

SLAC BEAM LINE

"All composite things decay. Strive diligently."
 -- Buddha (his last words)

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Bob Gould's sketch, shown above, was used this year in the SLAC Christmas card. The Wizard seems to be having some problems in fitting together the pieces of the PEP puzzle, even with the help of his formidable hand-cranked computer and crystal ball. All going well, the real PEP should begin operating in about October of 1979. Happy holidays!

Love is skin- deep. Give Blood.



SLAC RED CROSS GOAL ACHIEVED

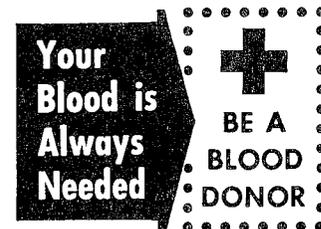
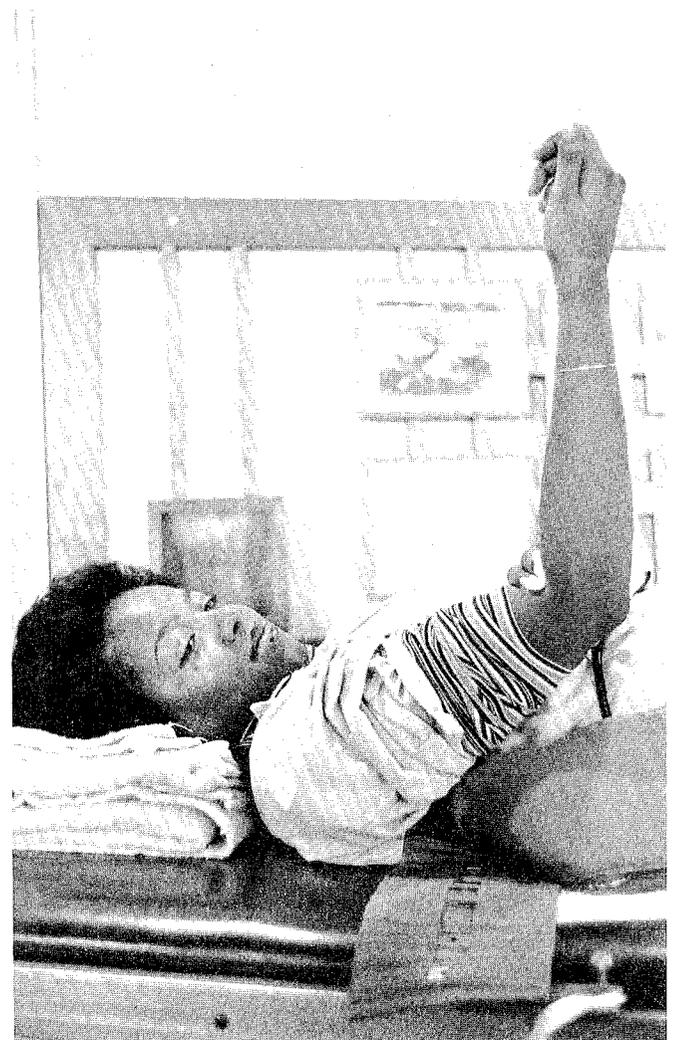
The Red Cross Bloodmobile came to SLAC on the morning of November 17 and reached its goal of 30 SLAC donors. Although the average was 10 donors per hour, the first and third hours were very slow. Apparently 10:00 o'clock was the favorite time. In the future, it would be helpful to schedule appointments in order to alleviate the waiting time and to reduce the strain on the Red Cross volunteers. There were a number of comments from SLAC people that they hadn't heard about this event until it was happening.

A survey of the donors determined that there is a definite interest in regular on-site donations. Visits are planned at three-month intervals for those at SLAC who are regular donors. The next visit is scheduled for April 13, 1979. Past donors can help by bringing a new person with them and by reminding regulars as the date approaches. Watch the *Beam Line* for reminders and check bulletin boards for posters as the day draws near. For any additional information, call Joan Gardner in the SLAC Medical Facility, ext. 2281, or the Personnel Office, ext. 2205.

As for the 30+ donors, your support was appreciated by the Red Cross, and the holiday weekend was made brighter by your generosity.

Joe Faust took the accompanying photographs of the donors in action on November 17.

--Nina E. Adelman
Blood Drive Coordinator



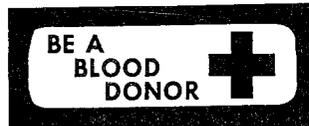
Note: For those persons at SLAC who subscribe to the Peninsula Memorial Blood Bank, visits to the Menlo Park Recreation Center are scheduled for the following dates in 1979:

January 19
April 20
July 20
October 19

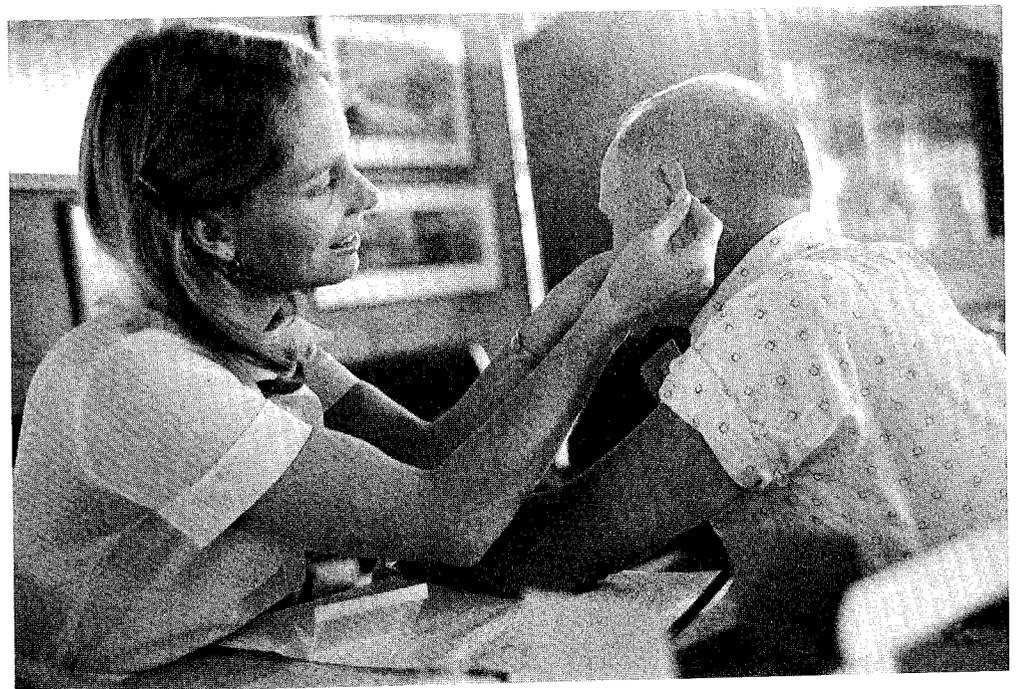
All will be held from 1:00 to 6:00 PM. Please direct any questions to Mrs. Bizjak, 697-4034.

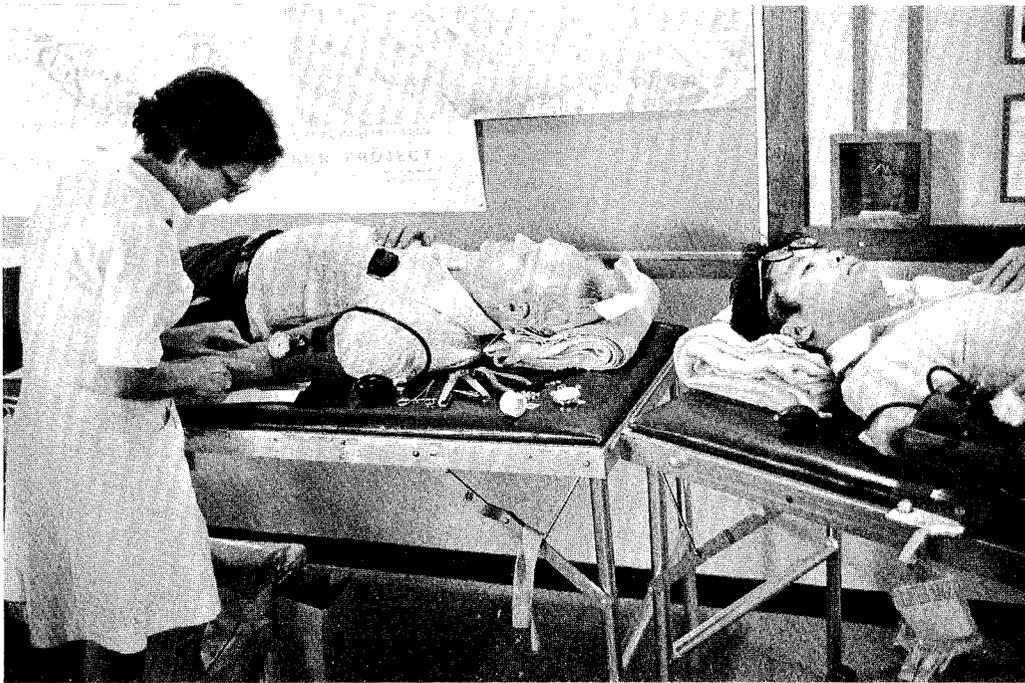


Although an attempt was made to schedule appointments, there were times when a crowd gathered around the registration desk.

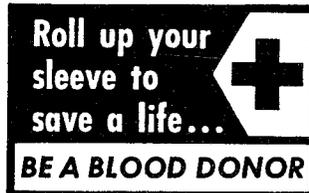


Part of the physical is a hemoglobin check to determine the level of iron in prospective donors (we're told its not painful).

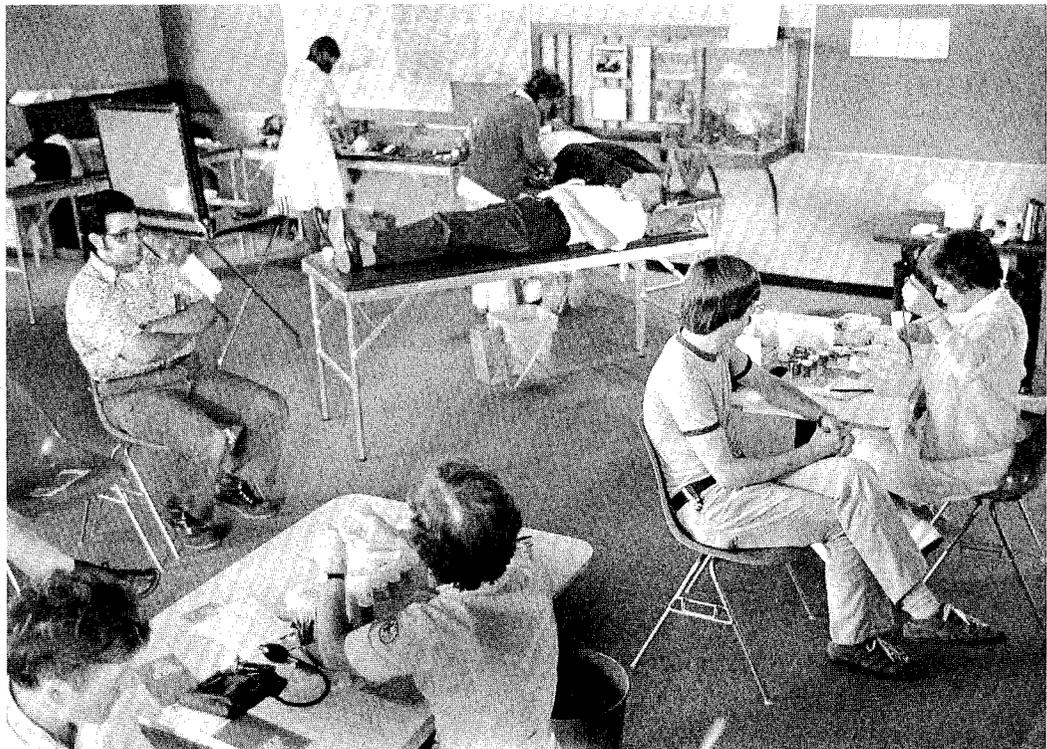




Once you pass the physical, it's onto the table. These people just look like they're sleeping. (No, no one fainted, either!)



Overall, it was a very successful morning at SLAC. Next time we'll try for heating the lobby and shortening the waiting period. See you there!



SSRL REPORT

SYNCHROTRON RADIATION RESEARCH RELATED TO ENERGY
CONSERVATION: EXAFS AND METALLIC GLASSES

About 2×10^{12} kilowatt-hours of electrical energy is generated annually in the United States. Of this total, about 0.5% is lost in the cores of distribution transformers alone. Substantial reduction in these losses is possible, for example, by using cores made of amorphous iron-boron (Fe-B; loss = 0.2 watts per pound), rather than the most commonly used core material, oriented iron-silicon (Fe-Si; loss = 0.7 watts per pound). This change could result in an annual saving of more than \$200 million of electricity that is now wasted as heat in transformers.

The low losses are developed only when the amorphous alloy is heated to cause it to be stress-relieved; that is, changes in the local structure around the magnetic atoms leads to an improvement in magnetic properties. There are fundamental questions about the relationship between the local environment and the electronic and magnetic properties and the mechanical and transport properties of these novel materials. These *structure-property* correlations are essential ingredients to the development and propagation of any new technology, for without knowledge of the structure, we know very little. A comprehensive review of the structure and properties of metallic glasses has recently been made by Praveen Chaudhari and David Turnbull (*Science*, 6 Jan. 1978, pp. 11-21).

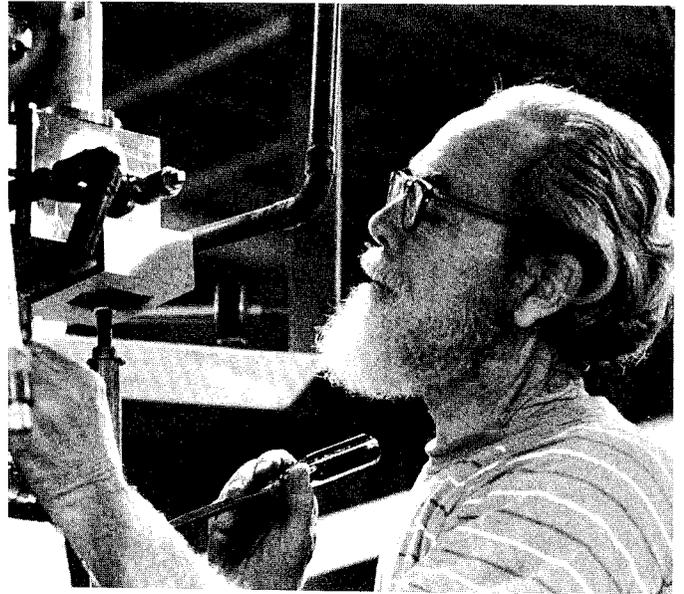
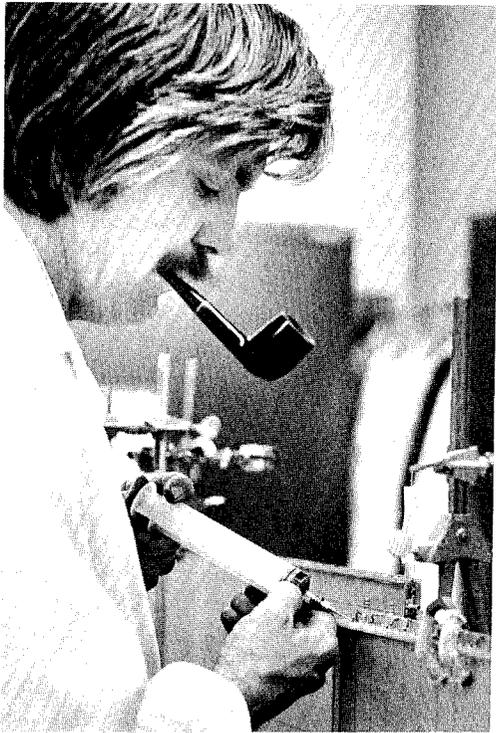
A powerful new technique for structure determination has been developed with synchrotron radiation at SSRL. This is called Extended X-ray Absorption Fine Structure (EXAFS). EXAFS deals with the fine wiggles, 10-20% in magnitude, that appear on the high-energy side of the X-ray absorption edge of a particular atom in a complex material. X-ray absorption in matter usually results in an electron being emitted by the absorbing atom. (This is the photo-electric effect first explained by Einstein some 70 years ago.) When this emitted photoelectron wave encounters atoms near the absorbing atom, a backscattering of the wave occurs. EXAFS wiggles are the modulated absorption cross section caused by the interference between the outgoing and backscattered electron waves. Since this interference depends strongly on the distance to and species of the nearby atoms, it is possible to determine this local environment by analysis of EXAFS data. The advent of synchrotron radiation has enormously speeded up the acquisition of EXAFS data, thus transforming the EXAFS technique from a lab-

oratory curiosity into a powerful tool for structural analysis. (For a more complete discussion of EXAFS, see "EXAFS: New horizons in structure determinations," by Peter Eisenberger and Brian Kincaid, *Science*, 30 June 1978, pp. 1441-1447.)

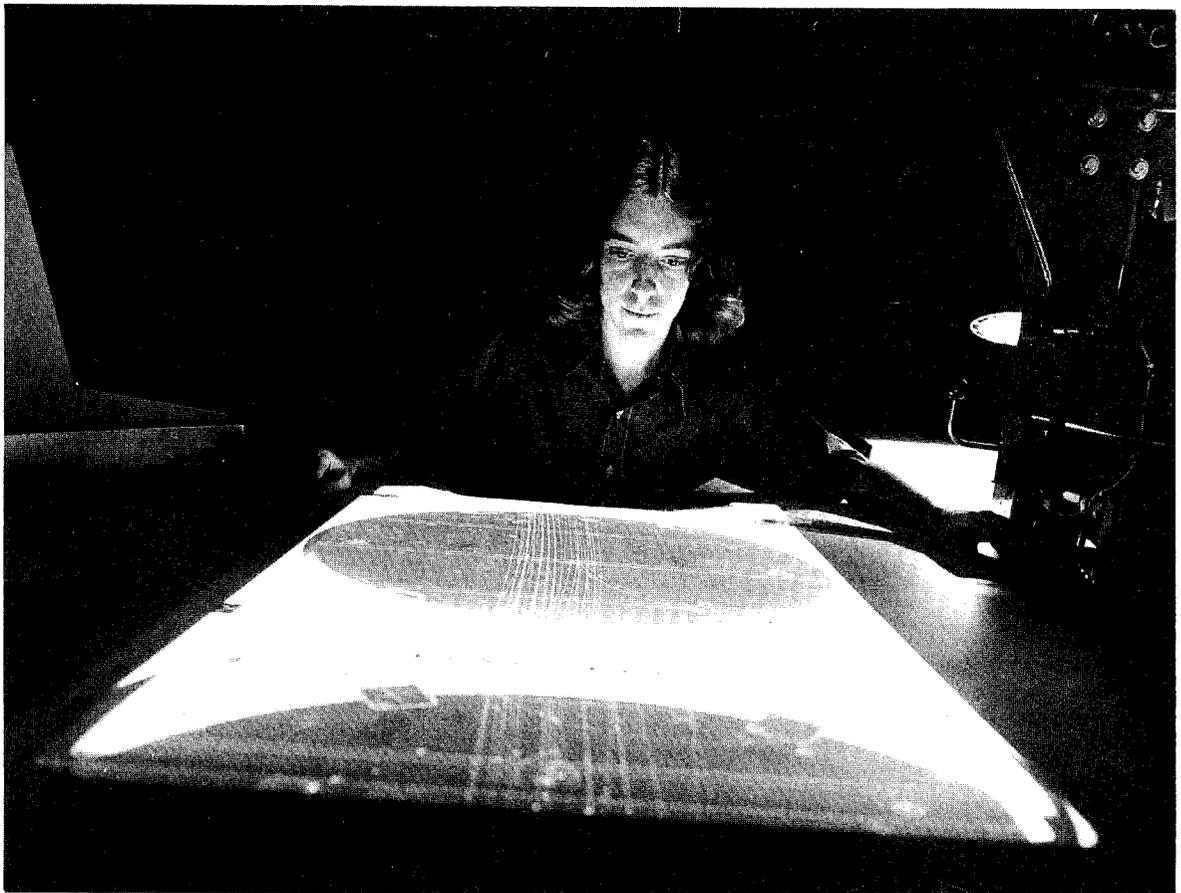
The EXAFS technique is thus a natural means to try to understand the structure and hence the properties of metallic glasses such as those used in transformers. The glass formation of metallic alloys was first demonstrated by the work of Professor Duwez and his colleagues at Cal Tech in 1960. Their pioneering experiment consisted of squeezing a falling drop of liquid metal between two opposed, rapidly moving anvils, thereby "splat" quenching the liquid drop to an amorphous solid at a cooling rate of about one million degrees per second. Mass production of metallic glasses in the form of wire or ribbon was developed by the Allied Chemical Corp. about a decade later using a melt-spinning technique, whereby a stream of molten alloy is ejected and quenched on the surface of a rapidly rotating drum. However, novel properties such as ductility in bending, corrosion resistance, and soft magnetic behavior with low coercivity have only been realized recently in these amorphous metallic alloys. In this energy-conscious era, it is important to understand and exploit these properties more fully.

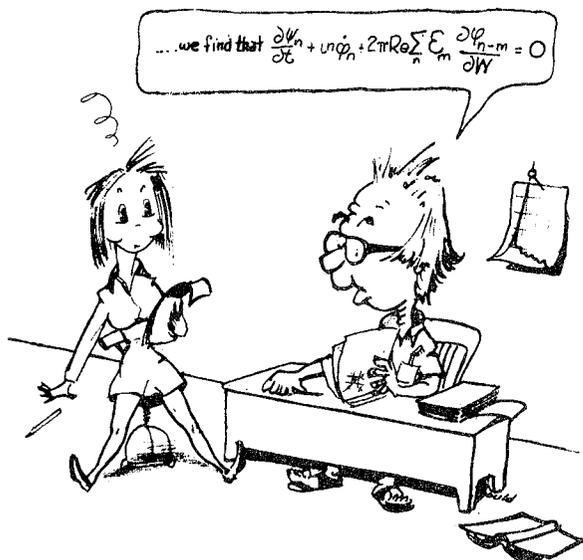
EXAFS measurements on metallic glasses have been initiated by workers from General Electric, Boeing, Xerox, Stanford University and other institutions. Preliminary results on some amorphous iron-nickel-boron (Fe-Ni-B) and iron-nickel-phosphorous (Fe-Ni-P) alloys show that there exists chemical ordering, in the sense that the Ni atoms in the Fe-Ni-B alloy are surrounded preferentially by B atoms, whereas in the Fe-Ni-P alloy the Fe atoms are surrounded preferentially by the P atoms. These structural data correlate with the lower magnetic moments observed for the Fe-Ni-P alloy. This is due primarily to the quenching of the moments about the Fe atoms by the P atoms which preferentially coordinate with the Fe in the Fe-Ni alloy. Extensive EXAFS measurements are proposed on metallic glasses, and data analyses are now under way. Users can hardly wait for beam time to capture every single X-ray photon coming out of the EXAFS beam lines at the Stanford Synchrotron Radiation Laboratory!

--Herman Winick & Joe Wong
SSRL General Electric Company



*Some Faces Seen At SLAC
Photos by Joe Faust*





TECHNICAL TYPING TRAINING PROGRAM

Ask any manager who has hired a technical typist during the past year and you'll probably hear that there were very few applicants, and that the hiring process was long and difficult because of the scarcity of qualified applicants.

Fortunately, SLAC has been able to hire a few technical typists this past year who are proficient in the use of Greek and mathematical symbols, and we welcome them to our staff. However, there is a continuing need, and the SLAC Employment Office is interested in identifying anyone at SLAC with basic typing skills who would like to participate in a technical typing training program that is taught through the Clerical Skills Training Center on the Stanford campus. The program is comprehensive and self-paced, and it can enhance the career opportunities for typists presently employed at levels under or the same as Specialist Typist/Secretary Specialist. In addition, it can provide training to improve the skills of current technical typists, if needed. It's a seller's market these days for technical typists.

The program involves an assessment of current typing skills which will be made at the Skills Training Center. Participants will then go to campus twice a week for four weeks for in-depth training. Students will continue to work at their own pace at their desks or, if feasible, practice in Stanford's training room.

The time required for training will of course have to be negotiated with immediate supervisors. If you would like to explore the possibility of participating in this training program, please contact Hilda Korner, Employment Manager, at ext. 2203.

On November 18, 1978, the Council of the American Physical Society passed the following resolution by a vote of 13 to 10 with 3 abstentions:

Whereas the Council of the American Physical Society supports the passage of the Equal Rights Amendment as one step in increasing equal opportunity for women in our society, including helping to increase the presently low proportion of women physicists. Whereas the American Physical Society will intensify its efforts to assist and to encourage women to study physics and to enter physics as a career. Be it resolved that until the present Equal Rights Amendment is ratified, or the present period for its ratification lapses, whichever occurs first, the APS schedule general and divisional meetings, beyond those already scheduled, only in states which have ratified (and not rescinded—should Congress permit rescision) the Equal Rights Amendment.

WALTER LEE HAWKINS

August 16, 1927 - October 8, 1978

Soft be the turf above him
Friend of all in better days
All who knew him loved him
None named him but to praise.

His death took us by surprise
On that October Sunday morning
His design unfinished lies
While we stalked speechless mourning.

His was a hurried life
The struggle and the pain
The daily work and strife
The constant paging of his name.

If someone quickly required
Something from Walter Lee
No matter how he was tired
Was greeted by smiles of glee.

He loved open lands and sea
Where he fell and ceased to be
From all labor now is free
Leaving emptiness to you and me.

I, who with tearful eyes
May weep, but never see
But his vision amidst sighs
This verse I dedicate to Lee.

--Charles Xuereb

Joan Gardner of the SLAC Medical Facility has recently been elected to serve as Secretary of the Western Association Occupational Health Nurses, which encompasses an eleven-state area.

RETRAINED WORKERS FILL TECHNICAL JOBS
AT STANFORD'S ACCELERATOR CENTER

The first attempt to retrain 15 "economically disadvantaged" young people to fill technical jobs at the Stanford Linear Accelerator Center (SLAC) has culminated in hiring 14 of them for skilled jobs in putting together the new Positron Electron Project (PEP) storage ring now under construction for DOE.

The 15th trainee was offered a job but had already planned to move east. All 15 were recruited under the Comprehensive Employment Training Act (CETA), the federally funded program for creating job training and employment for such people....

The CETA program was undertaken just over a year ago at the request of DOE which supports SLAC under a contract with Stanford University for its operation. The CETA funds were made available to DOE through the California Employment and Training Advisory Office, which oversees the program in California.

The 15 starters, six women and nine men, were given classroom instruction in math, physics, basic electricity and vacuum technology. Among the trainees were three blacks, three orientals, four chicanos, and five whites. Their instruction and job training lasted a full year, during which they were paid regular hourly rates....

--DOE Energy Insider
November 13, 1978

SLAC TEN-YEAR SERVICE AWARDS

Gloria Allen	Cynthia A. Imelli
Marie Arnold	William H. Kinker
Al Ashley	Maurice W. Lamb
Margie Lee Barnes	Rudolf K. Langer
Frank Barrera	J. J. Lauer
Anthony J. Benedetti	Evaughn A. Lewis
Stanley Billitzer	Herbert McIntye
Gordon Bowden	Daniel Nauenberg
Don Burwell	David J. Nelson
Emmett Carmena	Robert Noriega
Patrick B. Colgan	Robert Lee Partelow
Carol Colon	William C. Pioske
Ruth E. Consul	Thomas G. Porter
George Crane	Pam Roque
Mary Curl	Edward H. Schulte
Carlton F. Dubbert	John Sikeotis
Joel M. Fitch	Raymond A. Staff
Charles W. Freudenthal	William P. Swanson
Roger A. Gearhart	Rita J. Taylor
William E. Graham	Herbert V. Tiedemann
Richard W. Gross	Mamie L. Trevillion
Celik M. Guracar	George S. Tunis
Edward P. Guthrie	Felix A. Vargas
David C. Hamilton	Andres B. Vega
Earl G. Hamner	Thelma L. Whaley
Gordon Harding	Wendy Usher Wheaton
David E. Heggie	Edward E. Wilson
Gloria S. Hoganauer	Barbara M. Woo
Robert W. Holm	Joe Zingheim
Frederick C. Hooker	
Bob Horne	

Reminder: The open meetings sponsored by Alcoholics Anonymous are held every Thursday, from noon to 12:30 PM, in the Conference Room (Room 126) of the Electronics Building. Anyone interested in the recognition and treatment of alcoholism is cordially invited to attend.

SLAC Beam Line
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Stanford University
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