The Village Crier

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PROTON RADIOGRAPHY TO BE STUDIED HERE

An improved technique for detecting abnormalities in the deep regions of the body is the aim of an experiment being installed at Fermilab. The experiment will use the "extra" beam time of the linear accelerator to produce images on film by passing that beam through tissues of various densities. If the studies are favorable, the applications for the detection of cancer, for the diagnosis of lung and heart disease, and for other problems for which x-rays or scanning techniques are inadequate, could be significant.

...Sprouting from the Linac Gallery is the beam pipe leading to the experiment in proton radiography...

The experimenters are V. William Steward, M.D. and Joseph Curry, Ph.D., both of the Department of Surgery of the University of Chicago, and Andreas M. Koehler, physicist from Harvard University. Steward and Koehler began their collaboration in 1971 and did their first work in proton radiography at the Harvard cyclotron. They moved to the Argonne National Laboratory in 1974. But in both places they found their studies frequently "bumped" by the higher priority high energy physics program. With only ten hours of beam time a year, they could not make the progress they envisioned for their study. "The acceptance of our proposal by the URA Board of Trustees and our coming to Fermilab constitutes a real breakthrough for us," Dr. Steward ways. "Our set-up is compatible with both the high energy physics program and the Cancer Therapy Facility, and we are delighted that we will be able to have beam 24 hours a day, seven days a week." Theirs is the only proton radiography facility in the world, although similar work is contemplated in the Soviet Union.

The proton radiography experiment is located in the parking lot adjacent to the linear accelerator. Beam comes to the experiment through a long blue pipe dubbed "the snout" by passersby. The snout extends into a portable building where the experiment will be receiving test beam shortly. The experimenters will do studies with tissue specimens for several months. If their experimental results are satisfactory, they plan to seek approval to work with human patients in the spring of 1977.

Proton radiography tries to overcome two of medicine's most difficult problems -- the inability to diagnose tiny or hidden conditions suspected to be developing in a body, and the problem of excessive exposure to radiation from continued use of x-ray detection. Both conditions seriously hamper preventive medicine. "X-rays have now come to a 95% level of detection efficiency, and where do we go when we have exhausted the tricks of x-ray?" Steward comments.

"The clinician needs a radiographic image comparable to what the naked eye sees in autopsy, which x-rays cannot produce, while keeping the radiation doses within tolerable limits," he holds. "We think proton radiography will do this."

The difference between x-ray and proton radiography is largely the difference between

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the interaction in soft tissue of the two beams. X-rays interact at random with the soft tissue when they penetrate. Protons interact continuously and travel a known distance where their energy suddenly drops. However, if the protons encounter a mass of tissue with a density or hydrogen content which differs from its surroundings, those protons which pass through that inclusion will have a different energy loss than those that pass through the rest of the surrounding tissue. This difference can be recorded on film directly behind a site of suspected abnormality.

"More protons (than photons, x-rays) survive to tell their tale, so to speak, and thus a great deal more useful information is available at the detector (the film) level than from a beam of x-rays. This is the crucial difference between the two forms of radiation," the experimenters say.

In addition to the improved image, the preventive value of proton radiography offers hope for such problems as diagnosis of breast cancer. "There is still a question of the safety of mammography," Steward says. "There is the possibility of inducing cancer because of the dosage required to detect a cancer in the breast. We hope to show that we can detect a cancer of ¼ inch or less with a very small fraction of the dose presently used with x-rays. This would allow us to tell people who are completely healthy with no symptoms whatsoever that there is a valid clue they may have something developing.

"Since our dosage is not significantly higher than the natural radiation we have around us all the time, we could recommend regular screenings with proton radiography for such patients, with no danger of radiation damage."

The experimenters are just as hopeful about the results they might achieve with other ailments. Heart, brain, liver, and lung conditions which do not show up using any present day diagnostic procedure can be verified with proton radiography. Not a small bonus is the fact that their proposed in-hospital facility could treat 6-8 patients at one time.

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...A new Switchyard Service Building will house cryogenic refrigeration equipment and power supplies for achieving 1000 GeV capability in the proton beam transfer lines out of the accelerator. One bonus which will come with some of the present equipment moved to the new building and before the advent of the Energy Doubler and 1000 GeV, is the ability to run 500 GeV protons to the Meson Lab, thereby matching the capabilities of the Neutrino and Proton Lab beam lines...

BICENTENNIAL LECTURES CONTINUE HERE

Jane Goodall is among the lecturers on the 1976-77 schedule of the Fermilab Bicentennial Lecture Series. The famed anthropologist, known for her research while living among the wild chimpanzees in Tanzania, will come to Fermilab April 29, 1977. Others on the lecture schedule include Astrophysicist Carl Sagan, Robert McC. Adams, anthropologist-archeologist, and Economist Kenneth Boulding.

Tickets for the Sagan lecture on October 22 were completely taken within a few days after posters were distributed. Sagan, Director of the Laboratory of Planetary Studies at Cornell University, participates in the Mars Viking missions. He will speak about, "Extraterrestrial Life: Scientific Search and Human Implications."

On Friday, November 5, McC. Adams will speak on "Cities in the Sand." He describes the romance of exploring ancient cities and points up the ecological lessons modern civilization can learn from their remains. Professor Adams will illustrate his lecture with slides from his digs in Iran, Iraq, Saudia Arabia and Syria. A professor at the University of Chicago, Adams has been Director of the Oriental Institute.

Anyone interested in attending the Adams lecture should reserve his tickets early by calling the Guest Office at Fermilab at Ext. 3440 or Ext. 3091. If tickets cannot be used for any of the lectures, holders are urged to cancel their reservations so that the waiting list can be accommodated.

The Boulding lecture will be given February 4, 1977. Boulding is noted for his theories which combine economics and other social sciences in the attempt to find solutions to world problems.

Two earlier lectures in the Fermilab Bicentennial Lecture Series were given by William Powers, who discussed new radiation techniques used in cancer therapy, and Martin Kamen, who discussed the carbon isotopes and the rise of American biochemistry. Other lectures may be added to the present schedule.

The Fermilab Bicentennial Lecture Series has received a grant from the Illinois Humanities Council and the National Endowment for the Humanities. The lectures in the series were initiated by the Fermilab Auditorium Committee to bring together science and the humanities in such a way as to make both more understandable.

Both the scientists at the Laboratory and the laymen from the community have responded with enthusiasm, bringing full houses to the lectures in the past six months. The lectures are held in the Auditorium of the Central Laboratory Building at 8:30 p.m.

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NOBEL PRIZE IN PHYSICS AWARDED

Monday the Nobel Prize in physics was awarded jointly to B. Richter of Stanford University and Samuel Ting of the Massachusetts Institute of Technology. The award was in part for their work culminating in the remarkable simultaneous discovery of the psi/J at SLAC and at Brookhaven two years ago. This discovery has been a major part of the wave of new exciting high energy physics that has gone on both at Fermilab and elsewhere.

A few weeks ago Richter spoke at the Fermilab colloquium on "Very Big e+ e- Colliding Beams".

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BLOOD BANK SCHEDULES EMERGENCY VISIT TO FERMILAB

In an effort to bolster dwindling blood supplies in the Chicago Metropolitan area, the Aurora Blood Bank has requested that Fermilab schedule an extra day of donations. The Aurora Blood Bank will be at the Laboratory on Tuesday, October 26, from 9 a.m. to 2:30 p.m. in the Central Laboratory 1-West. Donors should schedule appointments with the Medical Office, Ext. 3232.

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EMPLOYEE NEWS AND NOTES

ESTIMATING YOUR RETIREMENT INCOME

Each year TIAA-CREF sends you a statement of annuity premiums paid during the year and an illustration of the annuity income you would receive at retirement under certain stated assumptions.

Your Social Security Retirement checks can be estimated too. For example let us say a man, age 58, joined the Laboratory in 1969 and expects to retire at age 65 in 1983. It can be estimated that the worker could get as much as $427.80/month from social security for himself at age 65 and $213.90/month for a dependent wife. Adding the amount from social security plus the TIAA-CREF estimated retirement income, the worker will better be able to plan his future. If the estimate is sizably less than his present income, he may want to contribute more to his regular retirement plan, start an SRA, or increase savings in some way to help supplement his retirement income. Your Social Security Office or the Employee Benefits Office, Ext. 3395, can assist you in estimating your retirement income to help plan for the future.

MARK YOUR CALENDAR AGAIN...

...NALREC Children's Christmas Party - Sunday, December 12.

...NALREC Holiday Dinner-Dance - Friday, December 17.

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DUPLICATE BRIDGE CLUB is off and running. First two sessions were enthusiastically attended and interest appears to be building. There is still room for additional players. Mark the time - every Monday at 7:30 in the User's Center (change from the barn). Call Marv Warner, Ext. 4430, if you have any questions.

HALLOWEEN DANCE

Sponsored by
Fermilab Music Club

No admission charge — Cash bar

DJ and records

Prize for the Best Costume

Kuhn Barn — Saturday, October 30, 1976 — 9 p.m. to 1:00 a.m.

CLASSIFIED ADS

WANTED - Avid philatelist needs foreign stamps. Would you save yours for her? Graciela Finstrom, CL-6W, Ext. 3447.

SQUARE DANCE lessons will begin on October 27 at Smith School in Aurora. For more information call Sharon, Ext. 3585 or Jim Humbert, Ext. 3555.

FOR RENT - 2 bedroom house on San Carlos Bay, Pine Island, Florida. Comp. furn., AC, best fishing & relax atmos., avail. by week-month or seasons. Call Art Streccius, X3580, 584-0712.

FOR SALE - Giant avocado, $30. Citrus trees, $5. R. Donaldson, Ext. 3278.

FOR SALE - 1969 Chevrolet Impala Custom V-8, auto. trans., P/S, radio, $550. Call Ralph Wagner, Ext. 3395.

FOR SALE - 1975 Pacer - 3-spd. manual, exc. cond., low mileage. $2600. Call Daine, X4450 or 584-5797.

FOR SALE - Fresh triple grade "A" Christmas greens - wreaths, garland & decorating kits (centerpiece or door decor). Sold by B.S. Troop 100 in Naperville. This money stays in the troop and also pays for the boys' summer camp in part or full. Call John, Ext. 3604.

FOR SALE - 1974 Fiat 128, 2 dr. sedan, exc. cond., low mileage, AM/FM, radials, protective trim. $2450. Call Henry Abarbanel, Ext. 3751 or 357-1699.