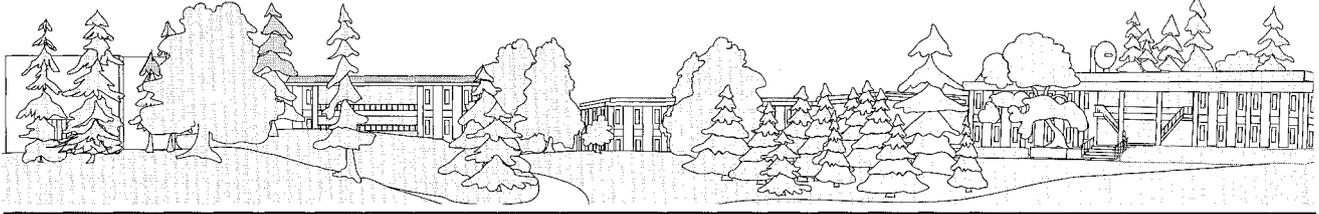


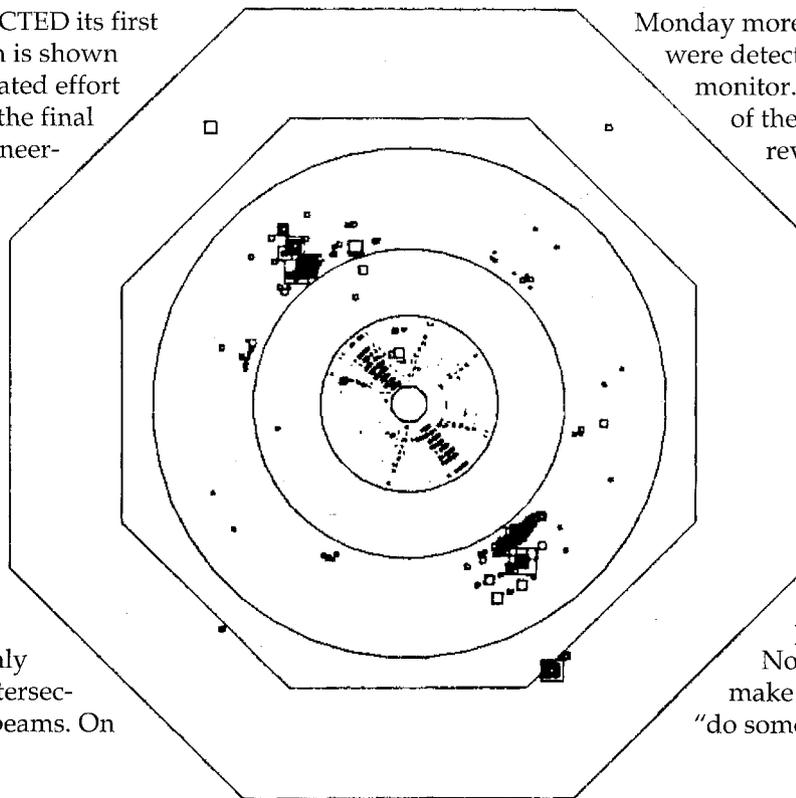
The Interaction Point

Events and Happenings
in the SLAC Community
July 1991, Vol. 2, No. 7



SLD Sees First Z's

THE SLD HAS DETECTED its first Z events, one of which is shown here. After a concentrated effort to set up the SLC and the final focus for the SLD engineering run, steady beam conditions were achieved on Saturday, July 6. This enabled the SLD to start data taking. In the wee hours of Sunday, the first Z was found with the offline calorimetry analysis program. The event bore the unmistakable signature of a large energy deposition in the calorimeter, roughly balanced about the intersection point of the SLC beams. On



Monday more Zs were found, which were detected in the luminosity monitor. A preliminary analysis of the data so far (July 12) has revealed 37 Z events extracted from the data.

It was quite heartening to begin data taking, even though many problems were uncovered and there are several things to fix as we commission the detector. Seeing these first real events is the culmination of the efforts of many people in SLC and SLD. Now we must learn to make everything better and "do some physics."

—Frank E. Taylor

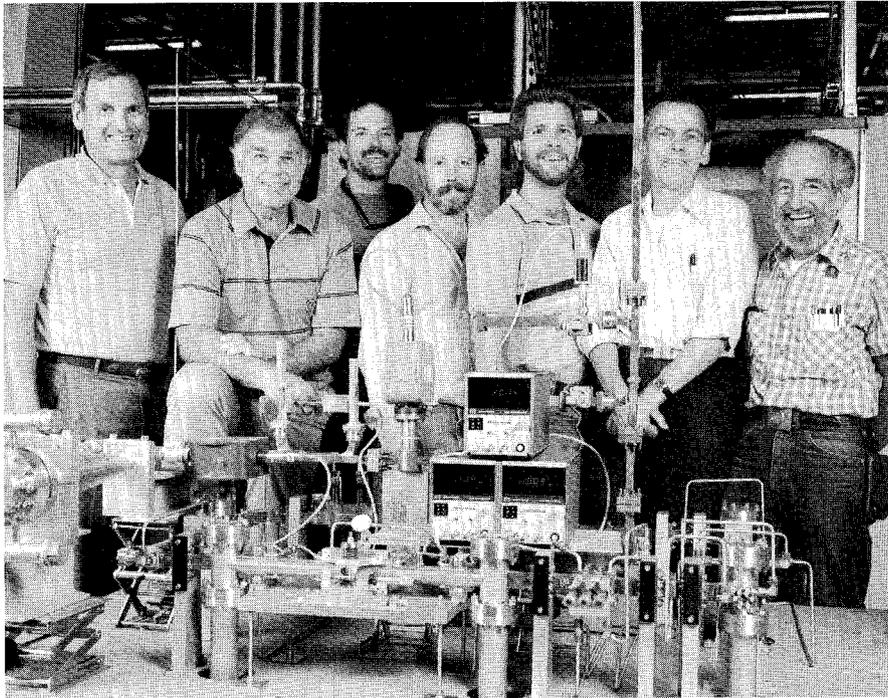
300 MW in X-Band Waveguide? No way...until....

SLAC IS COMMITTED TO DEVELOPING an rf source capable of producing in excess of 100 megawatts at four times SLAC's operating frequency of 2856 MHz to power the next linear collider. One question that arises is how can the critical components that must transmit this very high peak power be tested if such a source is not yet available? Until recently, the maximum power transmitted through X-Band waveguide components at the required pulse width of 800 nanoseconds had been typically a few megawatts.

All that has changed. The SLAC X-Band klystron has produced over 30 MW at the desired pulse width

and significantly more at shorter pulse widths. Early in June a device known as a traveling wave resonator, or traveling wave resonant ring (TWR) was commissioned at SLAC and to date has produced a pure traveling wave of 300 megawatts peak rf power at 11.4 GHz. Designed and built by a team in the Klystron/Microwave Department, this device makes it possible to test microwave waveguide components at power levels that are an order of magnitude higher than an rf source is capable of producing.

(cont'd. on p. 2)



Grouped behind the Traveling Wave Resonator, L. to R.: Rich Callin, Randy Fowkes, John Eichner, Von Taylor, John Hoyt, Michael Studzinski, Rod Curry.

(cont'd. from p. 1)

Is Conservation of Energy being violated? Not quite. This power multiplication is accomplished by wrapping an rf waveguide around into a ring configuration and recombining on itself with a bridge coupler network resulting in a stored rf traveling wave that is 10 times greater than that coming from the rf source feeding the system. A precision variable phase shifter and a system of six tuners, both designed to withstand the extremely high rf electric fields, are incorporated into this ring. These two devices are critical in achieving the resonant condition and also in tuning out residual mismatches that otherwise would result in the amplification of a detrimental backward wave.

The TWR concept is not new. It was the subject of several microwave papers in the late '50s and early '60s. An S-band version of the TWR was used to test klystron windows to 100 MW for several years. However, the higher rf electric field strengths in the new X-band TWR are four

times greater for a given power level, presenting a greater challenge over that of the S-band version.

The peak power record that was established was not achieved without some problems. Initially, intermittent rf electric field breakdown was experienced in these uncharted waters, but not exactly where it was expected to occur. It was assumed that the peak power handling capability of the TWR would be limited by a breakdown in one of the tunable components—probably the variable phase shifter. As it turned out, the first

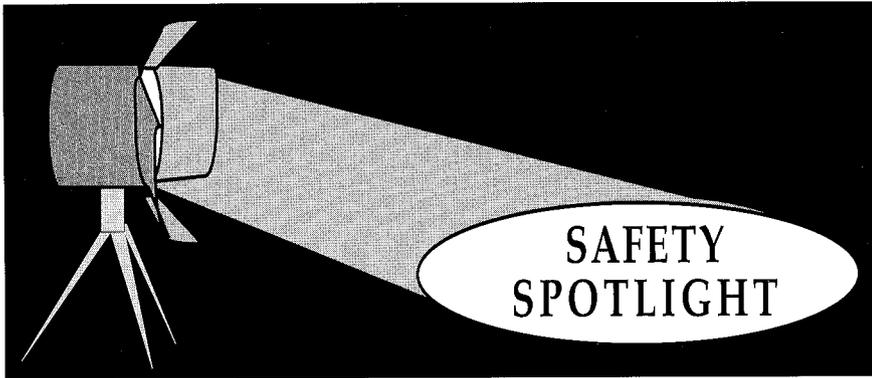
breakdown was observed in the high-vacuum crush-seal rf flanges that had previously served well in the relativistic klystron work at an ultra-high peak power (290 MW), but under very short pulse (40 nanoseconds) conditions. A design improvement in the rf flange seal was made, thus significantly raising the rf power handling capability of the TWR. Very high rf electric field breakdown results in significant X-ray radiation, making it necessary for this work to be carried out under the close scrutiny of the Occupational Health Safety Physicists.

The ultimate power handling capability and safe operating levels of this device are now being established. The traveling wave resonator will next be used to test rf windows and other NLC waveguide component candidates, at power levels above that at which they will be expected to perform.

—Randy Fowkes



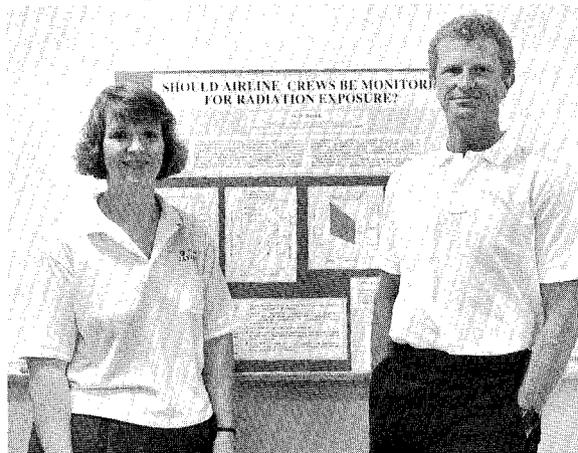
The Traveling Wave Resonator group held a brown-bag picnic in June to celebrate their impressive achievement. Prominently featured was the food basket won the day before for the greatest number of participants at the SLAC Fitness Day. Shown are, kneeling, L. to R.: Arnie Vlieks, Lou Garcia, Rafa Miranda, Rod Curry, Charley Griffin; standing: Chris Pearson, Randy Fowkes, Frank Abramo, Les Uyeda, Harry Greenhill, Gus Sandoval, Rich Callin, Michael Studzinski, Richard Goldsberry.



RUTH MCDUNN and Rod Hiemstra define and coordinate SLAC's Environment, Safety and Health Training Program. I met them recently and learned a little about their current activities and future plans. This article describes some of the resources they provide the SLAC community.

As part of the ES&H staff, their primary objectives are to contribute toward making SLAC a safe and healthy place to work and to facilitate SLAC's compliance with state and federal laws and DOE orders. As Safety Training Specialists, they accomplish these objectives by designing, creating and presenting safety training as well as helping others do the same. They develop and conduct courses and coordinate training provided by other people. For example, Rod and Ruth are coordinating training in Hazard Communication, Hazardous Waste Management, Confined Space, and Emergency Preparedness. Call them if you want help designing and developing a course; if you

need help with documenting training activities, if you're not sure what training you are required to have and/or provide for your employees, and if you need help in-



terpreting laws, regulations and orders related to safety training. If you prefer not to design and conduct training yourself, they can help you locate internal and external sources of quality training.

Ruth and Rod are clarifying the roles and responsibilities of those involved in training. Soon, they will announce a course for those of you who need to create a training plan for your department and/or provide training to your staff. This

course is designed to help you understand legal requirements as well as offer some brush-up work on training design.

They are also building and maintaining a resource library of training materials and references. They will publish and distribute lists of available courses and changes in legal requirements. You will be welcome to use these resources as soon as they are available.

Rod and Ruth were responsible for the "Task/Hazard Survey" filled out for every employee. Their primary focus at present is putting the results of this survey in a database, studying the data, and developing and implementing an action plan to bring SLAC's Safety Training into compliance with current laws and orders. As you may know, one of our self-assessment findings was the lack of a thorough safety training program. Once the database is set up you can look at it and determine which training you are legally responsible to provide to your employees and that which you are required to attend. The database will cross-reference individual employees, tasks and required training to insure each of us gets the training necessary for our safety and compliance with all regulations.

Both of them encourage you to call with your requests, questions, and comments. They're busy, yes; but you and your safety training needs are their first concern. You can reach Ruth at ext. 3054 and Rod at ext. 3662.

—Ginger Brower

SLAC Welcomes New Employees and Guests

David Bocek, Group I; **Flor Brazil**, Mech. Fabrication; **Joseph Burns**, Plant Maintenance; **Karen Campbell**, Personnel; **Jeffrey Chan**, Mechanical Engineering; **Lung Hai Chang**, Klystron; **Hrjoje Galic**, Library; **David Horn**, Theory; **Patricia Jones**, Mechanical Engineering; **Sebastian Kuhn**, Nuclear Physics at SLAC; **Wai Keung Lau**, Klystron; **Cleon Manz**, Accelerator; **Gina Mastrantonio**, Mechanical Engineering; **Carol Moss**, Plant Maintenance; **Benoit Mours**, Group A; **Michiko Myamoto**, Theory; **Nicolai Nikolaev**, Theory; **Stephen Schwarz**, Library; **James Scott**, ES&H; **Tsumora Shintake**, Theory; **Lewis Sign**, MFD; **Roger Sit**, ES&H; **Lana Smith**, Facilities; **Daniel Srna**, ES&H; **Ida Stelling**, Mechanical Engineering; **Michael Strittmatter**, Plant Maintenance; **Peggy Tank**, Mechanical Engineering; **Tomasz Taylor**, Theory.



When the sun was eclipsed by the moon on July 11, a walk around the site found people viewing the event with devices of varying sophistication: a telescope; welding helmets; even pin holes in cardboard. David Stoker, a physicist with EE, used a very effective method when he projected the image with binoculars that had been mounted on a tripod. David's arrangement for the past solar eclipse attracted an enthusiastic crowd in the Central Lab courtyard.

Benefits Office News

AUGUST IS TAKECARE and Dental month. TakeCare will be at SLAC August 21 and 22, with presentations set up in the Breezeway between 11:30 A.M. and 1 P.M. Effective January 1, 1992, Stanford University Clinic will be an option to all TakeCare members. TakeCare is the only network-model Health Maintenance Organization (HMO) in California to be ranked among the top 10 HMOs in the nation, according to the 1991 HMO Buyer's Guide. TakeCare has a health promotion and well-ness benefit offered to TakeCare members of the Stanford University community. TakeCare and the Health Improvement Program (HIP) at Stanford University's Center for Research in Disease Prevention have teamed up to provide low cost health

screening and individualized counseling. The program offered at HIP includes:

- a comprehensive health and fitness assessment (including cholesterol screening),
- a computer scored dietary analysis,
- a brief medical history,
- biometric testing, and
- individual counseling with an HIP professional.

For more information on TakeCare's benefits and doctors, please call TakeCare's Customer Service at 1-800-635-CARE.

Delta Dental Plan of California is the state's largest and oldest dental prepayment carrier. With Delta the employee does not have to submit any forms; Delta's participating dentists take care of the paperwork. If

you plan to have extensive dental work done, be sure your dentist gets a pre-determined approval from Delta. The approval is good for 60 days. Delta's staff includes 33 dentist consultants and 48 trained dental auditors who verify that a particular treatment is necessary and that it is included in a group's contractual benefits. Delta allows two free cleanings per year (not necessarily six months apart). Delta Dental treatment may be done anywhere. The representatives from Delta Dental will be at SLAC on August 20 and 27. They will be located in the Breezeway between the auditorium and the cafeteria from 11:30 A.M. to 1 P.M.

—Betty Strickland

SLAC Provides Research Opportunity for Texas Teacher

FOR THE THIRD YEAR Richard Taylor is spending his summer vacation at SLAC. A high school teacher in Richardson, Texas, nine months out of the year, he has been hired to work at SLAC for the last three summers.

Richard came to SLAC when he received a GTE fellowship in 1989. The fellowship was designed to fund a high school project. The fellowship also provided

funding for the recipient's personal development. As he was interested in high energy physics, Richard chose to visit SLAC. To prolong his stay here SLAC offered him a position as a visiting physicist, and he has been working with the Superconducting Final Focus Group ever since.

Dividing his time between teaching high school physics in Texas and working at SLAC suits Richard Taylor well. It fruitfully combines the two central aspects of his profession: doing physics and teaching. There can be no doubt about how much Richard enjoys teaching. Giving five classes per day, however, leaves him very little time to engage in physics outside of school, and his job at SLAC allows him to compensate for this imbalance. Through his work with the Superconducting Final Focus Group Richard has seen the SLD go through various stages of development and has been able to work on exciting physics.

Richard's experiences at SLAC naturally feed back into the classroom. He has brought back

chunks of magnets and superconducting wire as well as many photographs, and he finds that giving examples from his job here makes his physics classes more alive. Through his involvement with the world of modern physics he brings a more concrete

and credible sense to the physics he teaches. His work here also gives his students a better idea of what it means to be a physicist today.

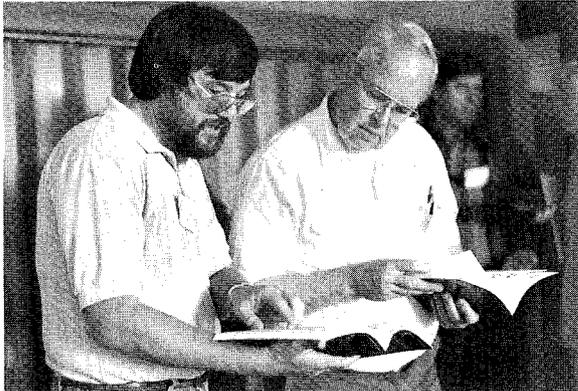
Aside from monitoring the magnets of the SLD, Richard helped give a workshop for high school teachers this summer. The workshop, organized by Helen Quinn, was held July 15-19. It was designed to familiarize the teachers with high energy physics and combined lectures and tours of SLAC with sessions designed to help the teachers develop activities they can do with their students.

Richard would most like to convey to his own students how a physicist sees the world. He finds this way of thinking to be very special as well as very successful in solving problems and believes it can be applied to many different situations. He himself studied physics as an undergraduate, found it was fun and interesting, and discovered his talent for teaching during his first year of graduate school. As part of his graduate work Richard did education oriented research, that involved teaching physics courses for non-science majors. He realized how much he enjoyed teaching

those unfamiliar with the sciences and especially appreciated the challenge of explaining physics without relying on jargon.

It was this experience that made Richard decide to be a high school teacher. Since then, neither his enthusiasm for teaching nor for physics has waned. Dividing his time between SLAC and the J. J. Pierce High School in Texas effectively combines both interests.

—Annette Cords



Richard Taylor (l.), and workshop participant Earl Boynton (r.) review workshop material.

EVENT CALENDAR: AUGUST-SEPTEMBER 1991

All meetings are held in the Orange Room, unless another location is listed. Please notify the Public Affairs Office of any additions or changes by calling ext. 2204 or sending e-mail to NINA@SLACVM.

August 5-16

SLAC Summer Institute (SSI) (Auditorium)
TOPIC: Lepton-Hadron Scattering (*D. Leith, L. Dixon, D. Burke, J. Hawthorne*)

August 9, 11:30 A.M.

SLUO Executive Committee (SCS 3rd Floor Conf. Room)

August 15

DOE Institutional Plan On-Site Review

August 26-28

SLD Collaboration Meeting (Squaw Valley) (*M. Breidenbach, C. Baltay, M. Helton*)

September 9-20

DOE ES&H Training (Auditorium)

September 18, 9-4

SUBB Mobile Blood Drive (Auditorium Lobby)

PALEOPARADOXIA EARLIEST SITE VISITOR

ONE OF THE FIRST SCIENTIFIC DISCOVERIES made at SLAC was neither planned nor did it pertain to physics. A fossil skeleton was unearthed during the construction of the accelerator in 1964; it turned out to belong to an amphibious mammal that had lived 14 million years ago.

Known as the *Paleoparadoxia*, this marine mammal roamed the northern shores of the Pacific 10–20 million years ago. Large and heavy set, it was comparable in size and proportion to a present-day hippopotamus. Not adapted for deep water swimming, it stayed close to the coast and fed off the aquatic vegetation. At the time of the *Paleoparadoxia*, San Francisco bay was considerably larger than it is now. Its warm, shallow water would have covered Petaluma, Napa, Livermore, and San Jose. The peninsula was a long, skinny island still disconnected from the mainland. The lifting of the high Sierra drained the bay and reduced it in size. The action of the San Andreas fault as well as the Sierra was crucial in burying animal bodies and plants and in doing so preserved them.

So far only two other *Paleoparadoxia* skeletons have been found—in Japan and in Northern California. Both of these specimens are more primitive and juvenile than the one at SLAC. The skeleton here is the most complete as well as the most mature—the arthritic development on some of its bones is seen as a certain sign of adulthood.

When the *Paleoparadoxia* was first discovered, its skeleton was given to the Museum of Paleontology at Berkeley in exchange for a plaster cast replica. Since 1969 Adele Panofsky has been working with a great deal of ingenuity and dedication to assemble the plaster skeleton. The replica is an impressive reconstruction of the fossilized skeleton and, once completed, will be on permanent display.

Pief Receives Ninth Honorary Degree

ON MAY 31 THE HONORARY DEGREE of Doctor of Science from Uppsala University (Sweden), was conferred on Pief Panofsky, Director Emeritus of SLAC. Because he was at the Institute of High Energy Physics at the time, he was unable to receive the degree in person. This makes a total of nine honorary degrees bestowed on Pief, giving him ten doctorates. Does this make him Dr. Dr. Dr. Dr. Dr. Dr. Dr. Dr. Dr. Panofsky, or Dr.¹⁰ Panofsky?



Adele Panofsky has reconstructed the missing bones of the Paleoparadoxia and assembled the entire plaster skeleton. The skeleton is held together by an intricate system of metal rods that have been submerged into the individual bones. Adele is now painting the plaster cast replica so it will resemble the original fossils. The reconstructed bones are a slightly different color to distinguish them from the fossilized ones.

The effect of the 10-foot skeleton can only be hinted at in writing. The *Paleoparadoxia* should really be encountered in person. Adele's workshop is always open to the interested public, and a visit there is certain to be both delightful and informative.

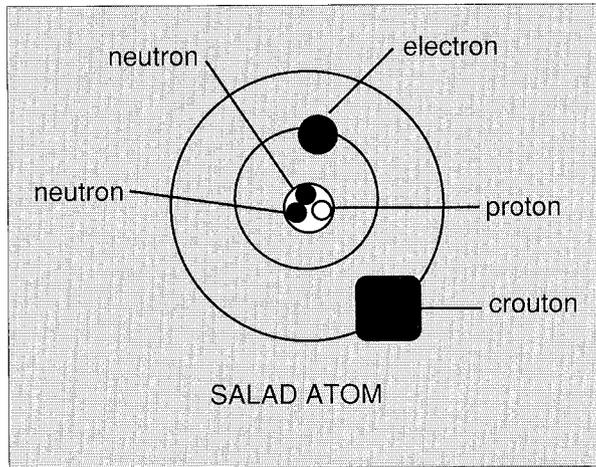
Adele works on the *Paleoparadoxia* every Monday, Wednesday, and Friday in the basement of building 003, located north of the accelerator just before Highway 280.

—Annette Cords

[Editor's Note: This is the first of four articles about the history of the SLAC site. Annette Cords, the author, is working part time this summer in the Publications Department. She is an Master of Fine Arts student at the University of Pennsylvania, and hopes to teach college-level art. In her free time Annette can be found painting at her easel.]

Raves for SLAC Café

THE SLAC CAFETERIA IS NO MORE. It is now the SLAC Café. But not for long: Guckenheimer, SLAC's new food service contractor, will be running a contest to find the name best suited to our laboratory.



But no matter what its name, the food service will be of a quality which many of us had abandoned all hope of obtaining within our lifetimes. One look at the menu (which will arrive at all the mailboxes on the site) should be enough: when did the eatery on the hill last offer Carved Rosemary Roast Veal, or Chicken

Breast Saute with Peppers, or Beer Batter Fresh Fish and Chips, or Greek Gyro with Greek Salad for lunch? Not to mention Blueberry Cornmeal Pancakes, or Avocado, Bacon, and Jack Cheese Omelette for breakfast? And fresh fruit, and fresh salads, and French Roast coffee. This is from last week's menu; this week's will be different, and so will all of them. Guckenheimer prides itself on variety, freshness, and wholesomeness, and has promised not to repeat the same meals until we either ask for them or forget when they were last served. In fact, the manager, Maureen Valdes, will welcome suggestions of favorite dishes or products, and if at all possible, will place them on some future menu. She also looks forward to meeting as many of you as want to comment on the service, or simply want to say hello.

For those who do not want to, or cannot, visit the brightly redecorated dining room and food service area, there are the vending machines. While operated by Canteen, they will also be supervised by Guckenheimer, which supplies the sandwiches and fresh foods, and which monitors the selection of snacks and candies. Problems with the machines should be reported to Maureen at ext. 2615.

All of this came about because, as the old vendor's contract was coming to an end, the purchasing department brought together a Cafeteria Evaluation Committee (on which I had the privilege to serve) that visited and ate at cafeterias operated by prospective vendors, interviewed their staffs, and wrote detailed evaluations of their findings. The evaluation criteria stressed quality and reliability; it is on the basis of these criteria that Guckenheimer was selected. For those responsible for such things, it is worth noting that the company will also cater any SLAC function by request; this too, can be arranged with Maureen.

And aside from what the SLAC Café will do for our taste buds, it should also help the local traffic situation, since many of us will no longer have to drive off-site for an enjoyable meal. See you there.

—Tony Roder

T-Shirt Design Contest/ 20th Annual SLAC Run

IN PREPARATION FOR our annual race on November 7, a contest is being held to choose a design for this year's T-shirt. This is our 20th annual race, and there will be a prize for the design that is chosen. The race committee will choose the winner. Please send your ideas to Eileen Derr at Mail Stop 25. The deadline for entries is September 15.

A beginner's running group for women is forming. The goal of the group, in addition to improving physical fitness, is to get ready for the annual race. For more information call Karen Fant at ext. 4466.

—Eileen Derr

Tuition Grant Program Applications Due

NOW IS THE TIME for eligible* employees to complete applications for Stanford's Tuition Grant Program. Guidelines and application forms are available in the Benefits Office, A&E Bldg., Room 236.

This scholarship program provides a benefit of up to one-half of Stanford's undergraduate tuition amount toward the cost of the child's undergraduate tuition at any eligible college or university in the world. The maximum tuition benefit for the 1991-92 school year is \$7551 (half of Stanford's tuition of \$15,102).

Be sure to return your completed application to Benefits (MS 11) to avoid delays in processing.

**Eligibility: completion of five years of continuous full-time service with Stanford. Must work full-time while child attends school.*

Second Annual Juneteenth Celebration Big Success

No shortage of food at this multi-cultural event



Taking time out from the festivities are, front, l. to r., Michelle Smith with a guest, Roslyn Prater and son, a KS Rapper and friends. Burt and Laurose Richter and David Price can be seen in the background.



Irma Frank-Williams directs the SLAC Gospel Choir, l. to r., Vernese Holms, Sandra Pickrom, Wanda Elliott, Evaughn Lewis, Effie Clewis, Lorenzo Lowery, Pauline Wethington, Margie Bangali.



Ben Smith serves Frank Bermudez and Cindy Stevenson generous portions of barbecue.

EMPLOYEES ARRIVING the morning of June 21 were tantalized by the savory smells from several barbecues as members of the Black Association of SLAC Employees (B.A.S.E.) began their preparations for the second annual Juneteenth celebration.

Floyd Thompkins, Jr., Associate Dean of the Chapel at Stanford University, spoke on Black American history, ending his speech with Martin Luther King's words, "Free at last. Free at last. Thank God almighty I'm free at last." The SLAC Gospel Choir followed with old Negro spirituals sung *a cappella*, while Shonnese Guion read a brief history of Black American music.

Contentedly smacking their lips and licking their fingers, the crowd sat back to eat, relax in the sun, and enjoy the rest of the program: the soulful band Sarakos, guitarist Huru's mellow strumming, and the KS Rappers (third graders). There was a drawing for prizes donated by local merchants. Black-American art and Civil War memorabilia were also displayed in the auditorium breezeway.

Reflecting on the afternoon and thinking about the past, the celebrants remembered the reason for Juneteenth and realized that black Americans have come a long way—from the bowels of the slave ship to the back-breaking fields of sharecropping, past the days of Jim Crow and segregation. These alone are reasons to celebrate, but the journey has not ended.

—Bette Reed and Shonnese Guion

SHARING OUR BOUNTY

THE OVERABUNDANCE of barbecued chicken, ribs, and beans that remained after the Juneteenth festivities was taken to St. Anthony's Padua Dining Room in Redwood City to help feed the hungry and homeless. Sam Acuff, Administrator of St. Anthony's, wrote to thank the Black Association of SLAC Employees, saying, "Although we make every effort to provide a daily hot and nutritionally balanced meal, we can't top the chicken, ribs, etc. you sent us. Indeed, it was a rare treat for those less fortunate, whom we serve. Thank you for helping us feed the hungry."

Whopping Turnout at Second Annual Fitness Day



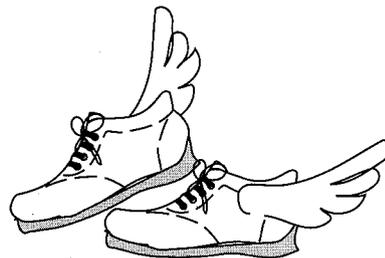
Above: Winning the category of "Greatest number of participants," the Klystron group was represented by a total of 23 members.

Left: With the end in sight, enthusiastic walkers stride towards chilled drinks and the awarding of prizes.

MORE THAN 110 employees turned out for the second annual employee Fitness Day. The weather was sunny and beautiful as we walked the two mile course through the Sector 30 gate on the SLAC Ring Road, passing the Collider Hall, back past SSRL to the front of the A&E building. Cold drinks and prizes waited for all participants at the finish line.

Everyone agreed that it had been a fun way to spend a lunch hour, and yes, we would repeat the annual trek next year.

Competition for this event was by department. A department head had to have participated in the walk in order for the department to qualify.



The winners were:

Best costumes:

Controls

Highest percentage of participants:

Affirmative Action

Greatest number of participants:

Klystron

—Eileen Derr

Improved Workplace Relationships Provide Better Health, Productivity

AS WE ENTER A MOST critical period at SLAC, our wellness program is offering a tool to ease workplace relationships. The program is entitled "WorkSkills®." The idea behind the project is improvement of work relationships, thereby alleviating some stress which can lead to other problems.

The program consists of eight brochures which will be mailed at two week intervals. Each brochure

covers a topic that deals with work relationships and communications. There will be voluntary noontime lectures to reinforce the ideas presented in these brochures. The lectures will be presented by off-site experts, followed by a question-and-answer period. The eight topics that will be covered are:

- change
- people
- power

- anger
- blame
- communication
- yourself
- problems

These communication skills have proven to be useful for *everyone* in an organization.

The program will start toward the end of July and will be completed in mid-November. Look for the first flyer in your mail.

—Eileen Derr

RICHARD BLUMBERG WARMLY REMEMBERED

RICHARD BLUMBERG PASSED away on June 1, 1991, after a brief illness. Rich was a colorful character who played a significant supporting role in the progress of physics in the past four decades.

His career began at the UC Radiation Lab in Berkeley in the EE department. In the early 1950s he was sent to Eniwetok atoll to participate in weapons tests. Toward the end of his tour of duty, the Scripps oceanographic vessel put in to port. Rich learned they were short of deck hands and promptly signed on. He later said the job wasn't at all romantic because the ship was at sea the whole time. When he returned to Berkeley he found he had been fired. Luis Alvarez immediately hired Rich into his physics group. Alvarez acknowledged Rich's contributions to the group's accomplishments in his Nobel lecture of December 11, 1968:

"In the year 1954, as I have recounted, various members of my research group had been responsible for the successful operation of

we felt were essential to the solution of high energy physics problems. I therefore enlisted the assistance of three close associates, J. Donald Gow, Robert Watt, and Richard Blumberg." Dr. Alvarez then told his Stockholm audience, "Dick Blumberg had been trained as a mechanical engineer, and he had designed the equipment used by Crawford, Stevenson, and me in our experiments, then in progress, on the Compton scattering of gamma rays by protons.

Wilson Powell had built two large magnets to accommodate his Wilson Cloud Chambers, pictures from which adorned the walls of every cyclotron laboratory in the world. He very generously placed one of these magnets at our disposal, and Dick Blumberg immediately started the mechanical design of the 10-inch chamber—the largest size we felt could be accommodated in the well of Powell's magnet. Blumberg's drafting table was in the middle of the single room that contained the desks of all the members of my research group. Not many engineers will tolerate such working conditions, but Blumberg was able to do so and he produced a design that was quickly built in



the main machine shop."

Richard Blumberg joined SLAC in 1964. Joe Ballam recalled his association with him:

"I met Rich in 1961 when we were both visitors at CERN. Although we did not work on the same project, I became aware of his potential as a coordinator and eventual project leader.

Later, in 1963, when it became clear that SLAC was going to build a bubble chamber, I remembered Rich and asked him if he would come here as chief engineer on the 40-inch chamber. Fortunately, he agreed and in September 1964 he began to assemble the team that was to create one of the most exciting bubble chambers of the 70s. To his credit this device was built in two years and at a cost below Rich's original estimate. With the help of people like John Mark, Steve St. Lorant, Henning Petersen, Habib Brechna, Knut Skarpaas, John Alcorn, Bohdan Sukiennicki, Hank Cutler and Bob Friday—as well as a very able crew of technicians and visitors, all of whose

"...the sadness of his sudden loss has been tempered by a flood of warm memories of a fine man for whom it was an honor and pleasure to work (with) and simultaneously regard as a friend."

four separate liquid hydrogen bubble chambers, increasing in diameter from 1.5 inches to 4 inches. By the end of that eventful year, it was clear that it would take a more concerted engineering-type approach to the problem if we were to progress to the larger chambers

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(cont'd. from p. 11)

work was coordinated by Rich, the chamber emerged as the first really fast-cycling production bubble chamber. Later Bob Watt modified it to run even faster. The basic design remained to the everlasting credit of Rich and his team.

Throughout this very intense period of design, construction, and early operation, Rich remained cheerful, ebullient and energetic, always moving, questioning, worrying about all possible missing pieces in the pattern and keeping everyone focussed on the main tasks. For these efforts SLAC will always remain in his debt."

Another colorful member of the BC Design Group was John Alcorn, now at CEBAF. He recalled his long association with Rich:

"I was profoundly shocked to learn of Dick Blumberg's untimely death. After the shock, I began to reflect upon what in retrospect had been something of a golden era for those of us who developed the 40-inch hydrogen bubble chamber under his capable and amiable guidance. It was an exciting, chal-

lenging, and cheerful project, resulting in a very successful experimental device. So the sadness of his sudden loss has been tempered by a flood of warm memories of a fine man for whom it was an honor and pleasure to work and simultaneously regard as a friend."

Henning Petersen was also a key member of Rich's group. They were friends and associates for over 30 years:

"I met Dick Blumberg at CERN in 1960 when he joined the two-meter Hydrogen Bubble Chamber group. We formed a car pool and I still have happy memories of our discussions. Dick had great ideas about changing the techniques of bubble chambers—and the world, too!

He was equally competent and upbeat as the manager of the 40-inch Bubble Chamber group. Ask any of Dick's old collaborators—they will tell you that the years they worked under his leadership were among the best they ever experienced.

More recently we shared in Dick's excitement over personal computers, his travels all over the

world, but most of all his cheerful demeanor when he was with his friends at SLAC.

We miss a valued colleague and a good friend."

SLAC's bubble chamber program was a notable success, due in no small part to Rich's efforts. As this program was approaching its conclusion, Rich joined EFD. His first project was to help convert the magnet from Argonne's 4-meter bubble chamber, which was headed for the scrapyard, for use in the HRS detector at PEP. Rich was one of the key figures in the transportation of the 105-ton superconducting magnet coil from ANL to SLAC, a project which received nationwide media attention. In a later crisis, Rich stepped in to arrange for the shipment of the Crystal Ball from SLAC to DESY in an Air Force C5-A and assist in its installation at DESY.

We all miss his boisterous, uninhibited approach to the problems of physics research, and his cheerful personality.

—Lew Keller,
Herb Weidner

Keeping Up With Journals

THE LIBRARY HAS about 350 journals available for routing to staff. We will put your name on a list, attach it to the issue, and send it around after the issue has been displayed in the library reading room. The leaflet called "Subject List of Current Periodicals" is available in the library. Call ext. 2411 or send e-mail to SERIALS@SLACVM, and we will be happy to send you the leaflet, put your name on a routing list, or sign you up for Tables of Contents (we send you an advance copy of the Table of Contents of the journal issues as they are checked in).

Some journals go to two or three readers; other popular titles have long routing lists. There are some that do not reach the last people and never make it back to the library. This plaintive message was attached to a copy of BYTE:

The state of the art moves so rapidly that to receive this publication nine months late makes it a genuine antique!

In fact, that is why we prefer to sign you up for Tables of Contents; you get the contents when the news is current and can come to

the library and read (or copy) the articles you want while the journal issue is on display.

Please take a look at your desk: are any journals stuck there? It's time to send them on!

—Arsella Raman

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ULTIMATE FRISBEE NEEDS YOU!



Standing, left to right, Cheng Gang Fan, Mike Huffer, Alice Bean, Jennie Huber, Greg Punkar, Safi Bahcall, Jan Lauber, Tom Hyer, Kevin Pitts. Sitting, left to right, David Marshall, Richard Dubois, Nety Krishna, Rafa Miranda, Michele Gallinaro.

"If a ball could dream, it would be a frisbee."

YOU HAVE PROBABLY NOTICED some kind of frisbee game on the SLAC Green during the lunch hour. It looks a little like football. Those folks are playing ULTIMATE FRISBEE. The game at SLAC was started in late 1989 by two SLD experiment collaborators from UC Santa Barbara, a hotbed of Ultimate. It still features a majority of players mostly from SLD, with representatives from Theory, Health Physics, SSRL and the Nuclear Physics program.

Ultimate began as a high school sport back east and quickly spread to colleges. Now most companies have teams as well. The World Championships will be held in Toronto this year. Our SLAC team has participated in two seasons of Intra-mural leagues on Stanford campus. The first year, we managed only one win and missed the playoffs. This second year, we were undefeated in the regular season in both the Men's and CoEd leagues, and lost in the quarter- and semi-finals of the playoffs. We have organized matches with several corporate teams, like Oracle, NASA, Apple and Hewlett Packard and just ran an eight-team tournament at the end of June. There is a lot of Ultimate out there!

The object of the game is to pass the disc to a teammate in your opponent's endzone; one cannot run

with the disc. One point is awarded for each score. If the disc is intercepted or dropped, it is immediately returned to the defending team, who then try to advance it down the field. This leads to continuous action punctuated only by breaks after a scoring play as the teams reassemble on their goal lines. There are no referees, and foul calls are made by the players themselves in an honor system.

We need new blood on our team. Most of our players have learned the game at SLAC playing at lunch hour and have improved their fitness tremendously in the process. But, as with any group, there is turnover from people moving to other places. We are looking for men or women from the SLAC community who would like to try the game. We are happy to have new people join in, and we take care to introduce them to the game properly. So, if you'd like to get some intense exercise on your lunch hour with the availability of extra-curricular play, you can drop in on a game, Monday or Friday noons on the Green. On Wednesdays we play on campus at Roble field with people from Microsoft and Digital. If you're interested in joining us, send e-mail to RICHARD@SLACVM or call Richard Dubois at ext. 3824. We'd love to have you!

—Richard Dubois