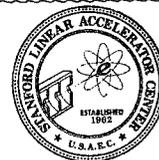


Season's Greetings



The Beam Line



VOLUME 3 NO. 5

Stanford Linear Accelerator Center

DECEMBER 18, 1972



A bit of joviality preceding the site tour. From left to right, Professor Pei Shih-Chang, Professor Chang Wen-Yu, Mr. Liu Chung-Jen (U.N. representative), Professor Pai Chieh-Fu, and Dr. Panofsky. Behind Dr. Panofsky are Alex Tseng and Guy Alitto, interpreter.

Mainland China Group Visits SLAC Dec. 11

Members of what is understood to be the first multi-disciplinary scientific delegation to leave the People's Republic of China since the Cultural Revolution visited SLAC on the morning of Monday, December 11.

The group was headed by Professor Pei Shih-Chang, Director of the Biophysics Institute at the Academia Sinica and Member of the Standing Committee of the National People's Council.

Deputy Leader was Professor Pai Chieh-Fu, Presidium Member of the Scientific and Technical Association of the PRC, and leading member of the Peking Municipal Bureau of Science and Technology.

Other members of the group were Professor Chang Wen-Yu, Vice-Director of the Institute of Atomic Energy of the Academia Sinica; Professor Chien Wai-Chang, a dynamicist; Professor Chien Jen-Yuan, a polymer chemist and Director of the Chinese Chemical Society; Mr. Hu Shih-Chuan, a biochemist; Mr. Li

Fu-Sheng, a computer scientist, and five attache-interpreters.

The group met in the Central Lab Orange Rooms for refreshments and was then taken on a site tour by SLAC Director W. Panofsky, assisted by Engineer Alex Tseng, Engineering Physicist Martin Lee, and Public Information head, Doug Dupen.

First stop on the site tour was a visit to the accelerator housing via the Sector 4 stairway. Assisting here were G. Loew, D. Tseng, and T.V. Huang.

The group was then given an overall view of the Research Yard from the hill east of the yard and then shown End Station A and the Counting House. Assisting with this part of the tour were R. Taylor and D. Sherden.

The visitors departed around noon for a luncheon at the Stanford Faculty Club.

Sera Election

The SLAC Emergency Relief Association, now four years old, has reached its original capital goal. In an unusual step for an organization dependent on contributions, SERA has asked its members who contribute more than the \$6 per year minimum to reduce their contributions by 25 percent in order to help balance income and outgo.

The semi-annual election of a director of SERA will be held in the Orange Room at noon, Monday December 18. Loy Barker, Mel Card, and Finn Halbo served on the nominating committee and have presented a slate of candidates: Ken Crook, Slim Harris, and George Owens.

All members are urged to attend the election meeting.

SLAC MEETINGS TODAY!

SLAC Director Dr. Panofsky has instituted an expanded series of general meetings dealing with all aspects of SLAC — budget status, technical and scientific progress reports, and the like. Speakers will include members of the staff in addition to Dr. Panofsky himself.

The first in the expanded series is being held today in the Auditorium at 8:30, 11:00, 1:00, and 4:00. If you haven't gone to one yet, try to make arrangements with your supervisor to attend a later one.

The next general meeting will be held early in 1973.

Guthrie Graduates Apprentices Program

Ed Guthrie of the Mechanical Fabrication Shops' Structural Fabrication and Assembly Shop recently became the first Stanford employee to become a journeyman after completing an on-the-job apprenticeship program.

At a lunch on November 30 Ed's supervisor, George Cruickshank, presented him with a certificate attesting to his successful completion of the formal apprenticeship program in combination welding, certified by the Division of Apprenticeship Standards of the Department of Industrial Relations of the State of California.

In order to meet the standards for certification, Ed had to complete 8000 hours of training. He began the program in August, 1968. During the apprenticeship period, he did all kinds of welding on such projects as the structural support for the 96,000-wire SPEAR magnetic detector, LASS, and various spark chambers.

Other people involved in training Ed were Herm Zaiss, Stan Butler, and Tony Sanchez, all of Mechanical Fabrication Shops. Completion of the program was contingent upon SLAC's approval of Ed's work.

Ed Guthrie lives in San Francisco.

There are currently four other em-

ployees in apprenticeship programs at SLAC. Felix Vargas and Ken Gibson are working as machinist apprentices in MFS under the supervision of Marion Adams. Pasqual Pimentel is also a MFS machinist apprentice, under Ray Pickup. Tony Barrera is working as an electrician apprentice in the Crafts Shop, under Phil Davies.

BEAM LINE Changes

This is the end of the BEAM LINE! At least as it has existed heretofore.

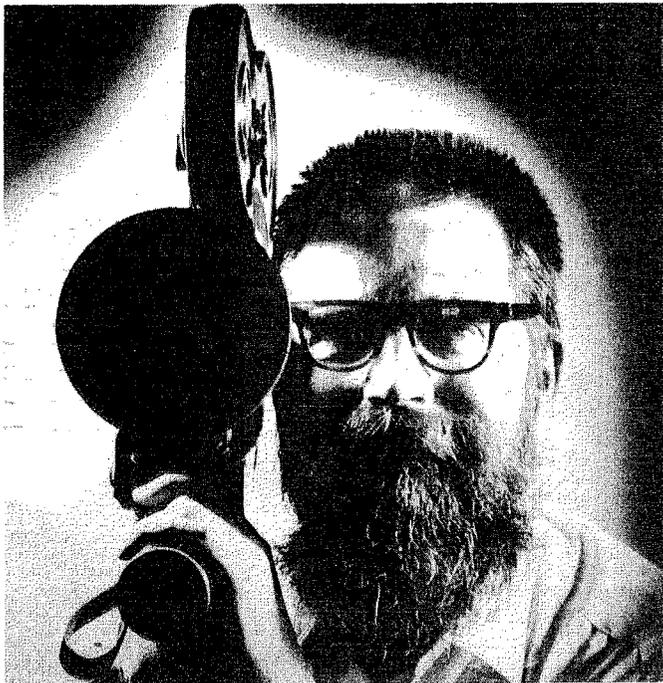
Starting in mid-January, the BEAM LINE will appear much more often (every two weeks initially, then weekly (and with a new format).

Bernie Lighthouse, Kathleen Maddern and Steve Kociol will edit the new version. The idea is to present more "topical" news and articles and to do it more often and at less cost. The new BEAM LINE will be typed at SLAC and printed, in part, at SLAC in Pete Munzell's Print Room.

Tentatively, it is planned that the format will be 11 inches by 17 inches, printed on both sides, with pictures and drawings on one side, printed commercially, and the other side printed at SLAC.



Ed Guthrie receiving a Certificate of Completion of Apprenticeship. From left to right: Stan Butler, Guthrie, George Cruickshank, Herm Zaiss, and Gerry Renner.



John Carey — behind his camera and ready for action!

"RIVERS OF GOLD"

by John Carey

(Ed. Note: After discovering John Carey's pursuit of California history through "travel-film" photography, we asked him for a first-hand account for the Beam Line of some of his filming experiences.)

The question most on my mind these days is: Can I make a feature length motion picture of events of a century ago? Can a travel-history film be produced to match the professional standards of today? I'm gambling that it can.

About fifteen years ago, for no particular reason, I purchased an adjustable camera. It was a medium good 35mm of the type so popular with the amateurs then and today. It was great fun to make photos of the family, and of the kids doing all sorts of foolish things. Those pictures are still enjoyed, but before too long, I felt the need to do something a little more worthwhile.

The beauty of the natural world through the viewfinder needed advertisement. Even common dandelions, enlarged to full-screen, produce magnificent displays that the hand of the artist finds it hard to match. That became such a consuming interest that nine years ago, after a month with SLAC, I took a leave and studied in Yosemite under Ansel Adams, the master photographer.

California has enough to offer the photographer to keep him busy for a decade and more. The Sierra and Yosemite are the first that come to mind, and Lassen Volcanic National Park perhaps is the second. But the lesser known ranges are equally as beautiful, if not as spectacular. My family and I have made many journeys into some of the wilder corners of the state just to see what was there. The Warner range, in the northeast, has one type of scenery and the Santa Lucias have another type, quite different.

Desert ranges are so unique that an entirely new method of investigation of them is necessary before photography can begin. The physical requirements of the desert demand special preparation of equipment and transportation. A sign on the north road into Death Valley, for instance, informs you that "Next Services 83 miles". The sand blowing from the dunes in Eureka Valley is sufficiently fine to ruin

machinery in either a camera or engine. Do you dare ford the alkaline lake in the bottom of Saline Valley? There was a salt works there once, with a tram up the Inyo Mountains and down the other side.

Our adventures have sparked an interest in California history. Markers, placed by various organizations and supervised by the state, informed us that a particular event occurred, and gradually these began to form a pattern. More formal and directed study was undertaken after consideration of adding to the pictures a third dimension — that of motion. So it followed, that, in order not to have simply a collection of animated snap shots, we needed to create a coherent story line and this led naturally to an assembly of all the factors: photography, travel, California history, and the desire to impart these interests to others in the strongest and most convincing way possible.

"RIVERS OF GOLD", the story of mining and the men who mined, is the result. Our tale is of an imaginary character, Will O. Wisp, who experiences the vagaries of mining and its modest successes. He will never become notable, for he follows an illusion from one bonanza to the next. The rich strike is always in the next gulch, and so he finds he has traveled from Sutter's Fort to Coloma, then to Crescent City. Will returns to San Francisco, for he has at last enough dust to take home, but a night on the Barbary Coast forces a change in plans. Returning to the diggin's, he starts prospecting south and decides, about the time he reaches Havilah, that the gold is gone (the Placer gold anyway) and that the thing to do is go for borax in the desert. This takes him from Bodie to Yuma, and from the Bristlecone Pine area at 14,000 feet to Badwater at -280 feet. He will suffer the consequences of the summer desert as well as the chill of winter nights. Eventually he will depart for the east after spending forty or fifty years trying to get rich quick.

The lure of California's rich history plus the excitement of meeting fascinating characters whose lives enrich our own, and hopefully others, are the reasons for our gambling on a travel-history film. None of the small-time casino stuff for us.

Fixed Past...Uncertain Future

by Pierre Noyes

For over two thousand years Western philosophers have struggled with two conflicting descriptions of time. One view is that both past and future are completely determined. Complete knowledge of what has and will happen is denied to finite human minds, yet some theistic philosophies hold that God has this complete prescience, while some atheistic philosophies maintain that determinism is the unalterable consequence of immutable scientific laws. Either belief says that, in principle, complete knowledge of the present implies the possibility of predicting the future and reconstructing the past. Competing views are that the unconstrained actions of the gods, or the unpredictable choices of free human beings, or some intrinsic randomness built into the structure of the universe, makes both past and future increasingly chaotic as one looks either forward or backward in time.

Physics employs both models, and like philosophies or religions which try to find a path between the two extreme views cited above, tries to reconcile them. "Classical" physics, which burgeoned out of the Scientific Revolution of the seventeenth century, was primarily deterministic, while quantum mechanics in our own century has usually been taken to imply increasing chaos as one looks farther into either past or future. Since the basic laws of both classical and quantum physics are reversible in time, neither finds it easy to account for many everyday experiences. For example, if a hot and a cold body are put in contact and insulated from their surroundings, we find that, following the usual human sense of the direction of time, they will come closer and closer to a common temperature. Thus a physicist (unless he is struggling with a philosophical problem) presented with a sequence of observations of their temperatures will unhesitatingly assert that time was moving forward if he reads the record in the direction of decreasing temperature difference, or backward if the hotter body is growing hotter and the colder body growing colder. But he has great difficulty in "proving" (using either classical or quantum physics) whether he has (or has not) in fact misread the time direction of the record as it would have been given by a clock in touch with the rest of the universe. To put the case more dramatically, contemporary physicists cannot guarantee that even if your refrigerator is working properly, an ice tray (by a very unlikely chance) may not start to boil.

Thus physics as taught and used in our society seems to contradict everyday experience. Few of us believe that we can actually alter the past, yet most of us act as if we believed that our acts can have some effect on the future. Symmetry under time reversal is only one of three symmetries that physicists used to believe were absolute, at least at the level of the elementary particle interactions. They also held that any experiment viewed in a mirror was also an experiment which could conceivably be carried out, and that the same would be true if particles were exchanged with their anti-particles. One of the most significant results achieved by the high energy accelerator laboratories such as the Stanford Linear Accelerator Center has been to prove that none of these "obvious" assumptions are true. The first breakthrough came in the fifties when Lee and Yang suggested that the mirror image of certain experiments might not picture experiments which it is possible to carry out on the surface of the earth. Experimental proof of this hypothesizes that "parity" is not conserved was soon forthcoming, but it was still possible to assume that the mirrored experiment could be performed on a planet composed of anti-matter (i.e. in which the atoms of the chemical elements are made up of electrons with positive electric charge and

the nuclei of the atoms have negative electric charge). But detailed study of K-meson decay here and elsewhere eventually proved that the decay of anti-K-mesons does not mirror the decay of K-mesons. Current theory requires, and it has since been shown experimentally, that K-meson decay occurs because of an interaction that is not reversible in time. But K-mesons are, so far, the only elementary particles with this peculiar property; it has not been able to connect up this effect with any of the other known facts about other particles. This unique example of the failure of the usual symmetry under time reversal is so weak that ways to connect it up with the obvious lack of time reversal invariance in everyday life have remained completely obscure.

Fortunately, the accumulation of experimental information and theoretical speculation over the last half century has finally led to a reinterpretation of the laws of quantum mechanics which might be able to remove this paradox. The theory is still highly controversial. The basic idea it contains is that the past is indeed fixed and unique, but can only partially be reconstructed from present evidence. In contrast, the future can be predicted only to the extent that the relative likelihood of different events which are allowed by the basic laws of energy and momentum conservation can be calculated. Since, for most processes, the predictions of the new approach coincide with earlier results, it will be difficult to devise crucial experimental tests. But the conceptual gain is already of great philosophical significance.

In the historical past the philosophical and scientific controversies over determinism and free will have allowed both sides in religious struggles to call on physics for support of their particular theologies. For example, Calvin held so strictly to the deterministic model that he taught that God decided before he created the world who would be damned and who saved. In contrast, Counter-Reformation Catholics emphasized the importance of the free choice of the individual between salvation and damnation, although they found this difficult to reconcile with the omnipotence of God. In human terms, this conflict was, for a time, quite literally a burning issue. More recently, some thinkers have tried to invoke the uncertainties inherent in quantum mechanics to justify a belief in free will, but many find their arguments unconvincing.

It may be that if this new interpretation of quantum mechanics bears fruit, a conjecture which only the uncertain future can decide, physics will once again be able to reclaim its old title of "Natural Philosophy" in a profoundly significant way. If the past is indeed fixed, but determines the probabilities of future events, study of the past can provide a significant guide to present action. The increasing precision which historical, evolutionary, and cosmological study has given to our understanding of how we have arrived at the current planetary crisis lends hope to this view. Yet if all we can predict are probabilities, we are not forced to choose courses which are likely to lead to disaster. We can always, with some finite hope for success, choose a more humane course of action. It is a tribute to the inherent wisdom of the peoples of this world that they have mainly taken this attitude of responsible moral choice, in spite of the erudite teachings of their theologians, philosophers, and scientists.

'Job Board'

SLAC's Personnel Office has put up a "job board" just outside their door (238 A&E Bldg.). All the openings at SLAC, campus, and the Medical School and Hospital are listed there. Every SLAC employee interested in seeing what positions are available is urged to stop by and find out what opportunities exist.

Ultra-Thin Diamonds

by Charles Oxley

In the study of high energy processes with gamma rays derived from the SLAC electron beam it is a great advantage to have sources of polarized and essentially mono-energetic gamma rays. Two methods that have been used at SLAC are the back-scattered laser beam and coherent radiation from a diamond crystal. Soon to be tried at SLAC is an ultra-thin diamond crystal which, with collimation, will provide a mono-energetic, highly polarized gamma beam.

In an ordinary target electrons radiate gamma rays mainly in near collision with the nuclei of the material. Electrons in this

chamber at SLAC. Its disadvantages are low yield, and comparatively low energy: a 20 billion electron volt electron will produce 7 billion volt gamma rays.

Another technique to be tried this fall is the use of a very thin diamond crystal, together with tight collimation or definition of the angle at which the gamma rays are used. This technique, first proposed by John Dewire of Cornell and Bob Mozley of SLAC, is being pursued by Charlie Sinclair, using ultra-thin diamonds prepared here by Ed Garwin.

With the regular diamond crystal structure it is possible with high-energy electrons to create polarized and mono-

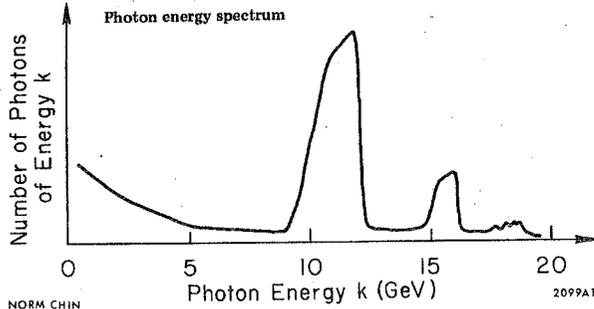
cleaved along natural planes and then ground and polished. The natural cleavage planes are not suitable for the crystal orientation desired in the SLAC applications. So the diamonds were sawed and then ground and polished, yielding $\frac{1}{4}$ " x $\frac{1}{4}$ " x $1/16$ " thick diamonds. These were used in End Station A by an MIT-SLAC collaboration. For the proposed collimated coherent bremsstrahlung team, the crystals need to be thinned from their approximately 12 mil (thousandths of an inch) thickness to a range of around three mils. Ed Garwin has succeeded in doing this by use of a sputter-etch technique. Sputtering is a process in which an electrical discharge in a gas dislodges material from one surface and deposits it on another. With metals, a simple, direct current discharge in a noble gas produces film deposits with relative ease. In the sputtering process the gas is first ionized and then the ions (and electrons) gain energy from the field. When the energetic ions strike a metal surface they produce intense local heating which may dislodge a few metal atoms from the surface. These find their way to a surface to be coated. In attempting to sputter material from an electrical insulator, difficulties arise because the surface rapidly becomes changed by the loss or addition of electrons so that the electric field is severely reduced and the discharge ceases. The technique that avoids this is a radio frequency glow discharge. When the electric field is such as to drive electrons to a surface, the charging is quite rapid and the local electric field is quickly erased. On the other hand, when a field is reversed and the ions are sped toward the surface, the heavier and slower moving ions take more time to reduce the field. During that time effective sputtering action can occur.

In the setup in Garwin's lab, an old radio transmitter borrowed from the SLAC ham club, applies voltage to two copper electrodes, shown in the sketch. On one electrode, which is water cooled, a quartz plate is placed and the diamonds stuck on it with silicone vacuum grease. The region is filled with argon gas at a low pressure of 0.002 torr. While a glow discharge is run, about two mils of diamond are etched by sputtering each day. To thin the diamond takes about four to five days. After the

diamond has been thinned it is removed by use of a solvent and transported by means of a miniature vacuum lift. It is extremely fragile, being about half the thickness of a microscope cover glass. Mounting the diamond is a problem of some difficulty which Joe Murray, Charles Sinclair, Ed Garwin, Ed Seppi and others are trying to solve. Background and safety requirements dictate that there be a minimum of material near the diamond. Also, precise orientation and freedom from vibration and bending stress is required.

The beam from the diamond will first be applied in experiment E-78 by a University of Washington group. That experiment studies the inclusive reaction gamma + proton goes to pi + plus anything. The experiment was originally contemplated as a subtraction experiment which in simplified terms consists of running electrons at one energy, collecting the data resulting from all energies in the bremsstrahlung spectrum and then running at a slightly lower energy and collecting similar data. Then the difference between the two results in ascribed to the gamma rays between the higher electron energy and the lower one. This subtraction technique involves small differences between very large numbers and suffers from statistical inaccuracies. With the possibility of a thin diamond making an essentially mono energetic beam available in End Station A, the experiment has been replanned to make use of this facility. Trials of the thin diamond are planned for the fall and the experiment is scheduled to start in January, 1973.

We do not have room to discuss in any detail another new method of gamma polarization in use at SLAC. However, in that new methods proposed at Frascati and tested at Cornell, an ordinary bremsstrahlung beam is run through a long single crystal of graphite. The resulting gamma rays are expected to be about 25 percent linearly polarized. As compared to the laser beam or the diamond beams, these have the advantage that the bremsstrahlung spectrum is polarized all the way to the tip. Therefore these are the highest polarized gammas currently available. This method is presently in use in End Station A.



collision are deviated and accelerated, producing a continuous spectrum of gamma rays from the lowest energies to the full energy of the electron beam. This bremsstrahlung — German for "breaking radiation" — is often difficult to use experimentally, because of its wide-spread inenergy. Sometimes, in a particularly simple process, measurements on final products can be traced back so as to define a unique initial gamma energy. For many processes, however, a difficult subtraction technique must be used in which the difference between the resulting processes from two different initial electron energies is compared. It is a great advantage to have essentially mono energetic beams.

With mono energetic gamma beams, the study of high-energy processes can be undertaken, but when more detailed information is desired, to decide between competing theories or models, polarized gamma rays and polarized targets may become desirable and decisive.

The laser technique, in which red light from a ruby laser is run against the electron beam over a long path and interactions occur resulting in mono-energetic polarized gamma rays, has been successfully used with the 82' bubble

energetic gamma beams at a particular angle. The graph shows the results expected. This is a cooperative coherent process in which no single nucleus as such radiates but the whole crystal makes its contribution and takes up the recoil. A very thin crystal is required because in a thicker crystal the electrons would lose their original precise direction by many small encounters with the atoms in the crystal. To be effective one must have a very well defined electron beam direction, a thin crystal, so as not to lose the incident beam direction and also precise definition of the angular extent of the gamma beam. In a planned experiment in End Station A, the diamond target will be placed about 300 feet from a collimator hole only $3/32$ or an inch in diameter and in heavy shielding.

To find and prepare diamonds suitable for use in the SLAC beam a considerable search was initiated three years ago by an MIT group. The physical properties require that single crystals rather than a conglomeration of small crystals be used. After much searching, two stones were found that were not of top gem quality but were extremely satisfactory for SLAC purposes. Ordinarily, diamonds are

SLAC Major Medical Plan

This time each year many employees review their medical expenditures incurred during the previous calendar year for purposes of itemizing their medical expenses on income tax returns. Whether you intend to itemize these expenses or not, this is also a good time to review the applicability of Major Medical Insurance to any medical expenditures.

Stanford's Major Medical plan is designed to pay 80 per cent of practically all medical expense incurred by an individual for one or a series of illnesses or injuries, in excess of an annual deductible amount, up to \$25,000. If an employee or his dependents have coverage under one of the three Stanford Basic Health Insurance plans, the deductible is \$100 in medical expenses not otherwise covered or paid by the basic plan. Without a base plan and regardless of whatever partial benefits received from other health insurance coverage, if any, the deductible is \$500 in total incurred expenses.

Covered medical expenses include charges incurred for hospital expenses; fees of physicians, surgeons, and physiotherapists; X-ray and laboratory tests; prescription drugs and medicines;

and other medical services and supplies authorized or prescribed by your doctor. For any individual covered by this major medical plan, expenses may be submitted for services provided any time during a calendar year in which the claim is based. In addition, covered medical expenses incurred during the last three months of one calendar year may be used to meet all or part of the deductible for the ensuing year. That is, for example, if you did not establish a claim in 1971, all expenses incurred from October 1, 1971 through December 31, 1972 could be used in establishing a 1972 calendar year claim.

Obviously, in a brief news article it is difficult to cover all the features of the Major Medical insurance plan. However, even though our basic health plans provide excellent protection against heavy and prolonged medical expenses, Major Medical claims are not necessarily associated with "major" illnesses. With increasing costs, we submit many claims with drug purchases as the only out-of-pocket expenses involved.

For further information about Major Medical Insurance, drop by the Benefits Office in Room 238, A&E Building, or call us on Ext. 2357.

Calliope to be Installed

Do you prefer rhythm and blues, rock, backwoods banjo, jazz, classical music — or would you rather have a calliope?

Two SLAC employees, Wilbur Wolfe and Peter Pines, have informed the SLAC Beam Line of plans for the installation of the historically popular carnival instrument here on the site.

Always a congenial group, the Scanners like to have music around during work hours in order to bring some fun and lightness into the otherwise near black-out conditions in their chambers. Apparently, however, there has been some difficulty in preserving AM-FM radios in the department because of others who also enjoy the music but on a decidedly more exclusive listening basis.

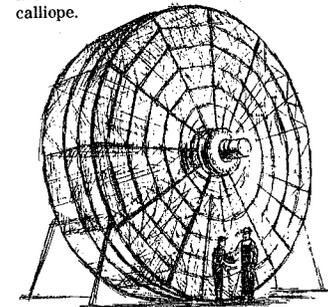
Partly as a solution to the Recurring Ripitoff Problem, Mr. Wolfe, Mr. Pines, and Mr. Alfred Smelt of Employee Relations, propose the calliope, a more permanent source of musical enjoyment for all concerned. A vendor has been selected from a now-defunct circus troupe which was willing to sell to SLAC for only \$35.00 an almost new calliope and generator which together, weigh 5 tons.

Powered by the steam generator, which will be located outside the A&E Building, the calliope itself would be located in the Scanning Department's NRI room in Central Lab, and would certainly provide the needed musical refreshment for SLAC Scanners.

As was stated in the plan (according to a

recent psychological study made at SLAC, presumably in the Scanning Department), the tootling sounds of a calliope would unquestionably raise the work-efficiency of the scanners, not to mention the increased adrenalin flow of the physicists and workers directly above the calliope on 2nd and 3rd floors of Central Lab.

Instead of morning coffee, now SLAC employees can really come awake with the first blast of our new music-maker, the calliope.



(Editor's note: If you believe this you're as "believing" as one person in the Public Information Office was. The plan was seriously presented as a newsworthy article by two SLAC wits (all names are fictitious) who are now very low on our credibility rating, and we are high on their naiveive scale. It was intended as a joke on someone, but we never found out who.)



Lineup at start of SLAC long distance run.

Kung-Fu Presentation

by K. Maddern

On October 6 SLAC had the honor of having as a guest Professor Kuo Lien Ying, one of the few masters during our time of the ancient Chinese martial art, known as Kung-Fu. Professor Kuo has been a teacher of Kung-Fu for over half a century and is a specialist in Chinese therapy. He teaches Tai Chi Chuan Shaolin, Shing-Yee, Bak-Quok, and Internal System, all of which are different forms of Kung-Fu. Also with Professor Kuo were his wife and 5-year old son, and his student, Professor Chiang Yun-Chung, an artist by profession.

While the audience streamed in,



Martin Lee (left), SLAC engineering physicist, with Kung-Fu Master, Professor Kuo Lien Ying.

Professor Kuo (called Sei-Fu) waited amid the hubbub until the distinctly charged moment arrived for Sei Fu to understand and signal that the activity must begin. With Alex Tseng of SLAC translating for an audience of about 300, Sei-Fu enthusiastically greeted all and said in part that "Tai-Chi is not only good for your health but will actually cure your sickness..." "We will present some of the basic principles of Tai-Chi Chuan to you..."

Professor Chiang came forward, bowed to the audience and first began to perform Bak-Quok, circling in ballet-like rhythm with sweeping, harmonious hand and arm gestures. A feeling of constant energy flow was generated through the disciplined interaction of mind and body. The 64 movement of Tai-Chi were next executed in a powerful, graceful form of thought and action fused into oneness of movement. His body was a study in con-

Vacuum Technology Course

A course entitled "Introduction to Vacuum Technology" has been added to SLAC's "De Anza and Foothill College" classes for the Winter Quarter beginning Wednesday January 3, 1973. The course is oriented primarily for the designer or technician who wishes to become more familiar with vacuum equipment, techniques and practices.

The one prerequisite for the course is Mathematics 200 or equivalent (structure of arithmetic). The course will be offered in the Electronics Conference Room Monday, Wednesday and Friday 8-9 A.M. (3 hours/week lecture-lab). Those interested may contact Richard Callin, x-2433. Registration will be held during the first two regular class sessions.

servation of energy as he extended his arms and legs in a series of pulling, striking, and bending motions — always a balanced thought behind each balancing of the physical body — a demonstration of the power of peaceful thought when applied in dynamic action to the human instrument.

The audience was a unit of active silence, all attention drawn to Professor Chiang's demonstration. Next, Martin Lee, who has studied Tai-Chi for 3 years with Professor Kuo, was persuaded by his teacher to perform some of the movements of the art. Professor Kuo's young son and wife also performed.

Finally, Sei-Fu himself stepped forward in his flowing robes and seemed to command even the air around him as he began a type of movement which could be somewhat described as the burning of a living fire in the form of a man. All the movements of Kung-Fu which were performed in slow motion by the other 3 guests were as a deep, unseen form structure in Sei-Fu whose free-form government over his own life force had all the elements of an offensive military strategy, only in the reverse context of being positive and life-constructive.

Sei-Fu's government over himself is the result of many years of working with his own energy of being, which, channeled through a powerful discipline such as Kung-Fu, has come to be used more for healing purposes than for self-defense.

Our thanks go to Martin Lee for making Professor Kuo's visit possible. For more information on either Kung-Fu or on specific instances of people who have directly benefited from it, please call Martin Lee or Joe Juraw.

SLAC Counseling

by Leonard Sagan, M.D.

Although most SLAC employees will come to us with medical problems, particularly those that are job related, there seems to be some reluctance to consult the Medical Department for emotional problems such as alcoholism, drugs, or marital problems. Although it is considerably easier to treat broken bones than broken marriages, it is often helpful just to have somebody who can listen and we are good at that.

There is an array of resources available in the community of which many people are unaware. Furthermore, getting into the system is not easy and we may be able to facilitate that. Just as for any medical problem this consultation will be treated with strict confidentiality.

If referral to a psychiatrist should be arranged, your Major Medical Plan will pay half of the cost of such consultation above the deductible of \$100 although maximum benefit is limited to \$500 per year.

Because of the bewildering nature of the mental health establishment, it is planned soon to have a noon session in the SLAC auditorium during which we will offer a brief explanation of the mental health field, — who and what is available for help. When this is scheduled, it will be announced in the "All Hands Bulletin."

In Case You're Wondering

(Ken Moore of SLAC Crafts Shop won the four-mile sprint around the accelerator which took place (way back) in late August on a hot summer day.)

In true Olympian style, a flaming torch (rolled-up computer printout) carried in by Charlie Howard sprinting up to Sector 30 gate brought the professional sportsman's light touch to the first annual Long Distance Run at SLAC. About 200 curious SLAC'ers gathered to watch the event under a very hot midday sun.

There were four classes of runners: (1) 34 years and under, (2) 35 years to 49, (3) 50 and over, and (4) women.

The race started a few minutes late in order to wait for one hopeful runner who had forgotten his track shoes — finally the race had to start without him.

Explanation of rules by Bill Lusebrink, countdown, and off! Runners headed down the north side of the accelerator, with enthusiastic bicyclers who wanted to eyewitness the entire 4 miles (but not on foot) pedaling right along beside them.

Participants were: Ken Moore, Alan Schmierer, Gerard Putallaz, John Alcorn, Justin Escalera, Bud Oliver, Ted Syrett, Philip Limbacher, Elliott Gibson, Raymond Brown, Martin Berndt, Ron Bodwell, Charlie Hoard, Bruno Cole, Randy Jung, Bob Rowe, Lydia Campbell, Greg Minshall, Joe Descharme, and Alex Gallegos.

After the take-off, spectators meandered slowly around to the south side of the accelerator to wait for the finished.

The first five runners to arrive at the finish line were: (Ken Moore, 24 minutes, 24 seconds; (2) Alan Schmierer, 25:55; (3) Gerard Putallaz, 26:17; (4) John Alcorn, 27:04 (5) Justin Escalera, 27:10. By categories, the winners in the 34 and under

class were: 1st place, A. Schmierer, 2nd place, G. Putallaz; 3rd place, J. Escalera. In the 35-49 category, 1st place, K. Moore; 2nd place, J. Alcorn; 3rd place, M. Berndt. In the 50 and over class, 1st place, C. Hoard; 2nd place, Bob Rowe. In the women's class, the undisputed winner was Lydia Campbell.

Dr. Neal presented ribbons to all runners as well as 2 trophies to Ken Moore — one to take home and the other to remain here at SLAC with his name engraved on it. Next year's winner will also have his name placed on the SLAC trophy.

Dr. Neal also suggested a possible job transfer for Ken to the Klystron Maintenance crew if that group ever experiences a shortage of electric carts.

PIO Personnel Merge

Expanded hours of service is one of the new features resulting from the recent amalgamation of the Personnel Department and the Public Information Department. Both are now housed in one area, Rooms 238 and 240 on the second floor of the A&E Building. The newly combined PPI Department is open for business continuously from 7:00 a.m. to 5:30 p.m. Please feel free to drop by anytime to talk about benefit matters, personal problems, job matters, transfer applications, other opportunities, training programs, tuition refund arrangements, noon programs, guided tours of SLAC, orientation programs, SLAC literature and pamphlets, meeting rooms, and any other special matters that seem to need attention.

In particular, Kathleen Maddern would welcome ideas for special noon programs.

SLAC Employees' Caucus?

by Jack Truher

Periodically some of us get involved in a short-lived attempt to create for non-faculty staff a body of elected representatives which would be recognized by university management. This is different from labor organizing because the goal is always simply to constitute a university committee to provide valid representation for non-faculty staff of the sort the faculty has made for itself. The idea of a Staff Congress keeps popping up, and other similar designations. The latest to surface is the SLAC EMPLOYEES' CAUCUS. Recently a friend commented, "What do you think this is, the United States of America?"

I did a little survey of my own last week. The response of people that I know was typically, "Absolutely, that's a good idea. Certainly. Ho-Hum. Where's my lunch?" The reaction is mildly affirmative, but never enough to provoke mad glandular enthusiasm. Actually that's the way I feel about it, too. I mean, yes and no.

The duality we all sense about this sort of thing is worth worrying about. Haven't you noticed a certain glassy-eyed, glazed withdrawal about everybody? Look around at the Christmas crowds. May have to polish up your glass eye first. Alistair Cooke, who made the new T.V. series, "America, a Personal View," is quoted recently to say, "There's tremendous sag now in morale, not unlike the cynicism and fatigue of France a year or two before World War II. Americans always thought they could roll up their sleeves and beat anything, and they've done it time and again. But they don't believe that any more. It's sad."

The decision to stop struggling is not just sad, it is death — the end. Our little micro-world at SLAC has all the elements of outside. Yes, the United States has been the best country in the world-but if everybody just quits, it's sure to be the worst. SLAC is a marvelous place to work, but things don't spontaneously stay that way. Countries and institutions are put

together by people. They just don't naturally bloom. Somehow I get the feeling I'm being sucked down the vortex of a whirlpool of withdrawal, and before I go under, I'd like to scream—just once more.

My conclusion on the Caucus is that I'm mildly against it. A caucus without staff determination, without staff struggle, is just a propaganda agency for the status quo, for weakness, for nothing. Without an aroused staff, don't bother.

Still, management around here would be responsive to staff pressure, to assembled staff sentiment, if the staff would just get it together. There are two parts to the problem. The "wheels" don't have it together, and the staff is worse. But the old rules aren't working, and you know it.

Actually the Caucus is of more interest to management, according to my polls, and for good cause. Industrial psychologists and educators are routinely describing similar processes throughout society. "Johnny is turned off at school," can be laid right alongside "Mr. or Mrs. Johnny Smith is turned off at work," and the literature reads the same except for the titles. Lots of people know what's wrong. Johnny and his parents are all deactualized by their history of automated, non-participatory experience. And they're all miserable. Johnny falls asleep in class, gets into pot and bennies, and hides in his room or someplace worse. All my old hyperventilating high-achiever friends have now taken to dreaming about "early retirement", or "dumping all this and going back" to some small town. I always say, "It's all in your head." If you find that farm, or that little house and store in a small town, you'd better leave your brain and the rest of your living parts in the city, because there's a record of the world stuck in there. It's not what we're doing that's bothering us; it's what we're not-doing that's bothering us. Running away from not-doing anything means we will only arrive where we started: at the depressing land of not-doing. We do not need a Caucus of dreamers. Forget the whole thing. Glub-glub-glub.