

SLAC BEAM LINE

Where there is matter, there is geometry.
—Johannes Kepler

Volume 13, Numbers 1-2

January-February 1982



The TPC, PEP's newest detector, was moved into the beamline in IR2 on Wednesday, January 6th. Challenging superstition, the crew held the ceremony *before* the move. LBL Director D. Shirley, W.K.H. Panofsky and project physicist Dave Nygren shared the podium. The 1000-ton detector, named for the Time Projection Chamber at its center, is visible at left.

SLAC Beam Line, Bin 80
Stanford Linear Accelerator Center
Stanford University
Stanford, CA 94305

Editors: Bill Ash, Bill Kirk, Herb Weidner
Editorial Assistant: Jan Adamson
Articles: Dorothy Edminster
Photography: Joe Faust, Walter Zawojski
Graphics: Technical Publications Department

In This Issue

Sayonara "91"	2	New Library Video	7
SLAC Footrace	4	SLAC Christmas Party	8
Aaron Baumgarten	6	Auld Lang Syne	8
Marguerite Nichols	7		

SAYONARA 91

After almost 13 years of service to the SLAC community, the IBM 360/91 was retired on Friday, August 21. The reduced use of the 369/91 and the continued cost of maintenance and utilities made this shutdown desirable.

The 91 was SLAC's first "big-time" computer. We installed a 360/75 in 1967 to gain experience with the new operating system and hardware. The 360/91 was installed in October, 1968 and was the only central computer at SLAC until it was joined by the two 370/168's in early 1974, forming the "Triplex" system.

The 91 was an unusual machine. It was designed specifically for very fast floating-point computation, and was remarkable in its day: 120 nanosecond (billionths of a second) addition,

180 nanoseconds for multiplication, and 300 nanoseconds for division--all for operands of 64 bits, equivalent to decimal numbers with about 15 places. The average rate was about 3 million instructions per second. It also had a special instruction stack that allowed small loops to be executed without memory references for instruction fetching, giving an instruction rate of about 15 million instructions per second. IBM built about 20 model 91's, of which only two are still known to be in service (at Oak Ridge and at NASA's Goddard Space Flight Center).

In the period when the 91 was our only production computer, many developments took place. Originally, the 91 ran under IBM's OS/MVT operating system, pretty much straight out of the box. Then, about a year later, we added the HASP (Houston Automatic Spooling Priority) sys-



An informal ceremony was held in the Computer Building on Friday, August 22, 1981, to say goodbye to the IBM 91 computer. The participants visible in the picture are (left to right): Fred Hooker and Hector Prado of the SCS Networking Group; Marv Finney, the IBM engineer who had to cope with the 91's quirks (see his farewell poems on the next page); Sujit Banerji, an IBM Systems Engineer who played a key role in the installation of the 91, the 168's and the new 3081; Les Cottrell, manager of the SCS Networking Group and a past heavy user of the 91 in his previous incarnation in Experimental Group A; Joe Ballam, Director of the Research Division; Vern Bland, a Senior Operator in SCS; Joe Wells, Assistant Director of SCS; Frank Rothacker of the Computation Research Group, one of the earliest users of the 91; and Alex Tseng of SLAC's Plant Engineering Department, who is clearly worried about this highly unorthodox method of turning off a major piece of delicate electronic machinery. The plaid-shirted arm at left is the author's.

tem to help schedule devices, jobs, tapes etc. (For a long time, the acronym HASP was believed to mean "Half-Assed System Program.") Then, in 1970, we began working on a terminal system: first, we used the Conversational Remote Batch Entry (CRBE) system; it was rapidly supplanted by WYLBUR, which enjoyed very rapid growth and wide popularity.

The summers of 1972 and 1973 were hectic, with the computing load having grown to the point where special scheduling meetings had to be held to accommodate the needs of physicists who had promised to give talks at meetings in August. Relief arrived in early 1974 in the form of the two 370/168's, new high-density tape drives, and bigger and faster disk drives. User conversion from HASP to ASP Triplex went much faster than we expected, so that all of SLAC's production work was running on the Triplex by the summer of 1974.

With the advent of the Triplex, the 91 became a batch machine, and all the interactive services were moved to the 168's. In this mode, the 91 was a very capable member of the Triplex; at its peak use, running in a "class H" production mode, the 91 delivered over 500 hours of computing in a single month.

The feature of "virtual memory" on the 168's allowed the users to write larger programs without affecting the performance of the system. Over time, however, two factors led to the demise of the 91: first, its technology and organization was such that it could not be connected to the newer and faster devices used with the 168's and the 3081 (the newest addition to the computing facility which was installed in the past year), nor was its fixed memory sufficient to cope with the continued expansion in the size of the user programs. Second, maintenance of the machine became more difficult as the availability of parts and trained engineers dwindled. (See the accompanying poems by Marv Finney, an IBM engineer who had to cope with the 91's many quirks in its later years.)

Over its 13-year lifetime, the 91 averaged 350 hours of production computing per month. At its nominal rate, it would appear that the 91 delivered about 500 trillion instructions in its 13 years. I don't know how many of us have come close to seeing, touching or smelling 500 trillion of anything; but if you ever did see touch, or smell the 91, remember that those boxes cranked out half a quadrillion instructions during their stay at SLAC.

-John Ehrman

TWO POEMS FOR THE NINETY-ONE

A massive computer at SLAC
Had a failure (alas and alack!).
The CE's couldn't fix it,
So Beeman said, "Nix it,
To IBM send it right back."

"The trouble, we're trying to plot it."
said the CE's, "and we think we've got it.
Of tea, have a cup
'Cause the beast is now up,
just IPL it and start it."

"Say hey!" said Al Beeman, a-smiling.
"Our programs are really compiling.
But you guys are too late,
For this is the date
That we turn this thing into iron filings."



Three-sixty, ninety-one
You've paid your dues, your day is done.
You have been a lot of fun,
Now there's a 3081.

You were once the star of this complex
You've run batch jobs, you've processed checks,
You've read a hundred thousand decks,
You've made the CE's nervous wrecks.

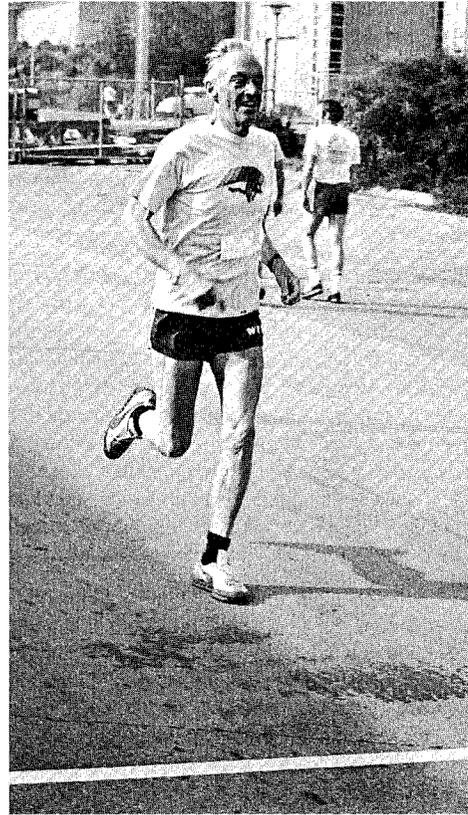
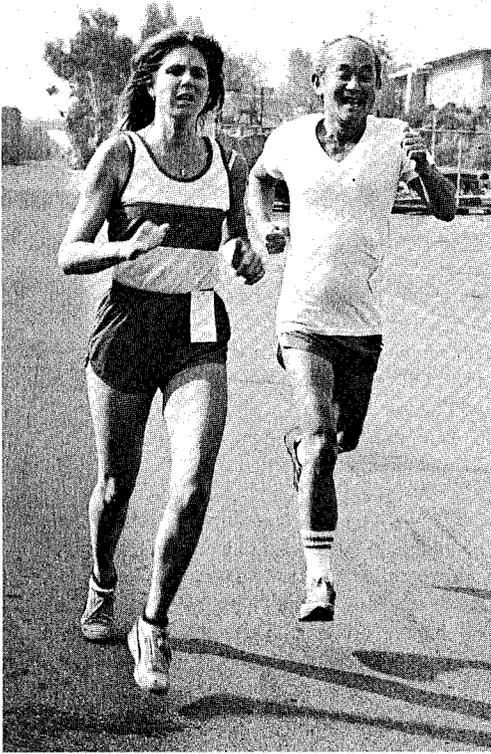
No more will we shake with terror
When confronted with a red-light error;
No more catering to your whim
To change another BSM.

You've served us now for 13 years,
It's hard to keep from shedding tears,
'Cause even now there are latent fears
That you may yet foul up your gears.

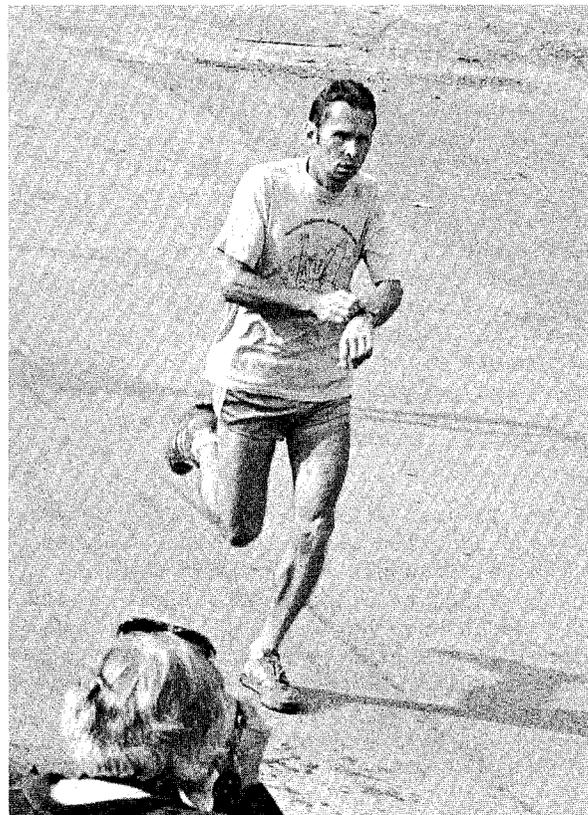
But here you sit, alive and kicking,
Lights a-blinking and relays clicking,
Switches jamming and buttons sticking,
Your interval timer still a-ticking.

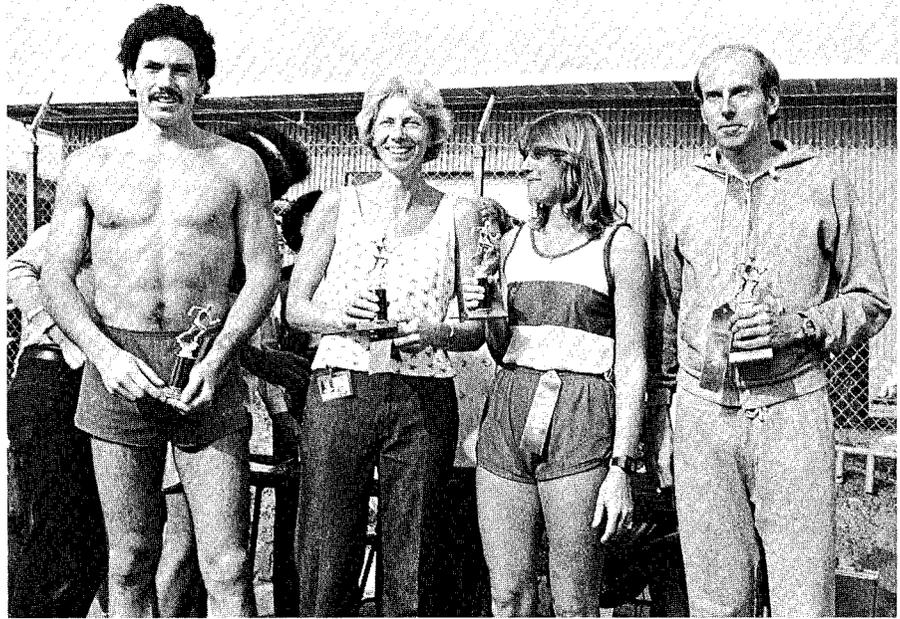
The time has come for you to fly
To that DP center in the sky;
And we have finally come to know
It's not that great to see you go.

-Marv Finney



Place	Time	Pace (/Mile)	Runner
1	19:23.2	5:04.8	Geoffrey Bodwin/1MS
2	19:54.3	5:12.9	Weston Press/1MNS
3	20:44.4	5:26.0	Jasper Kirkby/2MS
4	23:00.1	6:01.6	David Bostic/3MS
5	24:25.3	6:23.9	David Ernst/4MS
6	24:26.9	6:24.3	Rudy Maldonado/5MS
7	24:27.4	6:24.5	Ben Scott/6MS
8	24:39.5	6:27.6	Chuck Perkins/7MS
9	24:41.0	6:28.0	Dan Wright/8MS
10	24:58.6	6:32.6	Al Lisin/9MS
11	25:47.6	6:45.5	Ron Sax/10MS
12	26:04.2	6:49.8	Ed Loens/11MS
13	26:45.2	7:00.6	Herb Weidner/12MS
14	27:22.5	7:10.3	Tim Chervenak/13MS
15	27:25.7	7:11.2	Ken Moore/14MS
16	27:35.1	7:13.6	Ed Schulte/15MS
17	28:03.1	7:21.0	Bill Pierce/16MS
18	28:08.8	7:22.5	Dick Johnson/17MS
19	28:13.6	7:23.7	Pat Banglos/18MS
20	28:25.2	7:26.8	Bob Gex/19MS
21	28:51.4	7:33.6	Wes Asher/20MS
22	29:00.5	7:36.0	James Harm/21MS
23	29:07.1	7:37.7	Don Groom/22MS
24	29:19.3	7:40.9	Ken Witthaus/23MS
25	29:35.9	7:45.3	Joe Faust/24MS
26	30:18.2	7:56.4	Herman Winick/2MNS
27	30:33.0	8:00.2	Wouter Broers/25MS
28	31:07.8	8:09.4	John Brown/26MS
29	31:21.7	8:13.0	Pam Clayton/1FS
30	31:22.3	8:13.2	Harold Ito/27MS
31	31:29.1	8:14.9	Finn Halbo/28MS
32	31:57.8	8:22.5	Bob Laughead/29MS
33	32:37.0	8:32.7	Steven Flanders/3MNS
34	32:41.8	8:34.0	Willy De Haas/2FS
35	35:02.8	9:10.9	Dick Early/30MS
36	35:03.3	9:11.1	Jan Adamson/3FS
37	37:22.4	9:47.5	Syed B. Qadri/4MNS
38	39:57.1	10:28.0	Alan Nuttall/31MS
39	40:47.8	10:41.3	Nathan Peairs/32MS
40	42:14.1	11:03.9	Roy H. Johnson/33MS





TENTH ANNUAL SLAC FOOTRACE

For the second year in a row Geoff Bodwin of the Theory Group has won the SLAC footrace. His time of 19:23 was slightly off his record 1980 pace of 19:19. He attributed the difference to a layoff during the holidays. Weston Press was right behind Geoff with a time of 19:54.

The first woman finisher was Pam Clayton of the SLAC Purchasing Department in a time of 31:21.

The field of runners was 40 which is considerably smaller than in previous years, perhaps due to the change in schedule. When Ken Moore, the SLAC race promoter, originated the race in 1972, he decided to hold it around Labor Day but that's usually the hottest time of the year around here, so the date was set just after Thanksgiving. We were unable to make the necessary arrangements for last Thanksgiving, so for this once it was moved up to January.

Another innovation was forced on us by the Damping Ring construction. It looked a little risky to run on the south side of the klystron gallery so we ran both legs on the north side. This turned out to make the race more interesting because the runners got to see faces--not just backs.

Tom Knight handled the timing and record keeping. He added interest to the run with a drawing for sun shades and \$5 gift certificates from The Running Shop in Palo Alto.

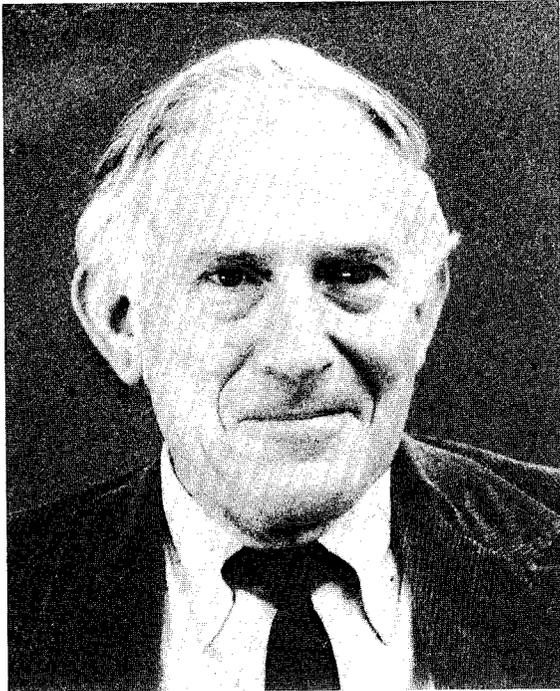
We circulated a sign-up sheet to determine the level of interest in SLAC race tee-shirts. The response was favorable so we will try to offer souvenir tee-shirts for sale at the next race.

The next annual SLAC race will be held on December 2, 1982.

We would like to express our thanks to the people who helped with the arrangements.

-H.A. Weidner, T. Knight, K. Moore





AARON BAUMGARTEN

It was with great sadness that his friends at SLAC learned of Aaron Baumgarten's untimely death. He would have been 62 this month.

Aaron's indomitable spirit kept him on the job until just three weeks before his battle with bone cancer ended on December 27, 1981. Those who were near Aaron during his last months will long remember his remarkable spirit and quiet courage.

Professionally, Aaron will probably be best remembered for his hard-driving style of project management and for his talent in mechanics. Aaron's personality and excellent judgment qualified him to manage large projects at SLAC. He was much in demand by scientists from SLAC groups and from other institutions. He participated in many experiments including DELCO at both SPEAR and PEP and most recently was planning the move of the Crystal Ball from SPEAR to DESY in Germany.

When working with these groups Aaron's temperament and engineering capability enabled him to achieve a rational consensus from divergent opinions. He was a serious-minded and even-tempered person, who could argue rationally with an occasional good-humored twinkle in his eye. Aaron's tenacity and passion for detail would not allow a perplexing problem to go unsolved. He was creative, especially in mechanics, but his creativity was tempered by good judgment. He was open to suggestion but was not prone to succumb to the impractical.

Aaron had an insatiable appetite for knowledge and was ever asking questions and seeking new understanding of ideas outside of his field. His favorite lunch time recreation was poring over the many engineering, science, and mathematics books that crowded his office shelves.

Not only did Aaron love to learn but he loved to teach. Many years of his life were spent in sharing his knowledge with others. Aaron taught drafting in evening courses at Foothill and DeAnza Colleges for many years. Still at SLAC are people who have benefited from Aaron's tutoring in drafting and engineering to achieve higher skills and to better themselves. Aaron also initiated and devoted a goodly portion of his personal time to the development of a minority-owned job shop. This effort failed but it was not for lack of effort on his part.

Aaron was born in New York City on January 7, 1920. As a young man he served in the Army working on the Manhattan Project during World War II. Aaron's role in that project placed him in close contact with many prominent physicists of that time and set the course of his career, which was largely in the field of nuclear and high energy physics. In 1951 he graduated from Hofstra University with a B.S. in Physics. He held various project engineering positions in industry before coming to SLAC in 1964, where he quickly proved his value.

Aaron was devoted to his family. He and his wife, Frieda, raised three sons, Ernest, David, Robert, and a daughter, Lisa. Ernest and David came from far away to be with their father during what proved to be his final illness. The strength of his family ties was evident during his last months when his son, David, drove his father to work each day and helped him get around.

Aaron's death leaves us mourning the loss of a good friend, but he left us an inspiring example of how a person can face insurmountable odds with dignity and courage. We will miss him.

-T. Fieguth

Ed. Note

Friends of Aaron Baumgarten who wish to make a contribution can make the donation payable to:

Aaron Baumgarten Memorial Fund
2681 Comstock Circle
Belmont, CA 94002

or send to: Dorothy Edminster, EFD, Bin 20.

The fund will be used for scholarships at DeAnza College, where Aaron taught evening classes for many years.

IN MEMORIUM - MARGUERITE NICHOLS

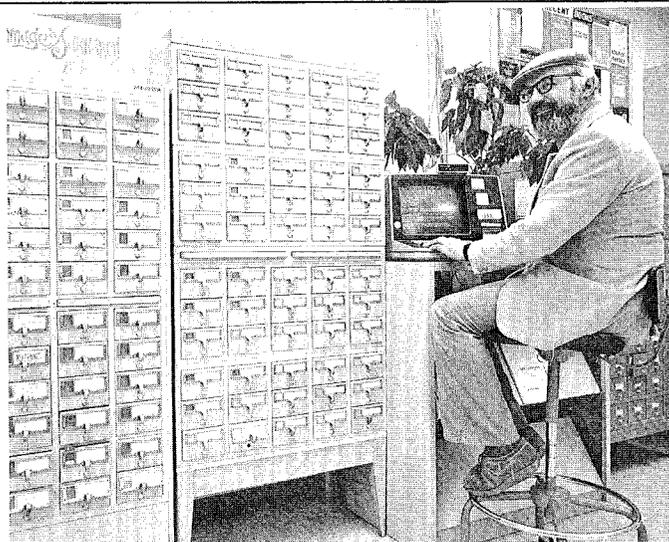
Marguerite Nichols, long time receptionist in the A&E Building at SLAC, passed away suddenly last October.

Peggy was born in San Francisco on November 26, 1925. She attended Sacred Heart Convent and graduated from Miss Burke's Academy in 1943. While attending Stanford, Peggy met her husband-to-be, Bill. They were married in 1944 and had three children. Ted, the eldest, is an orthopedic surgeon at Valley Medical Center; Bob is studying for his Ph.D. in neuro-science; Kathy lives with her husband in Ben Lomond. There are also four grandchildren in the Nichols family.

Bill and Peggy enjoyed extensive travel. She delighted in trips to the South Sea Islands, Alaska and Europe, where Peggy had relatives living in France.

Before coming to SLAC, Peggy worked at the Stanford-Brentwood Computer-Assisted Instruction Laboratory as a programmer. She joined the accelerator center in 1968. Peggy will be remembered for her dependability and dedication to her duties here.

-Helen Perigo

THE LIBRARY GOES EVEN MORE ELECTRONIC

Starting in February the library will take the next step into the computer age and will no longer file cards in the card catalog.

We are able to do this because all the bibliographic information on books, preprints, and reports is now available on a SPIRES file which can be easily looked at by anyone at SLAC using a computer terminal. For the last two years a public terminal has been in the catalog area in the library and almost all our regular users have learned how it works.

We must take this step for a variety of reasons including the rising price of catalog card stock, the cost of adding new catalog drawers, and the simple lack of space for new card catalog files.

The best way to find out what the library has is to use the display terminal located in the catalog area or, of course, any terminal at SLAC. Easy-to-use guides to searching the library data bases are available from the library and a copy is kept by the public terminal. The staff is always willing to help in person or by phone on extension 2411.

We plan to provide backup computer print-out which will be changed and updated monthly, and the main catalog will still be available for anything received prior to February 1982.

Searching will be easier using the online catalog:

- * you can search on any word or combination of words in the title, and on parts of words,
- * you can search on any author, even the 90th experimenter in a long list of authors for one paper,
- * you can speed up a search by adding other information, such as date and title words for an author who has written many papers,
- * and you can search from the comfort of your office terminal.

-Bob Gex



* SLAC * Christmas Party

Once again our party was a great success. Special thanks are in order to those who served on the organization committee and who baked the wonderful cookies. Safeway generously provided the \$10 grocery coupons and the oranges were grown by Frank Generali in his groves at Oroville. Santa, Roger Hicks, and his elf, Elizabeth Laubach, passed out candycanes to all the good SLAC'ers; lunch and refreshments were enjoyed by all. After Pief's holiday greeting, Roger Gearhart served as MC for the distribution of gifts. Beam trees were highly coveted prizes won by Ray Arnold, Greg Iufer, Casey James, Tom Jones, Bob Noriega, Carl Rago and Ed Tillman. Oranges went to Dick Bierce, Cheol On Pak, Jim Weaver and Yun-Shu Zhu. Mary Beth Beerbohm, Martin Berndt, Aage Bysheim, Littleton Cook, Urban Cummings, Elizabeth Laubach, Connie Logg, Alice McChinack, Henning Peterson, Dave Pollard, Hans Przybylski and Quand Trang received the Safeway gift certificates. Winners for best Christmas tree ornaments were Vern Smith (first place), Diana Childs (second) and Elizabeth Laubach (third).



AULD LANG SYNE

Bob Laurie and his bagpipes have become a SLAC tradition at the New Year season. Although Bob is only half Scottish his interest in playing began many years ago while working at Varian where a friend introduced him to the instrument. After taking lessons from one of the world's finest pipers he played "only for my own amazement." But desire to perform with others and improve his skill drew him into joining other skirlers. He is now a mainstay of the "Stuart Highlanders", a group which plays for many occasions in the bay area.

Most everyone at SLAC looks forward to his yearly performance which was first started in 1962 while Bob worked for Project M on campus. There are exceptions though...such as the time when Ernie Frei complained to Bob's wife about the bagpipe's mournful howl. She leaped to its defense saying that it is a very difficult instrument to play. Ernie's retort: "I wish to God it were IMPOSSIBLE!"

Don't be disheartened, Bob, the rest of us think you're great!

"...research is the highest human function, embracing the spirit of war and bright with the splendor of religion. To keep up a constant pressure on the surface of the real, is not that the supreme gesture of faith in Being, and therefore the highest form of adoration?"

-Teilhard de Chardin