

# The Beam Line

VOLUME 4, NO. 15

Stanford Linear Accelerator Center

OCTOBER 9, 1973

## Medical Adventures in Latin America -- SLAC Employee's Daughter

One of the many non-scientific conditions which makes life interesting at SLAC is the cosmopolitan atmosphere brought about by the number of languages spoken in addition to English. It is not uncommon to hear French, German, Hebrew, Spanish, or even Russian spoken here, but probably the most often spoken of these is Spanish because so many SLAC employees do have a Latin heritage or a great interest in Latin America. Vacations in Mexico or Central and South American have become increasingly popular, and a bare mention of interest in such a trip is usually enough to bring forth a number of people in any department who have been there and who have suggestions how to make such a vacation as enjoyable as their own.

This enjoyment of vacation time with our Southern neighbors is not just a SLAC phenomenon, for we are almost in the middle of the Bay Area "hot spot" of tourist interest in Mexico; Californians who travel to the South are only outnumbered in the United States by Texans.



Alicia Willmunder (right) and her partner from Florida make up a typical Amigos Team in front of their clinic in Montenegro, Colombia.

With all this interest it is not surprising that some more permanent ties have been made from the Bay Area to Latin America. One such arrangement is the Town Affiliation Association which helps communities find "Sister Cities" outside our country. (See September 10, 1973 issue of BEAM LINE.) Examples of Sister Cities are Palo Alto and Oaxaca, Mexico; San Jose (California) and San Jose, Costa Rica. Such city affiliations make it possible for citizens and officials to communicate and discuss common problems and their solutions, exchange students for visits and study, and just get to know one another as people. This experiment has been extremely successful, and the number of Sister City ties has continued to grow.

Latin America, however, is composed primarily of small communities, much too small and with problems much too large for any one Sister City to help solve. Most have chronic medical problems with everything from insect-caused "granos" or boils, to intestinal parasites, and even polio. Citizens of such villages rarely see a doctor and often must travel several days by trail to get to any medical facility. Several organizations have been formed to give medical aid to such villages. The "Flying Samaritans" consist of pilots and doctors who spend weekends and vacations in northern Mexico and Baja, California providing clinical care in the villages and also flying out cases who need hospital care.

Another organization providing medical help is called "Amigos de las Americas." This group, consisting of about 600 teenagers and their professional trainers and advisors, provides medical help to Guatemala, Honduras, Nicaragua, Colombia, Ecuador, and Paraguay during nine weeks of our summer. Unlike the Samaritans' primarily surgical program, the Amigos' program is primarily preventive. Young people 16 years or older must undergo over 100 hours of classwork in Spanish, Latin American history and culture, and medicine. At the end of their training they are made into teams of two or three and placed in villages in the six

countries where they set up clinics and provide injections or immunizations for diseases and parasites. Each team provides these services for three weeks and then returns home when replaced by the next team. Three such teams provide nine weeks of services to each village during the summer. The following year new areas will be selected in each country and appropriate immunizations provided until each country has been fully covered.

I first encountered the Amigos while driving with my family in Guatemala. We were visiting the Indian community of Chichicastenango on market day, and were much surprised to see a long line of Indians in their colorful Quiche costumes. The line started in the middle of the market square and continued for half a block where it ended at a card table attended by three neatly dressed girls, each with a red, white, and blue badge carrying the words "Amigos de las Americas" on her lapel. One was preparing hypodermic syringes, one was questioning each person at the head of the line, and the third was giving each a shot in the arm and a drop on the tongue from a medicine dropper. They were far too busy to talk to us then, but late in the afternoon they had to stop when they ran out of materials, so we talked with them as they were folding up their table and carrying off their equipment. They had been there since dawn and in that time had given a thousand injections for D. P. T. and polio immunizations. It was just sundown and we wanted them to join us for supper, but they said they couldn't; they were teaching the local people about sanitation and hygiene that evening and needed the time to prepare their lessons. Other evenings they had English classes or met with people to talk, mainly about the United States.

Two days later we found a second group of Amigos in Totonicapan, another village in the Guatemalan highlands. This time the Amigos had finished their work for the day and were playing with the children to whom they had just finished giving shots. They and the children were obviously having a good time, and it was clear that it would be hard to convince these children that such a thing as an "ugly American" existed.



A typical day includes taking care of those who came into the clinic (above), and bringing immunizations directly to those who live in houses in the outlying Barrios such as this one (below).

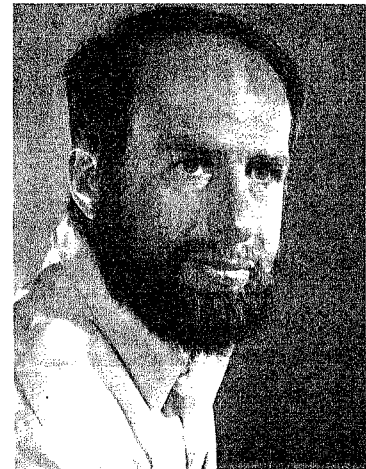


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## New Director of LBL

The appointment of Dr. Andrew M. Sessler, 44, internationally renowned physicist, as Director of the Lawrence Berkeley Laboratory, was announced September 21, 1973 by Dean A. Watkins, Chairman of the University of California Regents.

Chairman Watkins reported the appointment, which will be effective November 1, 1973, following approval by The Regents of the recommendation of Dr. Sessler by a search committee composed of Regents, faculty members and scientists.



Dr. Andrew M. Sessler, new Director of LBL

Dr. Sessler will succeed Dr. Edwin M. McMillan, Nobel Laureate, who nearly a year ago announced his intention of retiring this fall. Dr. McMillan, 66, has led the Lab for 15 years. The only previous Director was the late Ernest O. Lawrence, inventor of the cyclotron and founder of the Laboratory.

Citing Dr. Sessler's "solid credentials" as a scientist, Chairman Watkins said "We are indeed fortunate to have Dr. Sessler filling this important position and will benefit from the energy and dedication he brings to his new responsibilities."

Dr. McMillan praised Dr. Sessler's theoretical research which, he said, has led to "some spectacular cures" of instabilities in particle orbits in accelerators and storage rings. "I am confident that he will be an inspired leader," Dr. McMillan said.

Dr. Sessler will lead a research establishment with a staff of some 2,000 people and an annual budget of approximately \$40 million. Since the early 1930's LBL, currently having 6 Nobel Laureates on its staff, has been a major force in expanding man's knowledge of the atomic nucleus. Recently it has added research programs in materials science, environmental research, and energy development.

## Carnegie, Lynch Named to Faculty

The SLAC facility has been increased by two with the appointments of Robert K. Carnegie (Group B) and Harvey L. Lynch (Group C) as assistant professors of physics at SLAC. These appointments, effective September 1, bring SLAC faculty size to 18; 14 professors and four assistant professors.

Dr. Carnegie joined SLAC as a research associate in July, 1969. He received a B.Sc. degree in 1962 from Queen's University, Kingston, Ontario; an M.A. (1963) from the University of Toronto; and the Ph.D. from Princeton University (1967) where he was involved in studies of the difference in mass between the two different kinds of neutral K mesons.

Dr. Carnegie's activities at SLAC have centered

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# SLAC Job Openings

The following job opportunities are currently available at SLAC and have been approved for internal placement. Interested SLAC employees should apply immediately as the lead-time required to advertise in the BEAM LINE does not necessarily coincide with the formal posting periods.

**PS&E Technician III (Elect.)** - Applicant will be solely responsible for maintaining basic electrical standards and will perform verification measurements to insure traceability which is certified by the National Bureau of Standards. Make precision measurements. Will involve assembling the component devices of measurement systems in configurations consistent with established standard lab procedures. Will calibrate high accuracy DVM's - counters - electrometers and repair same when handling is indicated.  
SHIFT: Days SALARY: \$844-1,078  
REQ: No. 6671

**PS&E Technician II** - Applicant will maintain all types of Gallery electronics equipment including high power pulse modulators, high power r.f. amplifiers, hard tube modulators, regulated power supplies, low level solid state equipment.  
SHIFT: Owl SALARY: \$730-932  
REQ: No. 6689 Repeated

**Maintenance Person II** - Applicant will be required to prepare articles for painting by various methods, such as sandblasting, steam cleaning, sanding, stripping, etc. Also assist craftsmen in performing their duties, which may include the operation of some construction equipment.  
SHIFT: Days SALARY: \$764-842  
REQ: No. 7855

**PS&E Technician III** - Applicant will be required to perform various duties such as: chemical cleaning of copper, stainless steel, and exotic materials used in high vacuum systems. Electro-plating on base materials. Will work with hard chromium plating thick deposits to specifications. Anodize, dye and hard coat to specifications. Perform carbon purification treatment of plating baths. Will be required to care for and operate filter equipment. Prepare printed circuit boards for three hole plating.  
SHIFT: Days SALARY: \$844-1,078 REQ: No. 7171

**Office Assistant III** - Perform full clerical responsibility for determining procedures and methods of work in connection with subcontracts for the Plant Office. This includes maintenance of file records and reports, meeting timely report requirements of the AEC, correspondence and follow through on subcontracts as well as providing general clerical support for the office.  
SHIFT: Days SALARY: \$597-764  
REQ: No. 7813

Two other jobs available within SLAC are for a **Secretary II** and an **Office Assistant II**. Contact the Employee Relations Office (ext. 2355) if you are interested in any of these positions.

## Adventures in Latin America

(continued from front page)

I saw my 15 year old daughter, Alicia, in earnest conversation with the girls from the Amigos team, but I didn't realize why until we returned to Palo Alto and she asked me to telephone the Amigos headquarters in Houston to find if there was a local chapter she could join. The nearest one was in San Mateo, and I soon found myself making the weekly trip to her classes. Although I only intended to drop her off and then pick her up when the class was over, I made the mistake of staying one evening and soon was completely "hooked" on the program. Imagine yourself with a group of 50 young people, all of whom have already spent the day in school, now listening attentively and voluntarily to a man giving a talk about Constitutional History of Latin America. This had been preceded by a one hour Spanish lesson and was followed by an hour of medical lectures where they listened to a speaker discuss immunization theory. They had each been asked to bring an orange, and hypodermic syringes were issued so they could practice "immunizing" their orange. I started looking forward to the weekly Tuesday evening trip and was really a bit disappointed when a carpool was established.

Since starting with Amigos, Alicia has been in Colombia for a summer, and this year she set up a clinic in Guazacapan, Guatemala. Classes have not yet started for the 1974 season, but she and her younger sister are already signed up.

Worthwhile? Yes! Adventuresome? Yes! Dangerous? Possibly, but probably less so than daily commuting on bayshore. In all its years of operation we have yet to lose one Amigo.

The Amigos training program will be starting soon. Do you have a son or daughter or know anyone who will be 16 by next summer and might be interested in being an Amigo? If so, Alan Wilmunder would like to talk to you, but be careful or you might wind up as hooked on the program as he is. (That's me.)

Alan Wilmunder  
Extension 2441

Published by the SLAC Public Information Office  
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# SLAC Joggers Take Note

What's the best way to run a race? Start slow and give it all you've got in the "stretch?" Or, start fast so that the rest will never catch up?

These questions have been answered mathematically (believe it or not) by Professor Joseph Keller at the Courant Institute of Mathematical Sciences, New York University, in an article appearing in the September 1973 issue of "Physics Today." By using some fairly simple equations, including Newton's second law of motion and a mathematical representation of the energy lost by a runner during a race, Professor Keller was able to devise a theory of running which was able to give all the world's current track records, from 50 meters to 10,000 meters, with an error of not more than 3.1 percent.

We won't go into the mathematical techniques employed, but some qualitative results are interesting -- and may be useful to the hardy souls planning to enter next year's SLAC Long Distance Run.

First, the theory predicts that the strategy to be employed in short races is drastically different from that in longer races. For distances less than 320 yards, the runner should give it everything that he has -- that is, run at top speed throughout.

For distances longer than 320 yards, one should accelerate as hard as he can for one to two seconds (the exact time depends upon the distance to be run) and then run at a constant speed until a second or so before the end of the race, slowing down somewhat at the very end.

Thus it appears that one ought not to save energy for a faster speed in the stretch, but rather get going at the beginning and try to maintain that speed for essentially the rest of the race.

This result is equivalent to the case of the car wishing to go a certain distance in a minimum amount of time -- the gasoline should be used up shortly before the end of the trip.

Any comments, joggers?

# Electrons May Someday Help Dig Subway Tunnels

Machine-gun-like bursts of electrons may someday be used by engineers to dig hundred-mile tunnels for high-speed railway systems. Using accelerators, researchers at the Lawrence Berkeley Laboratory are examining the idea.

The concept, which sounds like the science fiction "ray gun," involves a single accelerator with a special nozzle. Its beams of electrons, with energy levels of millions of electron volts, would be aimed at solid rock. Fired at a rate of hundreds of times a second, the beam would be sprayed back and forth like a stream of water out of a fire hose, pulverizing large sections of the rock. The pulverized rock would fall to the bottom of the tunnel as dust and sand and literally be vacuumed out.

According to Robert Avery, an engineer in LBL's Advanced Accelerator Design Group, "Developing the concept is a technological challenge, but not impossible." He added, "We have reason to



This very high speed picture shows pieces of rock being exploded away from a 0.4 inch thick slab of granite after being bombarded with a single intense burst of invisible electrons for only one twenty-millionth of a second. The electrons created an intense pressure with the rock which not only disintegrated the right side of the rock where the electrons entered, but the pressure wave also travelled through the rock fracturing the left side as well. (Photo courtesy of LBL)

# Lynch Named to Faculty

(continued from front page)

around Group B's wire spark chamber program. He designed, constructed, and debugged a set of large (10 feet by 5 feet) wire chambers. The chambers are characterized by their economy and efficiency of operation.

Dr. Lynch joined the staff in August, 1968, also as a research associate, coming to SLAC after spending two years at CERN, Geneva, as a visiting scientist. He received a B.S. in physics from MIT in 1961 and a Ph.D. at Stanford in 1966. His thesis project, conducted at HEPL under D. Ritson, involved the inelastic scattering of electrons from hydrogen.

At SLAC, Dr. Lynch has been primarily responsible for the electronic system associated with the SPEAR detector, and he was involved with the magnetostriuctive sensing system for use with the detector.

Other members of SLAC's faculty include Professors J. Ballam, S. Berman, J. Bjorken, R. Blankenbecler, S. Drell, F. Gilman, D. Leith, W. Miller, R. Mozley, H. Noyes, W. Panofsky, M. Perl, B. Richter, and R. Taylor, and Assistant Professors E. Bloom and M. Davier.

hope this process would be less expensive than currently available excavation techniques, but much more work needs to be done before we can make a positive prediction."

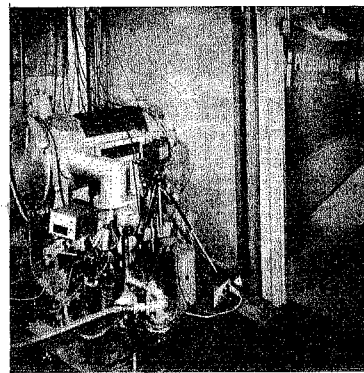
Sponsored by the National Science Foundation and administered by the AEC Laboratory's Energy and Environment Program, the research project is directed toward satisfying national needs for more rapid and economical underground excavation. For example, some transportation authorities are now discussing the possibility of eventually running 300-mile-an-hour trains, which might best be operated in very straight paths underground. The tunnel for such a train might be hundreds of miles long -- say, from San Francisco to Los Angeles, or from Washington, D.C. to Boston. More rapid tunneling techniques might make such projects feasible.

Other major projects which might benefit from such a high-speed system include mass transit systems and underground utility lines and fuel pipes.

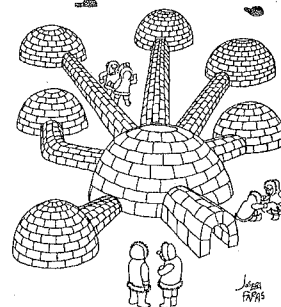
Experimentation to date, conducted on a small scale with commercially available electron accelerators at the Lawrence Livermore Laboratory, indicates that an intense electron burst of modest energy produces a significant cratering effect in granite, limestone, basalt and sandstone. It was also found that the effect is greater if the rock is wet, which is fortunate because most underground rock is saturated with water.

Early trials showed that a very intense burst lasting one twenty-millionth of a second could remove about two cubic centimeters of wet granite, leaving a shallow crater a millimeter deep and about two inches in diameter.

Accelerators required for an actual excavation system would have to be many times more powerful than the machines tested at Livermore. The most significant technical advance required, however, would be the ability to fire hundreds of pulses a second.



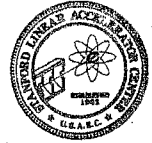
The stationary accelerator that was used in the latest experiments on the accelerator excavation technique. (Photo courtesy of LLL)



"We hired a committee of architects!"



# The Beam Line



Stanford Linear Accelerator Center

NOTE TO MEMBERS OF THE SLAC FAMILY FROM PIEF IN SWITZERLAND:

This is the first time I have been away from Stanford at Christmas time for fourteen years. It is good to learn here at CERN about the progress and methods of the High Energy Physics institutions in Europe, but it is even better to find that SLAC is regarded as a truly great laboratory by all. I am also pleased (but not surprised!) that SLAC runs even better when I am not there. With many thanks and best wishes for a great Christmas and peaceful New Year.

*Pief*

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SEASON'S GREETINGS -- A computer crossword to you from Dave Gustavson in Group F.

LETTERS	CANDY	MERRYCHRISTMAS
COOKIES	PINE	HAPPYNEWYEAR
FRIENDS	NOEL	SILENTNIGHT
CAROLS	STAR	CELEBRATION
WREATH	LOVE	SLEIGHRIDE
CAROLS	GIFT	SANTACLAUS
FAMILY	JOY	SNOWFLAKE
PEACE		MISTLETOE
HOLLY		GREETINGS
BELLS		CANDYCANES
		FRUITCAKE
		BLESSINGS
		REINDEER
		PRESENTS
		MEMORIES
		HOLIDAY
		SNOWMAN

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HOLIDAY GREETINGS!

COME TO OUR SPECIAL LUNCHEON AND PARTY

Thursday December 20, 1973

11:30-12:30 Luncheon - In SLAC Cafeteria, \$1.50 per person  
 Menu - Turkey with dressing and cranberry sauce -or- Roast beef  
 plus  
 Salad, mashed potatoes, vegetable, roll & butter, coffee, and  
 Cake - or - mince or pumpkin pie

The Palo Alto High School Madrigal singing group will be in the cafeteria singing Christmas selections from about 11:45 to 12:15.

12:30-1:00 Christmas caroling and special songs for all (who fit) in the SLAC Auditorium. The "Madrigals" will sing special numbers, followed by a soprano duet of Henry Purcell's "Sound the Trumpet." Then the whole SLAC chorus (everyone in audience) are invited to join in singing favorite Christmas carols.

1:00-1:30 Cookies and punch in the Breezeway --  
 Christmas greetings from Sid Drell  
 Drawing and prizes --

DETACH HERE FOR SLAC DRAWING

(PLEASE PRINT)

NAME \_\_\_\_\_

DEPARTMENT \_\_\_\_\_

