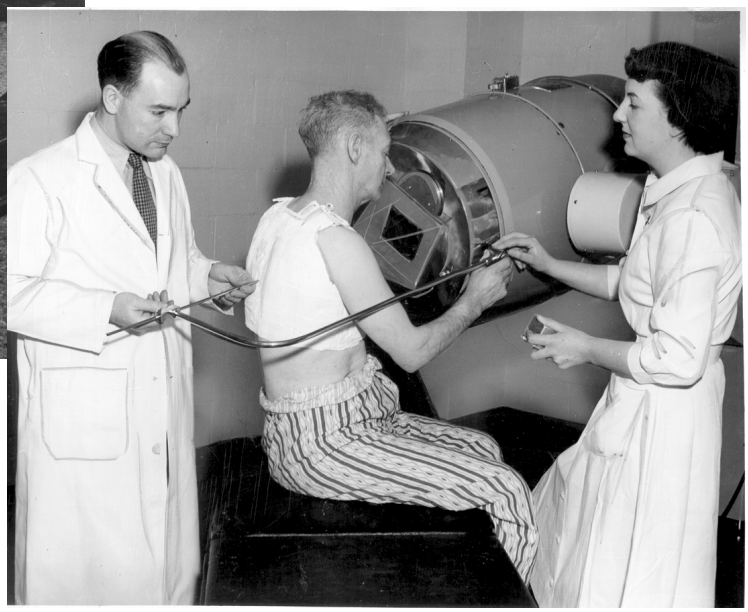


Fig. 5 The process of treatment planning and delivery. Clockwise from upper-left: cast of patient, virtual simulation circa 1951 using the plaster cast, setting up the patient using a back-pointer, treatment. The treatment moved the patient rather than the treatment unit. Note that the radiation oncologist (Dr. Frank Bately) was much more involved in treatment delivery than current oncologists.

HARPing with Bureaucrats

By Martin Yaffe
Physics Consultant, Ontario Breast Screening Program

Here is a letter that I sent to The Minister of Health earlier this year regarding the report of the task group set up by the HARP Commission to advise them on how the Regulations should be changed to improve the performance of mammography. The group consisted of two medical physicists - Ian Cunningham and myself - two expert mammographic radiologists and two senior technologists.

Last October, our report was accepted without modification by the Commission. Two key elements in the report were: i) changing the radiation limit for mammography from 900 mR ESE to 3 mGy mean glandular dose to be compatible with ACR, CAR, MQSA and many other jurisdictions and, ii) making CAR (or equivalent) accreditation mandatory (see text box on facing page).

The response from the Minister indicated that:

1. The report had been forwarded to her "consultants". (I would have thought that our task group and HARP were acting as her consultants.)

2. New HARP Commissioners (generally lay people who mainly seem to have little interest in developing an understanding of the technical issues) were being appointed. Will she ask them to review the report again and waste another year or two?

3. She felt confident that the women of Ontario were adequately protected by the current regulations. (FDA/CDRH stated that a reduction in maximum dose below 3 mGy might result in a compromise in the quality of mammography).

In light of this situation, I request that those of you who share our concern that the current regulations and the threat of being shut down by HARP are pushing high quality facilities toward suboptimal techniques (high kV, excessively fast systems, low OD, etc.) are requested to voice those concerns to the next Minister.

I request that those of you who share our concern that the current regulations and the threat of being shut down by HARP are pushing high quality facilities toward suboptimal techniques (high kV, excessively fast systems, low OD, etc.) are requested to voice those concerns to the next Minister.

March 24, 1999

The Honourable Elizabeth Witmer
Ontario Minister of Health
Minister's Office
10th Floor Hepburn Block
80 Grosvenor St.
Toronto Ontario
M7A 2C4
Canada

Dear Minister:

I am writing regarding the issue of the quality of mammography in Ontario. I would like to applaud your ministry for supporting the expansion of the Ontario Breast Screening Program. I believe that this program will contribute toward a higher standard of mammography resulting in earlier detection of breast cancer and improved access to such high quality across Ontario.

I am also requesting your assistance in an urgent matter affecting the quality of mammography in Ontario. This relates to the need for revision of the Healing Arts Radiation Protection (HARP) Regulations which are sorely out of date. Enforcement of the Regulations in their current form has created a situation where the quality of mammography is being compromised at some facilities.

In 1985, the Healing Arts Radiation Protection (HARP) Regulations were enacted. This groundbreaking legislation promoted safe use of radiation and high quality in medical imaging. Quality control of x-ray equipment became mandatory and equipment performance standards were set. The Regulations were based on the technical practice of radiology of the early 80's. Since that time, there have been enormous improvements in mammography equipment and technique, resulting in improved image quality and more efficient use of radiation. In fact, an enormous reduction in the amount of x rays required for a mammogram took place. Since 1985, various technical innovations have occurred in mammography. These required increasing the x-ray doses slightly to achieve even higher quality of mammography. These developments have been accepted internationally by many agencies including the FDA Center for Devices and Radiological Health (CDRH) and the American College of Radiology in the U. S., the Canadian Association of Radiologists, several other provinces and the Ontario Breast Screening Program. They were readily accepted because it is recognized that the risk of radiation-induced cancer from mammography is negligible compared to risk of failing to detect a cancer due to poor image quality.

Mammography facilities in Ontario, (including OBSP facilities) however, must compromise image quality to comply with increasingly outdated radiation regulations. The Ontario medical imaging community through advisory committees to the HARP Commission, made repeated efforts throughout the 1990s to initiate changes to the HARP Regulations to enable high quality mammography to be performed. Physics and Medical Advisory Committees recommended such changes to the HARP Commission in 1994/95, however, at the time, these were rejected without a stated reason.

Last Spring, an expert task force was established by the Commission to review the Regulations and make other suggestions regarding improvement of mammography in Ontario. I was a member of that group. The task force produced detailed recommendations for updating the Regulations and correcting technical errors contained therein. These recommendations were accepted by the Commission. In the Minutes of their final meeting of Oct. 7/ 1998 (attached), the Chairman of the Commission requested that the task force recommendations be forwarded to you with a strong recommendation for action. To the best of my knowledge, the recommendations were not forwarded to you, *i.e.* not only was our time spent on the task group wasted, but the government spent money on our meetings without your even having received our advice.

The terms of all of the HARP Commission members have lapsed and they have not been replaced. In any case, there is no collective memory of this issue, except via the task group. Even if new members are appointed to the Commission, our past experience suggests that at least 1-2 years will be wasted, as they "ramp up" to understand the complex issues involved. The commissioners are lay people, without any background in the science of medical imaging or radiation. For over 10 years, physicians and scientists have been requesting that the Regulations be updated to reflect modern radiological practice. Further delay is simply not acceptable.

We now have documented evidence of sub-optimal techniques being used for mammography so that facilities can operate below the current, outdated radiation limit. This limit is approximately one half of the internationally accepted value! Those who do not understand the principles of mammography may think that this limit results in increased safety for the patient, however, the contrary is actually the case. It is easy to reduce radiation levels, however the resulting underexposed mammograms lack contrast and definition and may result in the missed detection of an early breast cancer by the radiologist - and perhaps the opportunity to save a life. This is an unacceptable and unnecessary risk benefiting no one.

Revision to the regulations according to the recommendations approved by the HARP Commission will allow a high standard of mammography to be carried out in Ontario at virtually no additional cost to the taxpayer. This will facilitate earlier and/or more accurate detection of breast cancer and will increase the value of the investment which Ontario has made in high quality breast screening. I strongly urge you to take this opportunity to correct the current problem.

Please feel free to contact me if I can be of any assistance with respect to this matter. I would be delighted to meet with you to discuss the task force recommendations.

Sincerely,

Martin J. Yaffe, Ph.D.
Professor, Departments of Medical Imaging and Medical Biophyscs, University of Toronto
Senior Scientist, Imaging/Bioengineering Research, Sunnybrook & Women's College Health Sciences Centre
Physics Consultant, Ontario Breast Screening Program

REPORT OF THE COMP AWARDS COMMITTEE

By L. John Schreiner, Chair

The Awards Committee (consisting of Dick Drost, Ken Short, Clemént Arseneault and myself) has had another successful year coordinating the competitions at the annual meeting. Due to changes in the competitions, the main function of the committee this year was to select the final competitors in the J.R. Cunningham Young Investors Symposium. I also coordinated the selection of judges for the YIS and for the COMP Poster Competition and prepared materials required in the judging of these competitions.

Last year the Committee suggested changes in the various competitions to the COMP Executive. Some changes were implemented, solving a number of problems encountered in past years. The first change was the cancellation of a separate competition for travel assistance. The decision was that rather than awarding travel money to three individuals, the finalists for the YIS would each receive assistance through waived registration fees. Therefore, the pre-conference work of the Committee was cut significantly. Our main effort this April was to determine the finalists for the YIS competition from 15 submissions. The detailed conference proceedings again made this effort easier than in the past. Also, the call for abstracts, with the new checklist for YIS applicants, increased compliance, so that all competitors this year submitted all required documentation without requiring follow-up.

The poster competition also changed slightly with the authors of poster submissions being able to decide whether they wanted to take part in the competition or to withdraw. Of the 35 abstracts accepted for the poster session, 10 groups declined to be part of the competition. I would like to thank these 10 for making our work easier, since the judging of a large number of posters in a very limited time is an onerous task. As in the past two years the poster judging went through three rounds: each judge first reviewed the submitted proceedings for a subset of posters and then viewed the actual posters in this set. Judges for each subset ranked the posters and the top half advanced to the next round. These finalists (~12) were then judged by all judges using similar criteria as for the Y.I.S. competition.

In the last three years I have been able to develop, with feedback from the other committee members and judges, a set of tools and guidelines for the various competitions. These have facilitated the preparations for the competitions and the actual judging at the meeting. These protocols and documents will be passed on this year to the editors of the COMP handbook so that these developments can be used in upcoming years.

My Chairmanship of the Committee ends at this meeting, although I will stay on the committee for one more set of competitions to help in the transition. I would like to thank the Award Committee members for their assistance since the beginning of my time as Chair. Over the years they have done a large amount of unrecognized work in the spring, when finalists for competitions and travel assistance had to be determined quickly for the Scientific Programme folk to be able to proceed with their work.

I wish to also thank the many judges that have helped make the COMP competitions a success. In particular this year, I thank the sixteen judges here in Quebec. They have worked incredibly hard during this annual scientific meeting, often while the rest of the attendees were schmoozing, visiting vendors' displays, and having a good time. The judges had to use this time working so to do the competitions, and the competitors, justice

Clemént Arseneault has willingly and enthusiastically offered to take up the Chair's position. I am sure that he will find it as rewarding a job as I have the last three years. It is quite exciting to be involved with the competitions and with the many young and exciting workers who compete each year at COMP. Because of our young investigators and our poster contestants, I believe that we have in Canada two of the best competitions in medical physics in the world.

Respectfully submitted,
Sherbrooke, QC, June 1999

The YIS candidates. Standing l to r: Bilal Shahine, Marianne Aznar, Siobhan Ozard, Michelle Hilts, Deidre Batchelar, Jeremy Gill, Seemantini Nadkarni. Seated l to r: Warren Foltz and Tim Craig.

COMP Competition Winners – Sherbrooke, QC 1999

By L. John Schreiner
Kingston Regional Cancer Centre

On behalf of the of the COMP Awards Committee and the COMP judges it is my pleasure to announce the winners of the J.R. Cunningham Young Investigators' Symposium and of the COMP Poster Competition held in Sherbrooke, QC, June 17th to 19th of this year.

J.R. Cunningham Young Investigators' Symposium

First Prize: *1st Author: Deidre Batchelar*
(Institute: JP Robarts Research Institute and University of Western Ontario, supervisor: Ian Cunningham)
Title: Imaging bone composition using coherent-scatter computed tomography.

Second Prize: *1st Author: Michelle Hilts*
(Institute: Vancouver Cancer Centre and University of British Columbia, supervisors: Cheryl Duzenli and Chantal Audet)
Title: **X-ray computed tomography polymer gel dosimetry.**

Third Prize: *1st Author: Jeremy Gill*
(Institute: JP Robarts Research Institute and University of Western Ontario, supervisor: Aaron Fenster)
Title: Evaluation of a semi-automatic technique for segmentation of the carotid arteries from 3D ultrasound images.

COMP Poster Awards:

The winning posters of the poster competition were:

Authors: *Jan Seuntjens and Chang-Ming Ma*
Institute: *Ionizing Radiation Standards, National Research Council of Canada, and Stanford University, CA*
Title: **Dose conversion factors and depth scaling for tissue dose calculations in kilovoltage x-ray beams.**

Authors: *Rubi Ananthamoorthy and Andrew Kerr*
Institute: *Kingston Regional Cancer Centre and Queen's University*
Title:. **Modelling and error detection capabilities of a strip ion chamber for Varian dynamic wedge treatments.**

The Awards Committee and Judges commend all competitors for their efforts in these two excellent events. The task of reducing the excellent field of competitors to five winners was an enormous challenge.

Editor's note: The photographs show that COMP is a class organisation when it comes to how we treat our award winners. They receive their cheques at the same time that the awards are announced!

L to r: Jeremy Gill, Michelle Hilts, and Deidre Batchelar with John Schreiner (2nd from right)

L to r: John Schreiner with Rubi Ananthamoorthy and Jan Seuntjens

Sylvia Fedoruk Award – 1998

This award is presented for the best paper on a subject falling within the field of medical physics, relating to work carried out wholly or mainly within a Canadian institution and published during the past calendar year. This is the twelfth year the prize has been awarded.

Winner:

"Optical CT reconstruction of 3D dose distributions using the ferrousbenzoic-xylenol (FBX) gel dosimeter"
Med. Phys. 25(9) 1741-1750 (1998)
Robin Kelly, Kevin Jordan, and J. J. Battista
Departments of Oncology, Physics, and Medical Biophysics, University of Western Ontario and London Regional Cancer Centre

The Selection Committee notes:

"The authors present a novel application of laser CT scanning to readout the radiation dose pattern recorded in a gel volume by 3D conformal radiotherapy techniques. This article is well written and showed an impressive attention to detail on the experimental methodology. It builds upon previous original work presented at conferences by the authors, and it substantially adds to the science of optical CT scanning. The technique competes well with magnetic resonance imaging (MRI) dosimetry techniques and it will be applicable to the quality assurance of new 3D methods of treatment planning and radiation delivery to cancer patients."

Michael Patterson presents the Sylvia Fedoruk award to Robin Kelly at the banquet of the 1999 COMP annual meeting in Sherbrooke

Runners-up:

"A new approach to electron-beam reference dosimetry"
Med. Phys. 25(3), 310-320 (1998)
Dave Rogers

"A semi-analytical model to investigate the potential applications.of x-ray scatter imaging"
Med. Phys. 25(6), 1008-1020 (1998)
Robert LeClair and Paul Johns

In Brief

Kelowna Migrations

In April, David Choi came all the way from Seoul, Korea, for a locum position at the Cancer Centre for the Southern Interior, in Kelowna, and has now accepted a position in Calgary that starts in August.

Darcy Mason

New Practice Leader

It is with great pleasure we announce the appointment of Dr. Cheryl Duzenli as Professional Practice Leader (Head), Medical Physics, at the Fraser Valley Cancer Centre of the BC Cancer Agency in Surrey, BC. Cheryl will take up her duties there July 2, 1999.

Ellen El-Katib

ICCR Meeting

The XIII. International Conference on the Use of Computers in Radiation Therapy (ICCR) 2000 will be held in Heidelberg, Germany, from 22-25 May 2000. The scientific program includes focus sessions on treatment planning, IMRT, treatment verification and patient positioning. An industrial exhibition will take place in conjunction with the conference. Information about location, scientific program, deadlines etc. can be found at the website http://www.dkfz-heidelberg.de/iccr/ For further information and Call for Abstracts please mail to iccr@dkfz-heidelberg.de.

Uwe Oelfke

Therapist Job Security?

From an article in the Hamilton Spectator, April 15, 1999 describing the strike by nurses and health support workers in Saskatchewan....

Lindh and Healey, who both have prostate cancer, say they're still getting their treatments but the replacement staff aren't exactly inspiring confidence. "They weren't too sure of what they were doing," Lindh

(Continued on page 76)

MDS Nordion Acquires Radiation Therapy Companies

By Nancy Lambrechts
Marketing Department
MDS Nordion, Radiotherapy Division

The last twelve months have been incredibly exciting for the Radiotherapy Division of MDS Nordion of Kanata Ontario. We are now poised to offer our customers worldwide a substantially expanded product selection that includes therapy units and accessories, treatment planning systems, information systems, and HDR Afterloaders. In turn, our customers will be able to deliver the highest quality patient care.

In May 1998, MDS Nordion announced the acquisition of Theratronics International Limited, a well-known manufacturer and supplier of treatment planning systems, the THERAPLAN Plus, and radiation therapy units, the THERATRON line of treatment units. This acquisition was the first step in a strategic plan to develop a leadership position in the radiation therapy market.

The next step in this program was the addition of German-based Isotopen-Technik Dr. Sauerwein GmbH (GAMMAMED(r)), a maker of high-dose-rate (HDR) brachytherapy equipment used to treat cancer in December of 1998. In addition to being a technology leader and pioneer in HDR brachytherapy, GAMMAMED has other product lines which complement MDS Nordion's business including treatment planning software and industrial radiography. Looking into the future, development has started on a radioisotope-based system to treat cardiac restenosis.

Most recently, Swedish based Helax and Precitron AB have joined the MDS Nordion group of companies. These additions expand the software product offering for information management in the radiation oncology suite and the external beam equipment product line. This also establishes a strong base of business in the European market.

MDS Nordion (www.mds.nordion.com) is a world leader in radioisotopes, radiation and related technologies used to diagnose, prevent and treat disease. With over 1000 employees, it is part of MDS Inc, a Canadian-based, international health and life sciences company. MDS employs more than 7,000 highly skilled people at its global operations in Canada, the United States, Europe and Asia. Detailed information about the company is available at the MDS Web site at www.mdsintl.com.

In Brief *(Continued from page 75)*

grumbled. "The doctor and the physicist are doing it but the physicist has to walk around with the directions in his hand."

Michael Patterson

New Cancer Centre Opens

The Prince Edward Island cancer centre officially opened on 25th June, 1999. Now all provinces in the country have at least one treatment facility. The facility cost $3-million and should be fully operational within two weeks.

Peter Munro

Pay Raise for PMH

There has been a substantial salary increase for physicists at the Princess Margaret Hospital in Toronto. The salary formula is: new salary = **factor** * old salary where **factor** may be between 1.0 and 2.0. Call your local PMH colleague for details.

Peter Munro

Go West Young Man! - Reprise

Following on the heels of Gino Fallone's departure for Edmonton, Trevor Cradduck is going to Alberta on a two year contract as Telehealth Director for the province under the alberta we//net initiative (see <http://www.albertawellnet.org/). The alberta w//net is an initiative to use medical informatics to integrate the health care delivery system across the province. About a year ago an anonymous donor gave $14M directed specifically to telehealth activities to the province and the government added another $7M for a total of $21M. Trevor will be administering that pot of money to expand the telehealth activities in the province. The province currently provides telepsychiatry and teleradiology. While both of these services will be expanded, the focus of the project will to provide telelearning for continuing medical education and to expand clinical services to include such things as teledermatology, telepathology, and emergency room services. Trevor will bring his experience with LARG*net and ONet, as well as his exten-

(Continued on page 77)

Annual Report of the COMP/CCPM Radiation Regulation Committee

By Peter O'Brien,
Chair Radiation Regulation Committee

The current membership of the committee is:

Peter O'Brien , Toronto, (chair)
John Aldrich, Vancouver
Clement Arsenault, Moncton
George Mawko, Halifax
George Sandison, Calgary

During the last year, the Radiation Regulations Committee (RRC) has continued to monitor and make comment on federal legislation and other publications dealing with radiation protection. A second set of comments were submitted on proposed new regulations under the Nuclear Safety and Control Act. Comments are also being prepared on C-200e, a regulatory guide on the content of radiation safety programs and AC-9, an AECB report on the management of patients who have received therapeutic amounts of radionuclides. Members of the RRC are actively involved in an AECB initiative to produce national QA standards for radiation therapy. The strategy for producing and implementing the standards (AECB report AC-10) was presented to the AECB in May of this year.

The RRC is active in some situations that have arisen with regard to provincial legislation. There is a general trend for provincial governments to reduce their involvement in radiation protection and quality assurance auditing. A letter of concern was sent to the Minister of Health in New Brunswick with regard to the elimination of the Provincial Radiation Health Protection Act in that province. Medical physicists are involved in talks with government authorities to devise replacement strategies. The RRC is also monitoring the situation in British Columbia where a new Worker's Compensation Act and Regulations are now in force and regulate the use and performance of diagnostic medical equipment. Medical physicists will be a part of an expert panel to set standards for diagnostic radiology Q.A.in B.C. In Ontario, the HARP Commission has been reformed. Physicists appointed to the various HARP committees will now report through the Radiation Regulations Committee.

The role of the RRC in provincial matters has not been well defined. The RRC will assemble a comprehensive list of current radiation protection legislation in Canada and will assemble a roster of "watchdog" physicists to report to this committee on events in each province.

The Federal Provincial Territorial Radiation Protection Committee (FPTRPC) has been formed. The RRC has established a relationship with that group and will attempt to recruit a medical physicist to be a member of that committee.

In Brief *(Continued from page 76)*
sive clinical experience, to the position. He is due to start with alberta we//net on May 3rd, although he has been working with them in a less than full-time role for several months already.

Trevor Cradduck

AQPMC meeting in Sherbrooke

On June 17, 19 members of the Association Québécoise des Physicien(ne) s Médicaux Cliniques (AQPMC) met to discuss ongoing professional issues for medical physicists in Quebec. Since January, we have produced an augmented translation of the "Role and Function" documents produced by the COMP Professional Affairs Committee, and published in the October issue of Interactions; the director of human resources of Hôpital Maisonneuve-Rosemont, M. Yvan Dubé, has accepted to review this first draft of the document.

Among professional affairs issue, Annie Doiron has reported on the Ontario experience with unionization. She emphasized the advantages of accessing the union's lawyers to negotiate and interpret work contracts and official recognition of the physicists' union by the employer. One other issue of interest to AQPMC is that of forming a professional order of clinical physicists which would use the CCPM for certification purposes. Since the provincial government does not wish to create new professional orders, it has been suggested by l'Office des professions du Québec that we form a medical physics chapter within an existing order. A motion was passed to approach the professional order of physicians, who has been warned of our intentions by the Office des professions.

Finally, Horacio Patrocinio has established a mailing list for the AQPMC. The address is AQPMC@medphys.mcgill.ca.

Jean-Pierre Bissonnette

News From Toronto Sunnybrook Cancer Centre

Daryl Scora has recently passed his Peer Review A and has now joined the crew at

(Continued on page 78)

Report of Chief Examiner of the CCPM, 1999.

By Gino Fallone

Membership Examination:

This year we had 16 candidates, 14 in Radiation Oncology Physics, and 2 in Diagnostic Radiology Physics. Of these eight candidates were successful, all in Radiation Oncology Physics for a overall passing rate of 50 %.

The successful candidates and who are now new Members of the College are:

Dr. Jeff Chen	**London**
Dr. Mingkang Yu	**Surrey**
Dr. Rasika Rajapakshe	**Kelowna**
Dr. Robert Corns	**Montreal**
Dr. Thomas Chow	**Hamilton**
Mr. Anas Orfali	**Ann Arbor**
Mr. Colin Field	**Edmonton**
Ms. Mary MacGillivary	**Winnipeg**

The invigilators for this year are:

Dr. John Andrew (Halifax),
Dr. Alistair Baillie (Kelowna)
Dr. Jeff Bews (Winnipeg)
Ms. Sherry Connors (Edmonton)
Dr. Ellen El-Khatib (Vancouver)
Mr. Michael Evans (Montreal)
Dr. T.J. Farrell (Hamilton)
Dr. Ting Lee (London)
Dr. Brian McParland (Riyadh, Saudi Arabia)
Mr. Peter O'Brien (Toronto)

The examination committee for this year's written Membership examination included:

Dr. Dick Drost,
Mr. Michael Evans,
Dr. B.G. Fallone,
Dr. Paul Johns,
Dr. Ting Lee,
Ms. Marina Olivares,
Dr. Peter Raaphorst
Dr. Ron Sloboda.

Fellowship Examination:

There were 8 fellowship candidates this year, all in Radiation Oncology Physics. Five (5) were successful for a passing rate of 62.5 %.

The successful candidates and who are now new Fellows of the College are:

Dr. Rasika Rajapakshe	**Kelowna**
Dr. David Wilkins	**Ottawa**
Mr. Darcy Mason	**Kelowna**
Dr. Katharina Sixel	**Toronto**
Dr. Jim Meng	**Halifax**

The examination committee for this year's Fellowship oral examination included the CCPM board comprised of:

Dr. Alistair Baillie,
Dr. Brenda Clark,
Dr. Peter Dunscombe,
Dr. B. Gino Fallone,
Dr. Ting Lee,
Dr. George Mawko,
Dr. John Schreiner
Dr. Christopher Thompson.

I would like to thank all of invigilators and examiners for their efforts in the 1999 examinations.

This is my last report as Chief Examiner, and I would like to extend my thanks to all invigilators and examiners that accepted my invitation to help out in the examination processes. I would also thank my fellow Board members for the enjoyable environment they provided during my eight years on the Board. My best wishes are also extended to my successor, Dr. Ting Lee.

In Brief *(Continued from page 77)*

TSRCC; Raxa Sankreacha from Kingston will join TSRCC starting July 1; William Que has accepted a tenure track faculty position at Ryerson University starting August 1; he will maintain a close tie with TSRCC while at Ryerson.

William Que

COMP Chair *(Continued from page 60)*

maintain this productive and cordial relationship and I look forward to interacting with him over the next year.

That's it for now – I hope you and your families have an enjoyable summer.

Mike Patterson
Hamilton Regional Cancer Centre

COMP Treasurers Report – 1999

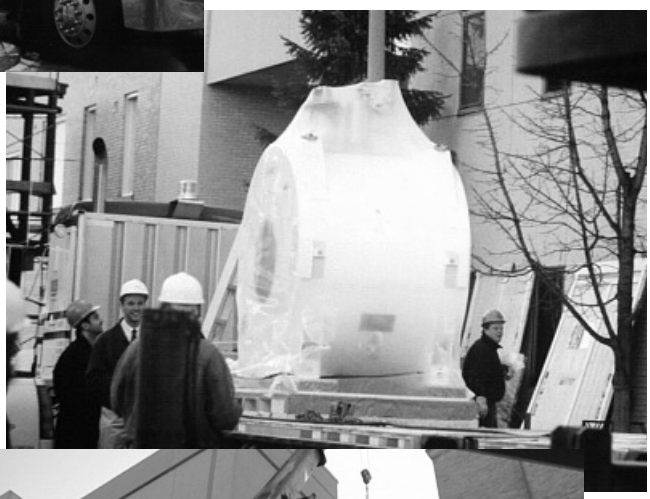
COMP Financial Details1998

BALANCE in Chequing/ Savings Account as of Jan1, 1998:			$19,647.42
Membership Dues			$32,279.82
Corporate dues			$13,084.34
Subscriptions	($276.01)	$0.00	($276.01)
HEJ Fund	$470.00	($2,470.00)	($2,000.00)
Minor Items	$0.00	($154.35)	($154.35)
Interest: CSA			$689.30
Interest: Bonds			$2,787.00
1998 Annual Meeting	$2,434.75	($2,434.75)	$0.00
Awards (YIS etc)			($1,189.00)
Midyear Mtg			($5,271.31)
Communication Committee			($1,823.00)
Radiation Regs Committee			($2,719.71)
Prof. Affairs Committee			($1,203.66)
Pres. Discrettionary Fund			($322.19)
ABR/CMA initiatives			($592.29)
Newsletter	$2,328.50	($5,566.76)	($3,238.26)
Annual Memb. Fees/Service charges			($1,008.66)
Publications/Directory			($3,216.53)
Secretariat Contract			($4,662.00)
Secretariat Non-Contract			($791.07)
Membership renewal			($236.95)
Miscellaneous			$0.00
Term Deposits		$0.00	$0.00
Profit (loss) from ASM'98			$9,200.00
To balance with Canada Trust			($30.99)
Balance of Canada Trust Account			$48,951.90
Term Deposits			$60,000.00
			$25,000.00
Balance of AGM 1997 account	$57,051.40	($57,030.20)	$21.20
NET as of Dec.31'98			$133,973.10

3T Magnet Installed at the Lawson Research Institute to Form Metabolic MR Laboratory

By Peter Munro with Paul Picot

On the 23 March, 1999 a 3T Magnet was delivered to the Lawson Research Institute, in London, Ont. Londoners finally were able to answer the question ”How do they get the ~~caramel~~ magnet into the …?” The magnet was commissioned during April 1999 and reached full field strength on 15th April, 1999 at 9:00 p.m. For more photographs and information see: http://mmrl.stjosephs.london.on.ca/index.html



A Look Towards the Third Millennium

By Rachad M. Shoucri
Royal Military College of Canada

Physicists can look back over their outstanding achievements in the 20th century with a sense of pride. The first half of this century has seen the development of relativity theory, quantum mechanics and the theory of atomic structure. The second half of this century has seen outstanding achievements in nuclear physics and in quantum electronics (lasers and masers); solid state physics has led to important applications of transistors and integrated circuits in the computer industry; fiber optics has introduced new developments in the communication industry; the conquest of space is without doubt a fascinating application of the laws of gravitation.

It has been said that the challenge of the 21th century will be the application of sciences in medicine and in environmental problems. As a theoretical physicist who has worked for 6 years in hospitals and who has done extensive work in the modeling of the mechanics of cardiac contraction(1,2), it is my opinion that theoretical physics will have the same impact on the advancement of medicine as it had on the advancement of physics. It is unfortunate that not many physicists seem to realize this evolution that is taking place, and that it will have a far reaching impact on our knowledge in biology and in physiology.

Several areas in medicine are using instrumentation that rely heavily on our knowledge in physics like x-rays, magnetic resonance imaging (MRI), positron emission tomography (PET), computerized axial tomography (CAT), ultrasounds imaging and doppler ultrasounds. These techniques are used to detect tumors and other abnormalties in brain, lungs, kidneys, heart and other parts of the body. The Nobel committee recognized this important contribution of physics to medicine by awarding the 1979 prize for medicine to U.S. physicist Allan Cormack and British researcher Godfrey Hounsfield, they worked out independently the mathematics of what we call now CAT scanning.

Application of electromagnetism in medicine has allowed the development of electrocardiograms (ECG) and made possible the easy detection of cardiac abnormalities. The same thing can be said about electroencephalograms (EEG) and electromyograms (EMG). Neurophysiology and the propagation of nerve impulses as well as the study of the bioelectricity of cells are more examples of the application of the electromagnetic theory in medicine. Fluid dynamics plays a fundamental role in modeling blood flow in arteries and in the study of the pump function of the heart. Transport phenomena are extremely important in the study of the way the blood carries oxygen and other nutrients to tissues, as well as in the study of the effect of drugs on the body. Diffusion processes are important in the study of the exchange of gases in the lungs as well as the diffusion of nutrients through membranes and to the foetus in the womb of the mother. Studies of DNA molecules rely heavily on forces between atoms and molecules that are studied essentially by means of quantum mechanics.

The physical concepts behind the way a man thinks, sees, hears, speaks, tastes, feels, walks, the birth of a baby – the greatest miracle of nature !! - are all marvelous and fascinating. They reflect the greatest physical design that has ever been invented in our world and probably in the universe.

It is my opinion that there is a need to reorient the teaching of physics in our universities in a way to add to the traditional study of inert matter the study of the physics of living matter. I suggest that courses in mathematical physiology and/or theoretical biology (like mathematical physics) can be introduced at the undergraduate level in physics departments in a way to draw the curiosity of young physicists to and to awake their interest in medical physics. Some books of general physics are already introducing examples taken from physiology. The traditional teaching of physics seems to have succeeded in forming graduates who have excelled in research and in laboratory work. There is a need nowadays to put more emphasis in the education of our young physicists on the way they can meet the growing challenges of the industry and of hospital work.

References:

1)R.M.Shoucri: Am. J. Physiol. 260, H282-H291 (1991)
2)R.M.Shoucri: IEEE Eng. in Med. & Biol. 17, 95-104 (1998)

New Executive Director

By Peter Munro

As you will see by reading the Chair's report, an Executive Director has been found by the search committee. The person selected is Brighid McGarry, who most of you will recognise as the person who has already served very ably in the role of the COMP Secretariat. To most COMP members she is only a name or perhaps a voice on the phone. To correct this lack of familiarity I managed to convince Brighid to provide a photograph so that COMP members could put a face to the name. So a warm welcome to Brighid McGarry – our new Executive Director!

I believe that her appointment marks the beginning of a new era in the development of COMP and provides the support we need to grow as an organization.

- Mike Patterson

Communications Committee Report – 1999

By Peter Munro

The Communications Committee (a joint committee of COMP and CCPM) was formed in June 1998 at the London annual meeting. Currently the members are:

Peter Munro, London (Chair)
Darcy Mason, Kelowna
Jacqueline Gallet, Winnipeg
James Mainprize, Toronto
Warren Foltz, Toronto
Lara Dyk, Montreal
Shidong Tong, Toronto

The Committee has two main roles – to publish the newsletter and to maintain the web site. I work on Interactions alone, while the other members of the committee work on the web site. In the past year we have:

1 created a new look and new name for the newsletter,

2 registered a url for a Canadian medical physics web site

3 created a new web site hosted by a commercial web hosting service called TorWeb, and

4 created an e-mail list-server to allow the COMP executive to communicate to the membership.

The web site appears to be well accepted. On average 1000 files are accessed per week (see Fig. 1) and the site is busy for approximately 9 hours each day (see Fig. 2).

We continue to work on improving the electronic version of the membership directory. We are working with the new executive director of COMP to simplify the task of maintaining the membership directory on-line. Electronic submission of abstracts and short communications are also a long term goal. We are looking to creating a repository of COMP documents on the web site, such as membership renewal forms. There is also some consideration about organising credit card payments for membership renewal. If this goes ahead the web site will support this feature.

The communications committee has many project to improve the services that members receive.

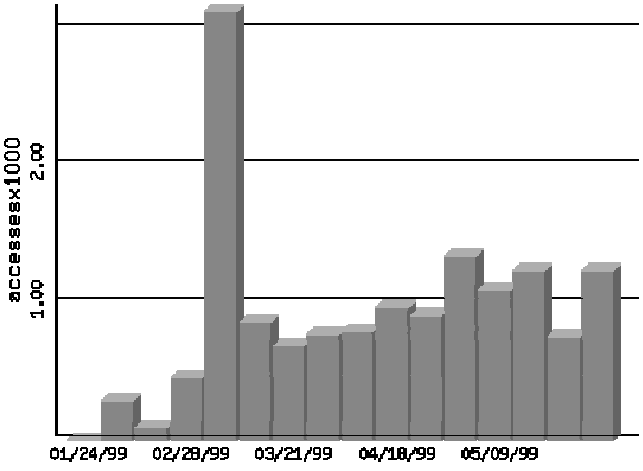


Figure 1

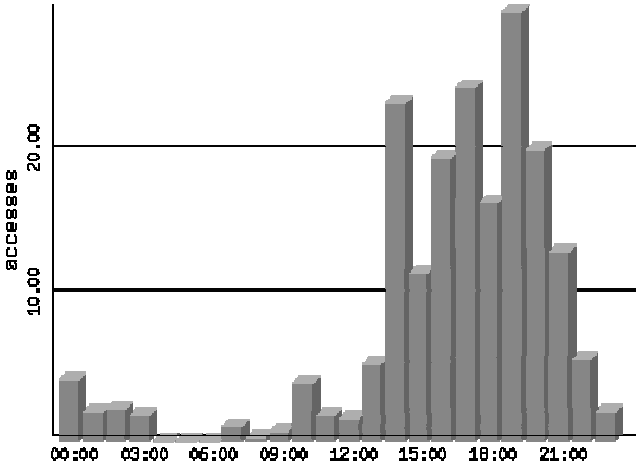


Figure 2

Scientific Program: COMP/OCPM Sherbrooke 1999 CCPM

Paper #	*Scheduled Time*	*Location*	*Title*	*Authors*
Wednesday, June 16, 1999				
	19:00	**Lobby**	Welcome Reception	
	20:30	**Coaticook**	**Mammography Forum**	Chair: I. Cunningham
Thursday, June 17, 1999				
	8:15	**C**	Welcome	M.S. Patterson (COMP), P.B. Dunscombe (CCPM), A. LaPointe (APIBQ), R. Lecomte (LAC), R. Lemieux (LAC)
		C	**CCPM APIBQ Symposium: The Role of Medical Physics and Biomedical Engineering in Healing the Broken Heart**	**Cochairs: C. Thompson and R. Lemieux**
S-1	8:30		Introduction: General anatomy and physiology of the heart	G. Leclerc
S-2	8:50		The use of PET and SPECT in the diagnosis of cardiac disease	R. deKemp
S-3	9:35		Cardiac SPECT and PET: clinical applications	F. Bénard
	10:15	**Lobby**	COFFEE	
S-4	10:35		The present and future roles of MRI, MRS and SPECT in ischemic cardiac disease	F. Prato
S-5	11:20		MRI and Radiology in cardiac disease	F. Plante
	12:00	**A,B**	**LUNCH/ Poster Viewing/Visit Commercial Exhibit** ***(lunch will be available in the Exhibit area)***	
S-6	13:30		Radiothérapie vasculaire pour prevenir la resténose: aspects cliniques	G. Leclerc, R. Carrier
S-7	14:15		Electrophysiologie et risque d'arythmies ventriculaires après l'infarctus	P. Savard
	14:55	**A,B**	COFFEE	
S-8	15:15		Utilisation de l'echographie Doppler pour l'évaluation hemodynamique des protheses valvulaires cardiaques	L.-G. Durand
	16:00	**C**	**CCPM Annual General Meeting (for CCPM Members and Fellows only)**	
	18:00	**A,B**	**Poster Session and Reception**	
P-1			Ion recombination in ion chambers in continuous radiation	C.C.L. Yang, D.W.O. Rogers, K.R. Shortt, L. van der Zwan
P-2			Characterization of a miniature fiber optic detector for radiation therapy	N. Kulkarni, P. Lu, X. Bao, K. Brown
P-3			Modelling and error detection capabilities of a strip ion chamber for Varian dynamic wedge treatments	R. Ananthamoorthy, A.T. Kerr
P-4			An automated method for the analysis of TL glow curves	P. Munger, R. Plourde, Y. Hervieux, W. Wierzbicki
P-5			Temperature changes in irradiated PAG gel dosimeters	G.J. Salomons, L.J. Schreiner
P-6			What radionuclides should be used for the radiation treatment of metastatic lesions?	W. Huda, M.V. Caliendo, F.D. Thomas
P-7			Commissioning of the brachytherapy module on Theraplan Plus	M.S. MacPherson, J.E. Cygler, D. Wilkins
P-8			Modeling primary fluence distribution of high energy photon beams in the Theraplan Plus treatment planning system	J. Sun, D. Sheikh-Bageri, G. Doswell
P-9			A simplified approach to dose calculations in heavily blocked hip irradiation fields used for the prevention of heterotopic bone formation	H.J. Patrocinio, M.D.C. Evans, L. Souhami, M. Tanzer, E. B. Podgorsak
P-10			Optimization parameters for inverse treatment planning of three-field prostate boost treatments	D.H. Hristov, B.A. Moftah, L. Dyke, W. Parker, L. Souhami, C. Huntzinger, E.B. Podgorsak
P-11			An improved method for commissioning 4MV wedged beams on a commercial treatment planning system	L.M. Sirois, C.Martel, H. Tremblay
P-12			Independent verification of monitor unit calculations performed by a 3-D Treatment Planning System	K. Leszczynski, P. Dunscombe, S. Desjardins
P-13			Dose conversion factors and depth scaling for tissue dose calculations in kilovoltage X-ray beams	J.P. Seuntjens, C.-M. Ma
P-14			Open and closed applicator effects on surface doses and extended SSD in kilovoltage energies.	D.N. Mihailidis, S.G. Connors
P-15			Total skin electron therapy (TSET) for mycosis fungoides (MF): a survey of current treatment techniques	S. Hussein

Scientific Program: COMP/OCPM Sherbrooke 1999 CCPM

P-16			Total body irradiation using 25 MV x-rays	E. Roussin, G. Lafrenière, J-P. Mercier, P. Chabot
P-17			Light collection from phoswich detectors used for depth-of-interaction measurement in positron emission tomography	A. Saoudi, C.M. Pepin, R. Lecomte
P-18			Comparison of regional cerebral blood flow and glucose metabolism in the normal brain	M. Bentourkia, A. Bol, A. Ivanoiu, D. Labar, M. Sibomana, A. Coppens, C. Michel, G. Cosnard, A.G. DeVolder
P-19			Image quality of a slot-scanned photodiode/CCD hybrid detector for digital mammography	J.G. Mainprize, N.L. Ford, S. Yin, T. Tumer, M.J. Yaffe
P-20			Program of accreditation for the units of mammography of the public institutions of Caracas	A. Diaz Aponte
P-21			A comparison of image quality measurements among mammography facilities in Ontario	N.L. Ford, D.R. Elfstrom, M.J. Yaffe
P-22			Breast screening for northern Quebec communities: a feasibility study	A. Gauvin, R. Carrier, R. Tremblay
P-23			Low Z and thin target portal imaging on a Siemens MDX linac	D.J. Beachey, O.Z. Ostapiak, P.F. O'Brien, B.A. Faddegon
P-24			Logit modeling of the MTF of metal/film portal detectors	T. Falco, B.G. Fallone
P-25			Monte Carlo simulations of recombination in amorphous selenium	M. Lachaine, B.G. Fallone
P-26			Optimum scan spacing for 3D ultrasound by speckle statistics	W.L. Smith, L. Boksman, J. Mandel, A. Fenster
P-27			MRI mapping of one-dimensional temperature gradients across ex-vivo liver during rapid and slow heating	J.C. Wallace, R.L. Clarke, G.E. Santyr
P-28			MR pulse sequences for accurate localisation of seeds and prostate contour in post-implant brachytherapy dosimetry	R. Poulin, A.-G. Martin, M. Dufour, G. Bouchard, R. Taschereau, L.M. Girouard, C. Moisan, J. Pouliot
P-29			Interstitial instrumentation for therapeutic ultrasonic heating: effects of the blood flow velocity in discrete vessels	B.J. Jarosz
P-30			Assessment of procedural modifications to improve cyrosurgery: an AT-1 Dunning rat prostate model investigation	J.C. Rewcastle, K. Muldrew, B.J. Donnelly, J.C. Saliken, G. A. Sandison, R. Baissalov
P-31			A study of dissolved hyperpolarized ^{129}Xenon for injection delivery	P. Sévigny, G. Santyr, J. Wallace, S. Breeze, S. Lang, A. Cross, I. Moudrakovski, C. Ratcliffe, B. Simard, J. Rip-meester
P-32			Aortic elastic properties: a perspective for surgical application	G. Pallotti, P. Pettazzoni
P-33			Study of an amplified time-gated transillumination technique for the detection of objects in highly scattering media	S. Marengo, C. Pépin, T. Goulet, D. Houde
P-34			Patient doses in spiral CT and intravenous pyelogram examinations for the detection of renal stones.	T.G. Green, W. Huda, R.B. Poster, C. Czyz
P-35			Fetal dose from the stereotactic irradiation of a pregnant patient	C. Audet, G.M. Kennelly, L.J. Watts and B.G. Clark
		C	**Prostate Brachytherapy Workshop**	**Chair: J. Pouliot**
	20:00		Introduction	J. Pouliot
	20:05		Seed calibration and activity measurements: should we rely on manu-facturer's numbers?	B. Clark
	20:17		Seed calibration and radiation exposure levels	D. Langer
	20:29		Impact of the AAPM TG-43 and NIST 1999 calibration standard on I-125	S. Tong
	20:41		Post implant comparison	S. Connors
	20:53		Uncertainties in post implant DVH determination	R. Taschereau
	21:05		Snap shots on needle loading techniques	All speakers
	21:20		Panel discussion	All speakers

Friday, June 18, 1999

		C	**Session 1: Radiation Modelling and Measurement**	**Chair: G. Fallone**
1-1	8:00		Monte Carlo study of cavity theory at low energies	J. Borg, J. Seuntjens, I. Kawrakow, D.W.O. Rogers
1-2	8:10		Diffusion with loss: a model for proton dose calculations	G.A. Sandison, A.V. Chvetsov
1-3	8:20		Assessment of the accuracy of a pencil beam algorithm to predict scattered photon fluence in portal images	B.M.C. McCurdy, S. Pistorius
1-4	8:30		Saturation current and collection efficiency for ionization chambers in pulsed beams	F. DeBlois, C. Zankowski, E.B. Podgorsak
1-5	8:40		Five dosimetric comparisons at ^{60}Co energy involving NRC in 1998	K.R. Shortt
1-6	8:50		Comparison of results in absorbed dose calibration between using the AAPM TG-21 and TG-51 protocols – photon beams	G.X. Ding, M.K. Yu, J.E. Cygler, C.B. Kwok
1-7	9:00		Clinical electron beam dosimetry – comparison between TG-21 and TG-51 protocols	J.E. Cygler, C.B. Kwok, G.X. Ding
1-8	9:10		Influence of isotope release on the dosimetry of a novel radioactive stent concept.	R. Corns, F. DeBlois, R. Mongrain, S. Julien, A. Garon, O. F. Bertrand
1-9	9:20		Determination of electron fluence ratios for various materials in a 9 MeV electron beam	M. Olivares, F. DeBlois, E.B. Podgorsak

Scientific Program: COMP/OCPM Sherbrooke 1999 CCPM

1-10	9:30		Comparison of solid water with water for dosimetry of kilovoltage x-ray therapy beams using cylindrical and parallel-plate ionization chambers	N. Blais, S. David
1-11	9:40		An analysis of work load and usage factors used for linac vault design.	B. Murray, D. Robinson
	9:50	**A,B**	COFFEE	
		C	Session 2: J.R. Cunningham Young Investigators Symposium	Chair: R. Lecomte
2-1	10:20		Monte-Carlo simulations of prostate implants to improve dosimetry and compare planning methods	R. Taschereau, J. Roy, J. Pouliot
2.2	10:32		Characterizing the myocardial blood oxygen state *in vivo* using MRI	W. Foltz, N. Merchant, G. Wright
2-3	10:44		Inhomogeneity correction factor for photons incorporating explicit electron transport	B. Shahine, E. El-Khatib
2-4	10:56		Evaluation of a semi-automatic technique for segmentation of the carotid anatomies from 3D ultrasound images	J.D. Gill, H. Ladak, D.A. Steinman, A. Fenster
2-5	11:08		Considerations for the implementation of clinical target volume protocols	T. Craig, J. Van Dyk, J. Kempe, V. Moiseenko, E. Wong, J. Battista
2-6	11:20		Quantitative analysis of metabolic breast images from positron emission mammography	M. Aznar, K. Murthy, C.J. Thompson, A. Loutfi, R. Lisbona, J.H. Gagnon
2-7	11:32		X-ray computed tomography polymer gel dosimetry	M. Hilts, C. Duzenli, C. Audet
2-8	11:44		Dynamic three-dimensional (3D) echocardiography: analysis of temporal jitter due to asynchronous image acquisition	S. K. Nadkarni, D. Boughner, M. Drangova, A. Fenster
2-9	11:56		Portal detector scatter dose calculation: comparison of convolution/ superposition with Monte Carlo	S. Ozard, E. El-Khatib
2-10	12:08		Imaging bone composition using coherent-scatter computed tomography	D.L. Batchelar, I.A. Cunningham
	12:20	**A,B**	**LUNCH/ Poster Viewing/ Visit Commercial Exhibit** ***(lunch will be available in the Exhibit area)***	
		C	**Session 3: Image - Guided Therapy**	**Chair: R. Carrier**
3-1	13:40		CT Imaging with a prototype Cobalt-60 tomotherapy unit	G.J. Salomons, B. Kim, G. Gallant, A. Kerr, L.J. Schreiner
3-2	13:50		Transabdominal ultrasound prostate imaging for monitoring target movements in the course of conformal therapy	D.H. Hristov, T. Falco
3-3	14:00		Quantifying thermal lesions induced by interstitial laser photocoagulation using blood flow maps	T.G. Purdie, M.D. Sherar, A. Fenster, T.-Y. Lee
3-4	14:10		Photodynamic therapy: implicit dosimetry via fluorescence	D. Hyde, T.J. Farrell, M.S. Patterson
3-5	14:20		Phantom study of isotherm dynamics during prostate cryosurgery	R.B. Baissalov, G.A. Sandison, J.C. Saliken, B.J. Donnelly, G.J. McKinnon, J.C. Rewcastle
3-6	14:30		A technique for setup verification in linac-based radiosurgery	T. Falco, M. Lachaine, B. Poffenbarger, E.B. Podgorsak, B. G. Fallone
3-7	14:40		A technique to characterize the motion of a medical linear accelerator and application to three-dimensional patient localization using radiographic image-guidance	M. Moreau, D.A. Jaffray, L.J. Pisani, D. Yan, J.W. Wong
	14:50	**A,B**	COFFEE	
	15:10	**C**	**CAP Lecture: F. Wesemael, *"Probing the Innards of Stars"***	**Chair: M. Patterson**
	16:00	**Mégantic**	**COMP AGM**	
	16:00	**Memphré**	**APIBQ AGM**	
	18:30	**B,C**	**Conference Banquet** **Announcement of Prize Winners**	
Saturday, June 19, 1999				
		C	**Session 4: Diagnostic Imaging – Physics and Technology**	**Chair: T. Lee**
4-1	8:00		Vascular tree extraction for landmark identification	B.K.H. Lee, D.G. Gobbi, T.M. Peters
4-2	8:10		Atomic evaluation of arterial stenoses by power Doppler imaging using a Markov field segmentation	D. Savéry, C. Tranulis, Z. Qin, Y. Goussard, G. Cloutier, L. G. Durand
4-3	8:20		Non-invasive measurement of the arterial input function for quantitative dynamic contrast-enhanced MR imaging of cancerous lesions in the rat	G.O. Cron, J.C. Wallace, T. Fortin, W.D. Stevens, B.A. Pappas, F. Kelcz, G.E. Santyr

Scientific Program: COMP/OCPM Sherbrooke 1999 CCPM

4-4	8:30		Accurate tracking of coronary artery motion for MR imaging	M.S. Susssman, N. Merchant, A. Kerr, J.M. Pauly, G.A. Wright
4-5	8:40		Imaging small animals with avalanche photodiode PET scanner	R. Lecomte, D. Lapointe, M. Bentourkia, J. Cadorette, S. Rodriugue, V. Silvanov, N. Brasseur, J.E. van Lier
4-6	8:50		Parallel FORE+OSEM iterative image reconstruction for 3D routine scans on the ECAT EXACT HR+	Y. Picard, M. Bentourkia, R. Lecomte
4-7	9:00		Initial experience with "ANIPET' a versatile PET scanner for imaging small animals	C.J. Thompson, P. Sciascia, S. Kecani, L. Nikkinen, A. Reader, M. Diksic, P. Cumming
4-8	9:10		Prospective study: new storage phosphor for digital mammography	R. Carrier, A. Gauvin, B. Curpen, L. Lalonde, D. Ouimet, M. Dumont, P.M. Dufresne, L. Menant
4-9	9:20		Radiation dose and mottle versus patient size in computed tomography	W. Huda, D.E. Ware, J.F. Ende
4-10	9:30		Measurement of X-ray scattering properties of biological materials	P.C. Johns, C. Buffet, S. Decossas, R.R. Scharf, R.J. Leclair
4-11	9:40		Noise aliasing in interline video-based fluoroscopy systems	H. Lai, I.A. Cunningham
4-12	9:50		Histogram analysis in the prediction of breast cancer	R. Lee, R. Palser, N. Davison
	10:00	**A,B**	COFFEE	
		C	**Session 5: Radiation Therapy Planning, Delivery, and QA**	**Chair: M. Olivares**
5-1	10:30		A practical approach to IMRT treatment planning, quality assurance, and beam delivery	W. Parker, L. Dyke, D.H. Hristov, E.B. Podgorsak
5-2	10:40		Beyond the conventional: advanced applications of CT-simulation	K. Mah, K.E. Sixel
5-3	10:50		A general relationship for the tolerance doses of different normal tissues in radiotherapy	G.K.Y. Lam
5-4	11:00		The first 50 proton therapy patients at TRIUMF: treatment planning considerations	C. Duzenli, R. Ma, T. Pickles, W. Kwa, V. Strgar,
5-5	11:10		A method to account for longitudinal wedge profile with Theraplan Plus	Y. Archambault, C. Dubois, M. Goulet
5-6	11:20		Assessing the advantages of conformal shaped fields over circular fields for stereotactic radiotherapy	B.G. Clark, J.L. Robar, C.M. Audet, L. Watts
5-7	11:30		Computer-assisted optimization for 3D brachytherapy treatment planning	J.W. Schella, P. Joseph
5-8	11:40		Choice of Pd-103 seed activity to minimize adverse effects due to seed migration associated with prostate implants	E. Oral, R. Taschereau, A.-G. Martin, J. Pouliot
5-9	11:50		Application of fiducial markers in conformal prostate radiation therapy	J. Szanto, S. Malone
5-10	12:00		A variable speed translating couch technique for total body irradiation	M. Chrétien, C. Côté, R. Blais, R. Roy, J. Pouliot
5-11	12:10		Quality assurance of compensators on a 3D treatment planning system	D. Provost, P. Dunscombe, K. Leszczynski, E. Lederer
5-12	12:20		Electron beam quality assurance using a commercially available energy-monitor	M.D.C. Evans, B.A. Moftah, M. Olivares, M. Gosselin, K. T.W. Wierzbicki, N. Frenière, E.B. Podgorsak
	12:30	**A,B**	**LUNCH / Poster Viewing / Visit Commercial Exhibit (lunch will be available in the Exhibit area)**	
	14:00	**Lobby**	**Departure for tours**	
	16:30	**Lobby**	**Departure for evening activities**	

CORPORATE MEMBERS

Argus Software, Inc.
2221 Broadway, Suite #212
Redwood City, CA 94063
Phone: (650) 299-8100
Fax: (650) 299-8104
e-mail: rstark@argusqa.com
Contact: Mr. Richard H. Stark, M.S.
President

Canadian Scientific Products
1055 Sarnia Road, Unit B2
London, ON N6H 5J9
Phone: (800) 265-3460
Fax: (519) 473-2585
e-mail: sgensens@csp2000.com
Contact: Mr. Steve Gensens
Sales Manager

CNMC Company, Inc.
2817-B Lebanon Pike, P O Box 148368
Nashville, TN 37214-8368
Phone: (615) 391-3076
Fax: (615) 885-0285
e-mail: CNMCCo@aol.com
Contact: Mr. Ferd Pusl

Donaldson Marphil Medical Inc.
1550 de Maisonneuve O. #801
Montreal, PQ H3G 1N2
Phone: (514) 842-5530
Fax: (514) 931-6408
e-mail:
Contact: Mr. Mike Donaldson

EEV Canada Ltd.
6305 Northam Drive, Unit 3
Mississauga, ON L4V 1H7
Phone: (905) 678-9811
Fax: (905) 678-7726
e-mail: Anne_An-Yong@eevinc.com
Contact: Ms. Anne An-Yong

Elekta Canada, Inc.
601 Milner Avenue
Scarborough, ON M1B 1M8
Phone: (416) 412-4607
Fax: (416) 412-4623
e-mail:
Contact: Ms. Anne Dreyer
Radiation Therapy Sales Specialist

G. E. Medical Systems
2300 Meadowvale Boulevard
Mississauga, ON L5N 5P9
Phone: (905) 567-2158
Fax: (905) 567-2115
e-mail: deborah.keep@med.ge.com
Contact: Ms. Deborah Keep

Hilferdine Scientific Inc.
25 Whitburn Crescent
Nepean, ON K2H 5K5
Phone: (613) 591-5220
Fax: (613) 591-0713
e-mail: hilferdine@sympatico.ca
Contact: Dr. Joseph Basinski

Landauer, Inc.
2 Science Road
Glenwood, IL 60425-1586
Phone: (708) 755-7000
Fax: (708) 755-7016
e-mail:
Contact: Mr. William Megale
National Sales Manager

Multidata Systems International Corp.
9801 Manchester Road
St. Louis, MO 63119
Phone: (314) 968-6880
Fax:
e-mail:
Contact: Ms. Patricia Roestel

PTW-New York Corporation
201 Park Avenue
Hicksville, NY 11807
Phone: (516) 827-3181
Fax: (516) 827-3184
e-mail:
Contact: Mr. Steve Szeglin
General Manager

Sandström Trade & Technology Inc.
610 Niagara Street, P. O. Box 850
Welland, ON L3B 5Y5
Phone: (800) 699-0745
Fax: (905) 735-6948
e-mail: stx@sandstrom.on.ca
Contact: Ms. Pia Sandström

Siemens Canada Ltd.
Medical Systems Division
2185 Derry Road West
Mississauga, ON L5N 7A6
Phone: (905) 819-5747
Fax: (905) 819-5884
e-mail: dean.willems@siemens.ca
Contact: Mr. M. Dean Willems
Manager, Oncology Systems

Theratronics International Limited
Box 13140, 413 March Rd.
Kanata, ON K2K 2B7
Phone: (613) 591-2100
Fax: (613) 592-3816
e-mail: marketing@theratronics.com
Contact: Ms. Denise Ashby
Regional Manager for Canada

VARIAN MEDICAL/EQ.
Bldg. 2-256, 4000 Kruseway Place
Lake Oswego, OR 97035
Phone: (503) 636-5433
Fax: (503) 636-7774
e-mail:
Contact: Mr. S. Clifford Robison
Northwest District Manager

Wellhofer North America
3111 Stage Post Drive, Suite 105
Bartlett, TN 38133
Phone: (901) 386-2242
Fax: (901) 382-9453
e-mail: wellusa@aol.com
Contact: Mr. Neil Johnston

X-Ray Imaging Consultants Ltd.
674378 Hurontario Street, RR #1
Orangeville, ON L9W 2Y8
Phone: (519) 942-1923
Fax: (519) 942-0288
e-mail: xicl@headwaters.com
Contact: Ms. Lois Brown, ACR
President

Together
we can put a new face on health science.

Princess Margaret Hospital, a member of the University Health Network, and a teaching hospital of the University of Toronto, has achieved an international reputation as a global leader in the fight against cancer.

Our international reputation for excellence includes many pioneering advances in the development of radiation treatment and planning. Many of the gold standards in radiation therapy were developed at Princess Margaret Hospital. Staff experts in all branches of oncology are world leaders in the planning and delivery of high-energy photon and electron radiation treatments, total body irradiation, and brachytherapy. We have an active and growing program in high precision radiation treatment. Our professional staff, including physicists and radiation therapists, collaborate freely with investigators at the University of Toronto and enjoy unparalleled opportunities to participate in clinical care, research and education programs.

Clinical Physicists

Princess Margaret Hospital has immediate openings for Clinical Physicists. Recognized as one of the top comprehensive cancer treatment and research centres in the world, Princess Margaret Hospital is Canada's largest cancer centre and houses the largest radiation facility in North America. Equipment includes 17 megavoltage treatment machines, several with MLC and EDIP, 4 simulators, a CT-simulator and a CT scanner, multiple 3D treatment planning systems and a range of brachytherapy equipment. An IMRT program is being implemented.

The ideal candidate will have opportunities for participating in the research, development and implementation of new technologies in precision radiotherapy and for participating in our clinical training programs. Qualified individuals will be eligible for academic appointment at the University of Toronto.

Candidates should have a Ph.D. in Medical Physics or closely related disciplines and a minimum of two years of clinical radiotherapy experience. Canadian or U.S. Board certification would be an asset.

We offer a competitive compensation and benefits package including relocation assistance.

Contact: Alan Rawlinson,
Head, Department of Clinical Physics,
Princess Margaret Hospital, 610 University Avenue, Toronto, Ontario CANADA M5G 2M9.
Fax: (416) 946-6566.

For more information on this and other opportunities, please visit our Web site at:
www.uhealthnet.on.ca

Princess Margaret Hospital is a member of the University Health Network, which also includes the Toronto General Hospital and the Toronto Western Hospital.

We thank all candidates for their interest, however only those considered will be contacted. We are an equal opportunity employer.

Princess Margaret Hospital
University Health Network

Cancer Care Ontario (CCO), Canada's largest cancer research, treatment and education organization, is responsible for developing an integrated cancer control system for the province of Ontario. CCO advises the provincial government on the planning of the provincial cancer system, develops standards related to the delivery of cancer programs, and promotes co-ordination and effectiveness of services provided.

As part of its mandate, CCO manages Ontario's eight regional cancer treatment centres. Each of these centres is equipped to support modern 3D radiation treatment planning, high energy photon and electron radiation treatment, and LDR and HDR brachytherapy. In addition, several of the centres are also equipped for techniques such as virtual simulation, stereotactic radiosurgery, total body irradiation and IMRT.

CCO is currently seeking qualified applicants for the following position to join the team-based radiation services programs in its Toronto, Hamilton, London, Windsor, Ottawa, Sudbury, Thunder Bay and Kingston cancer treatment centres.

MEDICAL PHYSICISTS

(Radiation Oncology)

These positions, along with support staff in mechanical and electronics technology, physics technology and computer systems, supply routine radiotherapy physics support to our radiation programs. In addition, they develop improvements to the radiotherapy programs through involvement in leading edge research and development initiatives. Current programs are underway in radiobiology, medical laser physics, and precision radiation therapy. Groups at various centres are working on improvements to verification imaging, dose calculation algorithm development and novel dosimetry systems. Qualified Medical Physicists are encouraged to assume academic appointments with affiliated universities, and are active participants in CCO's programs for training clinical medical physicists.

The ideal candidates will be caring professionals who possess a good working knowledge of the medical physics of radiation therapy, and who are able to integrate quickly and easily into the radiation program teams. Radiation therapy physics experience in diverse roles and settings would be an asset.

Succesfull candidates will have a Ph.D. or MSc. in medical physics or related discipline from a recognized university, at least two years clinical experience, and membership or eligibility for membership in the Canadian College of Physicists in Medicine (CCPM). A record of productivity in research or development activity will be a definite asset. Excellent written and oral communication skills are required.

Compensation for the positions of Senior and Medical Physicist is under negotiation effective December 1998, and currently ranges from $54,727 to $82,770 including a market retention bonus. CCO also offers competitive benefits, and will reimburse relocation expenses for successful candidates.

Qualified candidates for the above positions are invited to submit resumes and proof of qualification to: Provincial Human Resources, Cancer Care Ontario, 620 University Avenue, 15th Floor, Toronto, Ontario M5G 2L7. Fax: (416) 971-5400.

Or by e-mail to: karen.wallace@cancercare.on.ca

In accordance with Canadian Immigration requirements, preference will be given to Canadian citizens and permanent residents of Canada. We are an equal opportunity employer

From the Editor:

By Peter Munro

As you can see from this issue of Interactions the world of Canadian medical physics continues to be in turmoil. This includes pay increases for some physicists (see page 76), dissatisfaction by others (see page 63) and perhaps even extreme dissatisfactions by others (I understand that medical physicists in New Brunswick went out on strike immediately before the COMP annual meeting). I believe that we will look back at these times as ones of opportunity once all of the turmoil settles, but there will be many changes in the next few years. What are the forces behind this turmoil? There are the obvious ones such as the lag in the upswing of the Canadian economy compared to that of the USA, which has created unprecedented opportunities for those willing to migrate south of the border. Changes in standards in New York state have resulted in at least five Canadian medical physicists that I know of moving to New York in the past six months. But more importantly, although less recognised, is the influence of demographics on recruitment into the field. As those who perform research have been realising, the number of students applying for graduate studies has declined as the trough in the population following the baby boom exerts its influence. There is a fascinating article in the May 8th 1999 issue of the Economist that has some discussion about how demographics will influence salaries, recruitment, and retention. I believe that COMP can and should help recruitment into medical physics. In addition, as physicists leave the country, the shortage gives us an opportunity to refine or even re-define some of the roles of medical physicists.

Newsletter News

This issue of Interactions represents several firsts. One of those is the first advertisement from a COMP Corporate Member. I look forward to much more interest by our corporate members as the status of Interactions as a reliable and well-read publication increases.

Another first – for me – is the research that I performed for the historical article about London, Ontario's "Peacetime Bomb". Although it was a lot of work, I found that the more information that I discovered, the more fascinated I became about what actually happened 48 years ago. I was also intrigued (or perhaps frustrated might be a better description) by the poor reporting of the events by some of the popular media – especially the USA publications. It was very interesting to see how the events that occurred in London and Saskatoon were dismissed while activities at the MD Anderson were promoted. Far from claiming to have created an objective article at least I hope to have added a Canadian bias to this most Canadian of historic events. We have much to be proud of!

… as physicists leave the country, the shortage gives us an opportunity to refine or even re-define some of the roles of medical physicists.