Synchrotron Dedication Today

Cornell Machine World's Largest

By MATTHEW FEINSTEIN and SAM PIZZIGATI

The Robert Rathburn Wilson electron synchrotron, the largest and most powerful in the world, will be formally dedicated here today.

The $12 million machine has been operating at full energy, 10 billion electron volts (Gev), since March 5.

The dedication will take place at 4:45 p.m. and will be followed by a reception and dinner.

During the day informal seminars will be held for the exchange of information among the many scientists who have gathered for the ceremony.

The machine's godfather, Robert R. Wilson, director of the Laboratory of Nuclear Studies here from 1947 to 1967, will be here from Weston, III., where he is working on the construction of the Federal government's 200 Gev proton accelerator.

Joining him will be Prof. Boyce D. McDaniel, present director of the Laboratory of Nuclear Studies and head of the synchrotron's experimental program and Leland J. Hayworth, director of the National Science Foundation.

Dr. Maury Tigner, senior research associate in nuclear studies and experiment schedule maker for the synchrotron, Prof. Donald Edwards, physics, Prof. Raphael Littauer, physics, as well as other professors in the Cornell community who have helped during the synchrotron's development, will also be present.

Among the many other guests will be President James Perkins and members of the Board of Trustees and the Cornell University Council.

Of nearly the dozen other synchrotrons in the world today, only four approach the strength of the Cornell machine. The United States, at Cambridge, Mass., England, Germany and the Soviet Union each have one of these large synchrotrons, but none exceeds seven Gevs.

Dr. Maury Tigner
Schedule Maker

The synchrotron is the sledgehammer of modern physics.

It produces an intense beam of electrons which is used to scatter any atom or subatomic particle that happens to be in its immediate vicinity.

A breakdown of the research expenditures reveals that the humanities receive less than one percent of the total funds allotted. The social sciences get slightly more than eight percent.

Cornell's Laboratory of Nuclear Studies, under Robert R. Wilson, former director of the lab for whom the synchrotron was named, view the synchrotron model when the contract was awarded three years ago.

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THE ACCELERATOR: The source of the electrons hurled around the synchrotron is a 150 million volt traveling wave electron linear accelerator, commonly called a “linac.”

IN THE SYNCHROTRON: In the synchrotron hall, left, is the area where experiments are conducted. Several experimental set-ups are usually on the floor at one time. Technicians and scientists, right, use bicycles to perform their work around the half-mile long tunnel. The magnet ring opposite the idea shown curving around the tunnel.

Photos by Office of Public Information

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Synchrotron Story: How It Works

HOW IT WORKS: Three major subsystems are involved in a synchrotron. The first is the injector, in which electrons are collected and accelerated to an energy of millions of electron volts by forcing them to ride the crest of a wave in an S-shaped wave guide. The magnet ring, which shapes the beam into a circular path, is the second subsystem. The injector’s electrons receive a boost of energy. In a superferrant beam their wave is diverted into a heavy metal target by what is called the “bump” magnet. The sudden stopping of the electrons releases an intense narrow beam of gamma rays (H) which emerge from the magnet ring and pass into the experimental halls. Here the gamma rays may be allowed to hit a second target. Attaching novel properties of the target material to the detectors provides us with information.

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Checking

CONSTANT VIGILANCE Prof. Raphael Littauer, physics, is shown adjusting steering coils which are distributed around the synchrotron ring.

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G.B. CO., INC., ROCHESTER, N.Y.
Synchrotron Can Send Electron

1500 Miles in Fraction of Second

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about half as great as had been possible before.

A synchrotron works by taking a

number of the mill

electrons and bringing them up
to very high energies.

Each time electrons go around

the synchrotron loop they are

given four pulses by

strategically placed electron

pushers, more commonly known as

radio frequency resonating
cavities.

Each of these things can only

add a relatively small (up to 2.5

million electron volts) amount of

energy to the electrons, so the
electrons have to go around the

loop many times in order to

come up to their final energy.

In fact, the electrons go

around the loop about 3000 times,

traveling a total distance of 1500

miles, or about the distance

from here to New Orleans, in a
time of about 0.07 seconds.

They actually end up a few

yards from where they began

and are either used for

experimentation or are used

to make x-rays or other things

which are in turn used in other

experiments.

Electronic Circles

One of the problems one runs

into in designing a synchrotron is

that electrons, by themselves,
do not tend to travel in circles, and

in fact would tend to shoot off

into space somewhere.

So, electron-push-benders, also

known as electromagnets, are

placed around the loop.

Finally, if you take a bunch of
electrons and put them at the

start of the synchrotron loop, they

will just sit there and do

nothing. They must be given

some energy beforehand and be

shot into the loop.

This is done at the Cornell

machine with what is called a

linear accelerator, which brings

the electrons up to 150 million
electron volts.

Another problem that is
generally encountered is

figuring out just what it is that
the electrons have done, after

they've done what they do.

One device that is used at

Cornell is what is called a spark

chamber. When a particle goes

through the chamber, its path is

traced out in sparks and its

picture is taken from various

angles.

Scintillation

If the experiment is not as

much concerned with exactly

where the particles are as how

many there are, a scintillation

counter is used.

With a scintillation counter, as

the name implies, as something

happens it scintillates, or gives

off light, and these pulses of light

are then counted.

An unfortunate tendency of

electrons travelling around in

circles is that they tend to give

off radiation thereby losing

energy.

Besides the energy loss, this

radiation tends also to be

harmful to any biological

material that happens to be

around.

Safety Measures

In order to avoid damaging the

experimenters and their future

families, elaborate safety

precautions are taken.

For one thing, no one is

allowed near the machine while

it is in operation. If anything in

the tunnel moves while the

machine is going it is detected

with an electric eye network

which is said to be difficult to

circumvent.

If anything is detected, synchrotron personnel ride

around the tunnel on a bicycle to

find out just what is going on.

—MATTHEW FEINSTEIN

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Ohio 45042.
Illness Ends Bangs’ Reign
As County DemChairman

John F. Bangs resigned as the Tompkins County Democratic Committee Chairman, this Monday. Banks is presently in the hospital suffering from a heart attack, which occurred Monday, Sept. 30.

According to Mrs. Bangs, her husband resigned from his chairmanship because he felt that there was “too much tension and dissension in the party this year,” and that the resulting stress was “more than he can stand.”

Mrs. Bangs said that the doctor advised her husband to resign as chairman because his heart condition is worsened by stress.

Mr. Francis Fabricatore plans to run for the office which is elected by the county democratic committee. There are no other candidates for the chairmanship at this time. According to Mrs. Bangs, her husband considers Mr. Fabricatore a “fine man.”

In his resignation, Mr. Bangs said of Mr. Fabricatore that “if any Democrat in Tompkins County has earned the title of Mr. Democrat Fab most certainly has.”

Mr. Bangs is also at present the third ward alderman and acting mayor. He will continue to hold these offices.

Detroit Mauls
St. Louis, 13-1

Continued from Page 1

Tigers hopped on him for two runs in the second when Norm Cash walked on a hit by pinch hitter. But in the third inning, Jackson showed an offensive approach.

Before it was over 10 runs were in, 15 men had been at bat and the Cards’ Wachburn, Justor, Ron Willis and Dick Hughes had been roughed up for a grand slam homer, six singles, four walks and a hit batman.

Kaehne, the hitting star of the Tigers’ fine comeback, delivered his second Series homer in the fifth against Steve Carlton, fifth of seven Card pitchers.

McAlevin never had it so good. The 31-game winner of regular season coasted along with a big lead, pitching steady ball against the defelected Cards.

Donovan Runs
3 NYC Schools,
Sustains McCoy

Continued from Page 1

McCoy was suspended with the seven principals yesterday for delaying Board of Education orders to reinstate 80 white members of the AFL-CIO United Federation of Teachers. The 80 were ousted from their Ocean Hill classrooms in a dispute that grew out of the decentralization of the district. Four of the seven principals are Negroes, one of white, one is Puerto Rican and one is of Chinese extraction.

Over the weekend, the 19-member board of Ocean Hill also had been suspended. Their attorney filed a suit during the day in State Supreme Court asking for their reinstatement. A hearing was set for Friday.

The predominantly white UFT, with 65,000 members, threatened a citywide teachers strike for the third time in a month, unless the Ocean Hill teachers were restored to their original duties.

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Scouting Penn

Zbrzeznj, Santini Spark Quakers

By RED MARKS
The University of Pennsylvania football team is 2-0 this season. The Quakers stepped on Bucknell in the opening game and beat Harvard last Saturday in a 59-0 rout. Brown is the same team we’ve all known and loved for years.

Merely because Penn already has two victories under its belt, then, is no easy indicator of how good or bad coach Bob Odell’s Quakers really are. Their performance against Cornell Saturday will be the true test.

There are definite indications, however, that this year’s Penn squad may well be considerably stronger than Quaker teams of recent seasons.

Cornell assistant coach Bob Valecente, who has done the scouting on Penn over the last two weeks, was impressed by a "tough and desire" that may previously have been absent.

The spirit of the Quakers was obvious enough for Valecente to notice that they “responded to the relative rewards and were able to take advantage of opportunities given to them,” especially in the Bucknell game.

More important than picking up that two of the Quakers in the second game was the ability of the Penn offense to move the ball both on the ground and through the air. As far as mistakes go, Penn had enough of its own in the scoreless second half.

The Quakers lost two fumbles and had a pass intercepted, which kept them from making the win over Brown look easy.

In the first half, however, the Penn offense amply showed the same effectiveness it had displayed the week before against Bucknell.

Led by quarterback Bernie Zbrzeznj, halfback-work horse Gerry Santini, and end Pete Blumenthal, the Quakers have racked up a creditable 618 yards in their first two contests.

The 5’9. 172-pound Zbrzeznj (Za-breznj for you bafflers) has, in his roll out style, completed 18 of 33 pass attempts, 240 of total yards. But the diminutive QB can run as well, by his eight yard a touchdown against Brown.

When the ball is to be run, however, it’s a good bet that Santini will be holding it. He has completed 18 of 33 and has a total of 164 yards and one touchdown.

Frustrated Booters Bow
On Colgate Penalty Kick

By ROBERT A. MICHALOVE
Take a potent attack which just won’t get there. Then add a pair of officials who’s calls were questionable and at times most interested in the result. The result, frustration. That was about it yesterday afternoon as Colgate left Upper Alumni field with a stunning 1-0 upset over the Big Red.

While the win was the result of a tremendous effort by the out classed Maroon Raider things just didn’t go right for Cornell.

From the start it was apparent that Colgate was up for the game. The boys from Hamilton grabbed early breaks they could get and a few, more as they took their 1-0 lead with 1:45 gone in the second period, on a goal headed by Bob Tisch.

Cornell’s scoring woes centered around mid-field where Colgate maintained ball control. It was not until the closing minutes of the first half that Cornell really got going. The Raiders seemed to weather those scoring thrusts however as three shots off the foot of forward Nick Alexandris were parried blocked.

Cornell coach Bill Pentland’s half time show really fired up the Red as they came out flaming. After only two minutes of action Cornell appeared certain to even the score as Alexandris stood ready to drive a penalty kick past Rich Umpleby. Umpleby was golden as Alexandris failed to connect for the first time in his varsity career.

Several beautiful crosses by Clark Myock were eaten up by Umpleby. Allen Dittenhofer got hold of a corner kick high in front of the Colgate net and let loose with a spectacular scissor kick.

The Raiders got back however as the point blank bomb was right at Umpleby.

While he ended up on the wrong side of the shoutout John Penman played a strong game making 13 total saves including one on a Mario Pennutti penalty kick attempt.

SPORTS NOTICES

CROSS COUNTRY
The deadline on entries for the Intramural Cross Country Meet is today at 2 p.m. All those who wish to compete should register at the Intramural Office.

FENCING MANAGER
Any freshman or sophomore interested in becoming a fencing manager should contact Ed McCabe in the Teagle Hall fencing room, any weekday at 5 p.m.

FRESHMAN SKI TEAM
All freshmen interested in trying out for the freshman ski team should report to Barton Hall tomorrow at 4:30 p.m.