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A Newsletter for those interested in proton, light ion and heavy charged particle radiotherapy.

Number 6 June 1990 Editor: Janet Sisterson Ph. D., HCL

This is the sixth issue of a newsletter devoted to matters of interest to all those involved, or planning to become involved in proton, light or heavy ion and heavy charged particle radiation therapy.

Future E-mail and Fax directories: I am still working on the preparation of directories for E-mail addresses and FAX numbers to be published in a future issue of Particles. If you wish to be included, send me your E-mail address and FAX number.

Information sent to me for inclusion in the newsletter does not need to be extensive but it should be "camera ready" if possible. I am using the following format; flush left; three quarter inch left and right margins,; single spacing using the 12 point New Century Schoolbook, if you have it, and the Times font, or whatever, if you don't. Graphs and line drawings are welcome.

The deadline for the next newsletter is November 30 1990, so that the seventh issue can come out in January 1991. Address all correspondence to:-

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FUTURE PTCOG MEETINGS

The times and locations of the next PTCOG meetings have been **changed** and are now as follows:-

PTCOG XIII	Berkeley CA USA	November 1 and 2 1990	note changed location
PTCOG XIV	Boston MA USA	Spring 1991	note changed location
PTCOG XV	Europe	Fall 1991	(? where)

If you want further information about these meetings or if you wish to join PTCOG, please contact the secretary of PTCOG, Michael Goitein, Department of Radiation Medicine, Massachusetts General Hospital, Boston, MA 02114.

The following topics were suggested for inclusion in the **agenda for PTCOG XIII**:-
Loma Linda facility commissioning; patient positioning/verification; new heavy charged particle initiatives; clinical high-LET experiment designs; panel meetings on protocol reviews, comparison of beam delivery methods, patient accrual and cost recovery, dosimetry intercomparisons, shielding including neutron background and beam contamination.

PTCOG XII Loma Linda California May 1990 - report from the Editor

This meeting had the largest attendance of any PTCOG meeting. Over 100 people registered for the main PTCOG meeting and about 60 for the workshop on gantries. As a result, the agenda was very crowded as so many people gave presentations. It was a very interesting meeting where many novel gantry designs and beam delivery systems were presented. The level of interest in groups developing or expanding their proton beam facilities was very high. For the first time I heard that Japan is planning to have several hospital based proton facilities and that there is interest in both England and the Soviet Union in possibly designing linear accelerators for proton therapy. The tour of the new Loma Linda facility showed the great progress they have made, I look forward to seeing it again when it is completely finished. The gantries are very impressive and move very smoothly and silently despite their size.

PTCOG News

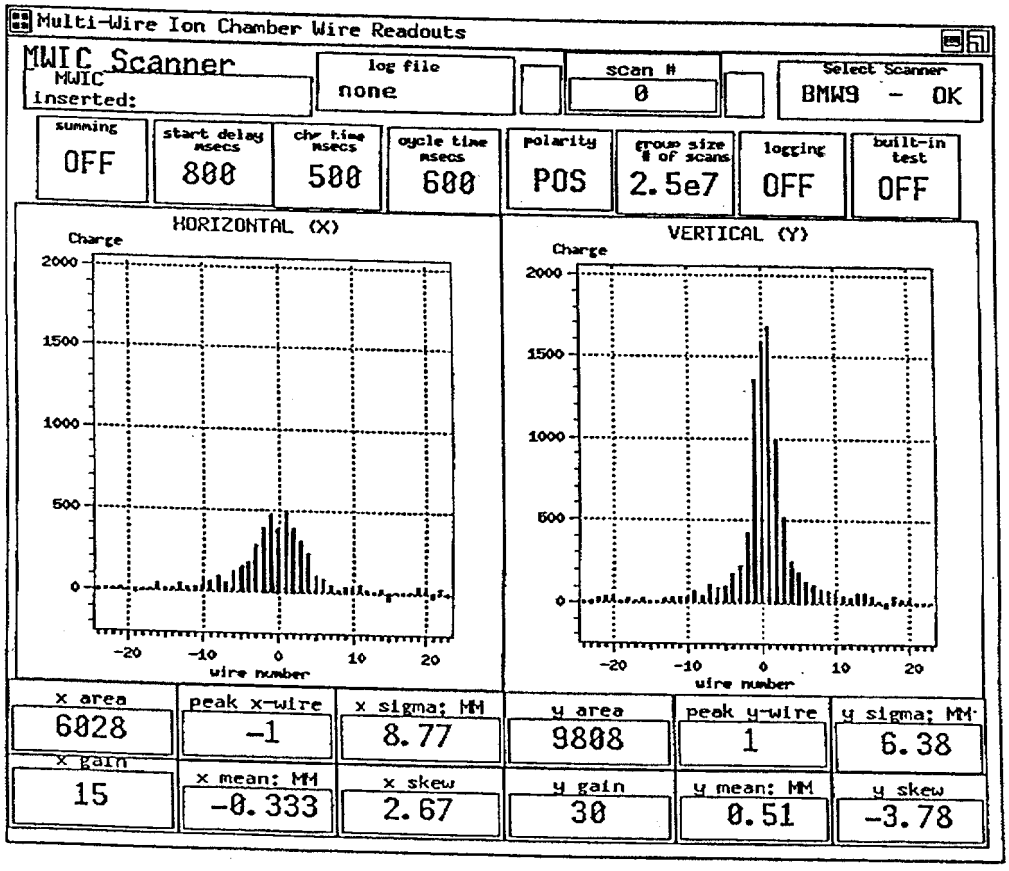
The following information was received by June 30 1990.

PMRC started at **Tsukuba, Japan**
PARMS, Particle Radiation Medical Science Center, terminated at the end of last March as scheduled before. A new facility, PMRC, Proton Medical Research Center, Tsukuba University, started April 1990. It took over most activities of PARMS, but no more irradiation with high energy neutrons is involved. Patient treatment with KEK proton beams is ongoing. Hirohiko Tsujii, M.D., was assigned as a new director, and Sadayoshi Fukumoto, Ph.D., was moved from KEK to PMRC for development and construction of a dedicated proton facility. *Sadayoshi Fukumoto, Proton Medical Research Center, University of Tsukuba, Tennoudai 1-1-1, Tsukuba-shi, Ibaraki-ken, 305 Japan.*

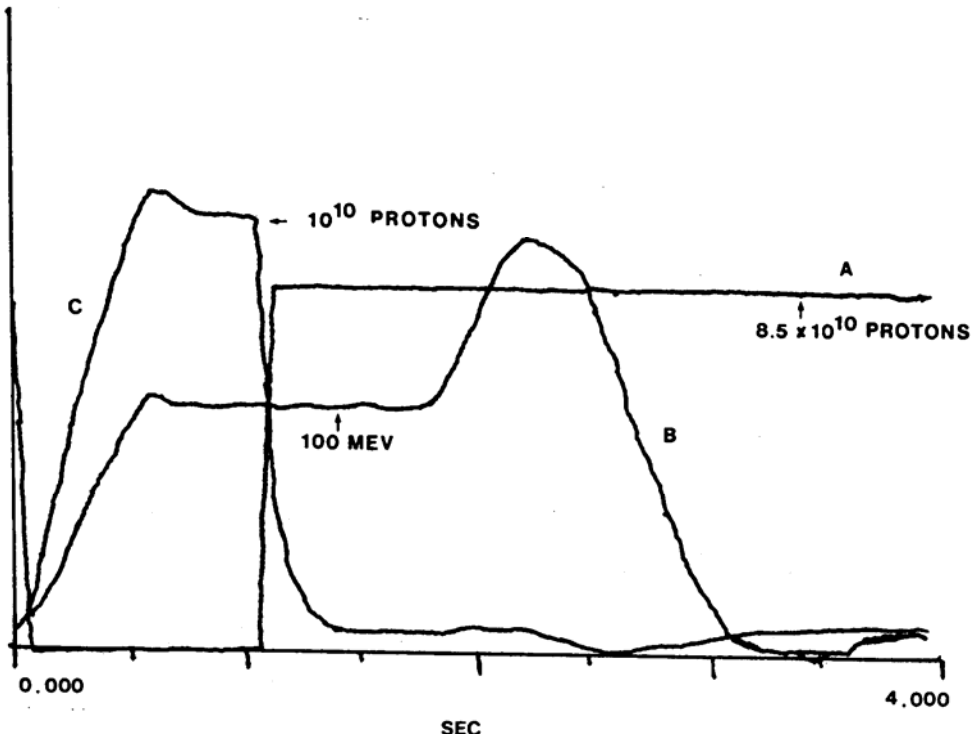
Loma Linda Accelerator and Facility
Construction of the proton treatment facility is nearly complete. The shell of the building is finished, and installation is on schedule for complete occupancy in mid-September. Presently, office appointments, carpeting and the like, are installed, and equipment such as CT scanners and simulators, is being installed in the new building and in adjacent, remodelled areas of existing facilities.

Present plans are to begin treatments with the eye beam line in the latter part of September, with the fixed horizontal beam line nozzle in December, and with the first gantry-mounted nozzle in early 1991. The accelerator is making good progress in commissioning and testing; the beam has been accelerated to 250 MeV, although at present it is operating at 100 MeV, in preparation for eye beam nozzle commissioning.

Approximately 10^{10} protons have been accelerated to flat-top with a four-second cycle time. The beam transport system to the Fixed Beam Room is operational; a 100 MeV beam was delivered on 6-13-90. Extraction efficiency of the accelerator is currently about 85%. At gantry #1, which will be the first employed for treatments, utilities are being attached; the system is expected to be ready for initial beam testing in July. The accelerator presently is being operated two shifts per day, 5 days per week; the beam line is in operation one evening shift per day, to permit installation in the Fixed Beam and Gantry rooms during daytime hours.
The following graphs illustrate the current performance status of the accelerator.



Beam Profile: First 100 MeV beam into fixed beam room
Grid spacing is in mm with each wire spacing at 1 mm



Extracted beam and beam intensity at 100 MeV
A. Extracted beam (8.5 x 10^9 protons extracted)
B. Dipole current (or ramp cycle) at 100 MeV
C. Ring intensity at 'Flat-top' showing number of protons in the accelerator

News from **Uppsala, Sweden**: A project for designing and building a proton gantry at the Uppsala synchrocyclotron has now begun.*Erik Grusell, Uppsala University, Department of Radiation Sciences, Box 535, S-751 21 Uppsala, Sweden.*

In **France**, the 200 MeV **Orsay** Synchrocyclotron, located 15 miles south of Paris, on the Orsay University Campus, has been renamed the "Centre de Protonthérapie d'Orsay" (CPO).

The facility is going to be devoted full time to proton therapy and is supported by 4 major Parisian oncologic groups: the Institut Gustave-Roussy, the Institut Curie, the Centre René Huguenin and the Assistance Publique de Paris (the City Public Hospitals Authority).

It should represent a yearly budget of $1.5 million, financed initially by the 4 groups and then by the National Health Care system, based on treatment expenses reimbursements.

Dr. Habrand, radiation oncologist at IGR and former fellow at MGH-HCL, has been appointed medical coordinator, Dr. Rosenwald, Chief of the Curie biophysics division, technical coordinator and Mr Desgranges, from the APP, administrative manager. The machine itself will be operated by 8 technicians and engineers chosen from the former physics team.

Moreover, a scientific and an administrative board are going to be constituted soon. They will evaluate, after a 3 year-operation, the project viability. The future treatment rooms have still been cleared and an eye treatment room should be completed by the end of this year. Future plans include a second room for large fields, 18 months later. *J.L. Habrand MD, Institut Gustave Roussy, Rue Camille Desmoulins, 94805 Villejuif cedex, France.*

Recent Developments at **TRIUMF, Canada**:
1) In this calendar year (1990) we will have 17 weeks of high intensity beam for pion therapy. To date the Glioblastoma trial has recruited 11 patients in each of the pion and photon arms. Accrual last year was seriously retarded by a protracted nursing strike and hospital bed closures. A total of 82 patients is required for completion of the study.

2) A prospective comparative trial of pions vs photons for patients with clinical Stage C or D (Clinical stage T3 or T4, No or Nx, Mo) adenocarcinoma of the prostate will begin in June 1990. The study will compare normal tissue tolerance doses of pions estimated at 37.5 Gy in 15 fractions with a best standard photon therapy estimated at 66 Gy in 33 fractions.

Patients will be stratified by stage, tumour grade and prostatic specific antigen level.

Principal end points will be an improvement in survival of 15% and in local control of 20% at 5 years. It is estimated that patient accrual would be complete in 2 years with study analysis done after a further 4.5 years of follow-up.

3) Please note that the Cancer Control Agency of B. C. has been renamed B. C. Cancer Agency.
George Goodman, B.C. Cancer Agency, 600 West 10th Avenue, Vancouver, B.C. V5Z 4E6, Canada.

News from the **Harvard Cyclotron Laboratory, U.S.A**: We have received an order for three compensated contoured scatterers to be designed and fabricated for LLUMC following the principles described by Bernie Gottschalk at the last PTCOG meeting. Delivery is scheduled for July.

The new stereotaxic alignment device for radiosurgery (STAR) has been delivered to HCL for extensive testing and completion of items by the supplier, Product Genesis Inc. It seems probable that Dr. Chapman's treatments with this apparatus will start in the autumn.

We have entered into a contract with an engineering firm for a design study of several building alterations, including two schemes to make a third treatment room of the former generator room. Discussion of possible funding schemes will be in order when we receive the study report in July. *A. M. Koehler, Harvard Cyclotron Laboratory, 44 Oxford Street, Cambridge MA 02138.*

At **ITEP, Moscow, U.S.S.R.**, the Medical Beam Laboratory has been transformed this year into the Medical Physics Department combining two laboratories and a number of technical groups. V. Khoroshkov is the head of this new department. Recently the patient totals data at ITEP has been reviewed and all those patients who had repeated courses of proton therapy are now only counted once.

Thus the patient totals reported in the 'World Table' in this issue of Particles are lower than before. As of March 1 1990, 1900 patients had been treated with 2573 courses of treatment; by May 1 1990, 1945 patients and a total of 2637 courses. *V. Khoroshkov, ITEP, B. Cheremushkinskaya 25, 117259 Moscow, U.S.S.R.*

Medical Satellite Meeting in Nice (EPAC 90): June 12-16 1990

The 1990 European Particle Accelerator Conference which was held at the Acropolis Convention Centre, Nice from Tuesday 12 June to Saturday 16 June, locally organized by the Cyclotron Laboratory of the Centre Antoine Lacassagne in Nice, included a 2-day Medical Satellite Meeting. 776 participants coming from 26 individual countries attended the conference. It opened with an address by P. Petiau, representing H. Curien, the French Minister for Research and Technology, followed by a brilliant review on physics with particle accelerators given by Professor Maurice Jacob; it ended with two excellent talks, on medical treatment with particle beams by Professor Castro from Berkeley and on Scientific policy in Europe by Professor Fasella, Director for Research and Development at the Commission of the European Communities.

The medical satellite meeting, organized by P. Chauvel, A. Wambersie and M. Wannenmacher, included a common afternoon session with EPAC on Thursday. The doctors interested in using what they call "high energy accelerators" welcomed this opportunity to interact with the machine designers. The satellite meeting concluded with a round table on the European Light Ion Medical Accelerator (EULIMA) and a description of the strategic approach of the Commission of the European Communities towards the use of particle accelerators for cancer treatment given by Professor Vermoken.

The associated industrial exhibition with 45 companies represented provided a good opportunity to develop contacts and gave the delegates a chance to see some of the latest technology available. This is an important component of EPAC, and contributes a particular style to these new conferences. *Pierre Mandrillon, Laboratoire du Cyclotron, 227 Avenue de la Lanterne, F-06200 Nice France*

Charged Particle Bibliography

Loma Linda Introduces PROLIT Database: Shown to attendees at PTCOG XII, this compilation of published and unpublished materials relating to basic and applied charged-particle research and therapy, was received enthusiastically. Several attendees obtained copies of the database; an order form is included with this newsletter if you are interested in obtaining PROLIT.

PROLIT currently contains about 1800 citations relating to charged-particle therapy, mostly proton therapy. The citations were compiled from MEDLINE searches and from lists of articles, reports and conference proceedings, supplied by some PTCOG members. The database as it exists now, is only a beginning; it certainly omits many important citations, because input thus far has been received from only a few sources. PTCOG members are encouraged to help the database grow.

Although the Department of Radiation Sciences and Medical Library & Information Center (MLIC) will continue to search the literature and update the citations, LLUMC intends that the database be interactive and dynamic, an ever-growing thing. That is, we ask that PTCOG members submit information to the

database, such as journal articles, book chapters, conference reports and internal reports. The objective is to share state-of-the-art information.The order insert included with this newsletter also contains a sign-up form for you to participate in this endeavor. We invite all who are interested in the physics, biology, engineering, and clinical applications of protons and other charged particles, to assist.

In its present form, PROLIT is a compilation of citations. Eventually, however, it will include the complete texts (with diagrams, illustrations and other figures) of important sources. The Radiation Sciences Department and MLIC are assembling the resources to accomplish the archiving task. In order to accumulate material for the archive, we will be asking contributing participants not only to recommend citations, but also tow provide full-text copies of all recommendations. Eventually, the full-text information will be available to all database users via networks such as BITNET or INTERNET, or via optical disc technology. *William Preston, Loma Linda University Medical Center, P. O. Box 2000, 11234 Anderson Street, Loma Linda CA 92354.*

Situations Vacant

The Harvard Cyclotron Laboratory

Postdoctoral Fellow

We seek a recent Ph.D. who will apply physics to the solution of practical problems arising in our work. Typical projects might include neutron shielding measurements and calculations; beam transport design, implementation and testing; dosimetry and digital radiography; design and construction of various electronic circuits. Since our support staff is minimal, hands-on experience with electronics and lab hardware and fluency in at least one computer language are essential. The Harvard University Cyclotron Laboratory is a clinical facility developing the use of a 160 MeV proton beam in radiation therapy and other applications such as radiation testing. We work in close collaboration with local area hospitals. Harness your skills to a worthy cause in a friendly and informal environment. Send your resumé, including references, to Bernard Gottschalk, Cyclotron Laboratory, 44 Oxford Street, Cambridge, MA 02138. Harvard University is an equal opportunity, affirmative action employer.

WORLD WIDE CHARGED PARTICLE PATIENT TOTALS
as of July 1 1990

WHO	WHERE	WHAT	DATE FIRST RX	DATE LAST RX	RECENT PATIENT TOTAL		DATE OF TOTAL
Berkeley 184	CA. U.S.A.	p	1955	— 1957	30		inc. in Berkeley Bev total
Berkeley 184	CA. U.S.A.	He	1957	— 1987	899		inc. in Berkeley Bev total
Berkeley Bev.	CA. U.S.A.	heavy	1975		2351		10/20/89 total all beams
Uppsala	Sweden	p	1957	— 1976	73		1976 original series
Harvard	MA. U.S.A.	p	1961		4994		Jun-90
Moscow	U.S.S.R.	p	1965		1945	*	May-90
Dubna	U.S.S.R.	p	1967	— 1977	80		1977 expected to reopen
Los Alamos	NM. U.S.A.	π-	1974	— 1982	230		final total 1982
Leningrad	U.S.S.R.	p	1975		508		Dec-87
Chiba	Japan	p	1979		65		Oct-89
TRIUMF	Canada	π-	1979		214		Dec-89
PSI (SIN)	Switzerland	π-	1980		478		Dec-89
Tsukuba	Japan	p	1983		178		Apr-90
PSI (SIN)	Switzerland	p	1984		719		Oct-89
Uppsala	Sweden	p	1988		13		May-90
Clatterbridge	England	p	1989		73		5/1/90
					922		pion beams
					2321		ion beams
					8678		proton beams
				TOTAL	11921		all particle beams

*Revised number; re-treatments are now excluded.

Proposed NEW FACILITIES for PROTON & ION BEAM Therapy

INSTITUTION	PLACE	TYPE	DATE 1ST RX?	COMMENTS
Loma Linda	CA U.S.A.	p	1990	250 MeV accelerator; 4 treatment rooms; 3 gantries.
Louvain-la-Neuve	Belgium	p	1990?	variable to 90 MeV proton beam; add to neutron facility
Nice	France	p	1990?	MEDICYC; neutron & proton radiotherapy facility
Orsay	France	p	1991	adapt an existing cyclotron no longer being used for physics.
N.A.C.	South Africa	p	1991	200 MeV.2 treatment rooms; 2 horiz. beam;1 vert. or gantry.
P.S.I	Switzerland	p	1992?	210 MeV, variable energy, dedicated beam line
G.S.I	W. Germany	ion	1992?	Heidelberg/Darmstadt. He & higher ions. 3-dim. raster scan
Chiba	Japan	ion	1994	HIMAC design complete; funds are available to construct.
A.P.D.C.	IL U.S.A	p	1994	250 MeV accelerator; private facility.
Harvard	MA U.S.A.	p	1995?	new accelerator & facility to be built at MGH
Novosibirsk	U.S.S.R	p	1995?	180 - 200 MeV linear accelerator
TRIUMF	Canada	p	?	adapt existing proton beam lines to therapy use.
EULIMA	Europe	ion	?	European cooperative venture; location not yet decided.
Indiana Cyclotron	IN U.S.A	p	?	200 MeV; other light ions possible.
Berkeley	CA U.S.A	p, ion	?	to replace the Bevalac.
Tsukuba	Japan	p	?	230 MeV accelerator; 2 treat. rooms; 2 vert+1 h beam;2 vert.