SLAC BEAM LINE

There are therefore Agents in Nature able to make the Particles of Bodies stick together by very strong Attractions. And it is the Business of experimental Philosophy to find them out.'--Isaac Newton, Opticks (1704)

Volume 5, Number 4 *October 1974*

From The Editor

With a little luck, this issue of the *SLAC Beam Line* will reach you just in time to remind you that the big event,

Family Day

is happening at SLAC on

Oct. 12

from about 10:00 A.M. to 5:00 P.M. A special attraction will be a

RAFFLE OF BEAM TREES

which look something like the sketch at the top of the next column. So be sure to pick up your free Raffle ticket at the gate on your way in to *FAMILY DAY*. Also at the gate there will be 5 free tickets to Carnival games for each young person, and an information/map handout (similar to the map on the last page of this *Beam Line*) to let you know what's happening.

See you there.

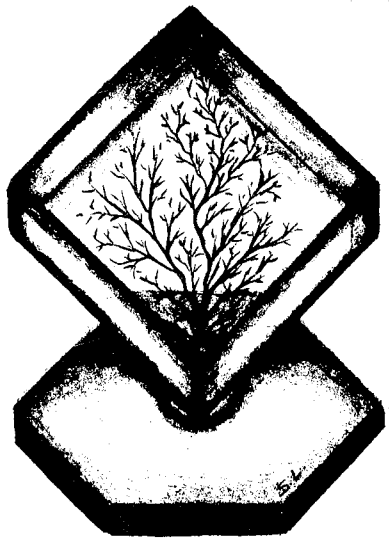
--Bill Kirk

QUIZ

Question: What raises avocados and rabbits, puts out fires and chases burglars, generates a large head of steam, and leaves for Fresno State College next week?

Answer: Jack Miljan (see page 9)

BEAM TREE RAFFLE !



DR. E. L. CHU RETIRES

Born in Kiangsu Province in China, En-Lung Chu first came to Stanford University in 1946 as a graduate student in the Physics Department. He wrote his Ph.D. Thesis, "The Theory of Linear Electron Accelerators," under Professors L. I. Schiff and W. W. Hansen, and in 1949 Dr. Chu became a Research Associate at the Hansen Laboratories of Physics on the Stanford campus. It was in these early days at the Hansen Labs that the theory and practice of linear electron acceleration was being developed with such notable success, and Dr. Chu made many important contributions to our understanding of the intricate acceleration process.

Dr. Chu was one of the earliest members of the "Project M" staff at the Hansen Labs, and one of the authors of the "M" proposal that eventually became the SLAC two-mile accelerator laboratory. In addition to his continuing contributions to accelerator theory, Dr. Chu has developed a deep interest in the foundations of electron physics in the areas of both classical and quantum theory. He is presently working on a comprehensive paper on the relativistic analytical dynamics of spinning particles which will summarize his work in this field.

Although Dr. Chu officially retired from SLAC at the end of August, after 25 years of service, he plans to continue to work on his own at SLAC in further pursuit of his life-long studies.

--Greg Loew

ELMER STOCKBRIDGE TO RETIRE

Elmer Stockbridge will retire from SLAC at the end of December 1974 after nearly 12 years of service as a technical planner in the Technical Division. Elmer is a native Californian, born in Los Angeles, and a long-time resident of San Carlos. He served in the Army during World War II, leaving with the rank of Captain in 1946. At that time he decided that the Bay Area was the place to live, and he started his own business in San Carlos. Before coming to SLAC, Elmer gained 13 years of experience working in planning and scheduling activities at Dalmo Victor Company and Ampex Corporation.

When Elmer first joined SLAC, in 1963, we were deeply involved in the construction phase of the project. During this critical time, Elmer provided planning ans scheduling services for the instrumentation and control work and for accelerator electronics. He has continued his responsibilities for the planning, scheduling and budgeting activities of the Accelerator Physics and Accelerator Electronics Groups, as well as taking on special assignments in connection with such projects as SPEAR, PEP, and most recently SLED. In recent years Elmer has also handled the voluminous records that go with keeping track of machine and experimental running time. These running-time records are invaluable as a source of information for measuring SLAC's output, and they find many uses in reporting to such groups as SLAC's Scientific Policy Committee about the work of the lab.

To many people, happiness is having a hot cup of coffee waiting for you when you walk into the office in the morning. Elmer was thus a source of much happiness for several departments in the A&E Building because of his habit of turning on the coffee pots when he arrived each morning at 7:15, a practice he followed during all his years at SLAC. After Elmer leaves, think of the man-hours that will be lost as all those poor souls wait bleary-eyed for the little red light to come on!

Although retirement seems a rather bleak prospect to many persons, this is definitely not the case with Elmer. Soon after he graduated from Stanford, in 1930, his job as purser for what was then the Dollar Steamship Lines took him around the world a number of times. His enthusiasm for travel is shared by his wife, Martha, and even though it seems to his fellow workers at SLAC that the Stockbridges have already been everywhere, retirement will give them the time to seek out new corners of the world. However, Elmer's first order of business after retirement calls for increased attention to another of his avocations: the stock market. Elmer has been the source of market information and statistics for many people at SLAC. (It is not true, as rumored, that Elmer is personally responsible for the recent behavior of the Dow-Jones averages.)

We thank Elmer for his long and dedicated service to SLAC, and we wish him many happy years in his well-earned retirement.

--Bill Beeger

STUDY OF CLERICAL CLASSIFICATION

A task force has been formed to gather information about the status of women at SLAC in clerical positions. This group consists of Marie LaBelle, a member of the Minority and Women's Committee; Glena Stewart, Research Division; Dorothy Ellison, Technical Division; and Gail Venables, Personnel. The group has been interviewing all women at SLAC who are currently in a clerical position; one purpose is to attempt to locate anyone who may obviously be under-classified at present. The group expects to complete its work and report its findings to Dr. Panofsky in November.

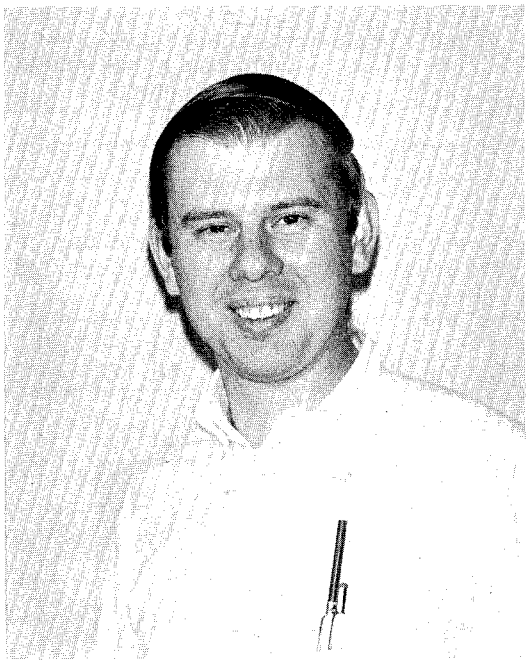
SUPERVISOR RAP SESSIONS

The Personnel Office is scheduling a series of rap sessions on various topics on Thursdays from 11:30 A.M. to 1:00 P.M. The schedule for the next few weeks is as follows:

Oct. 10 - *Absenteeism:* What to do about it
Oct. 17 - *Promotions:* How to help people
Oct. 24 - *Improved Performance:* How to get
Oct. 31 - *Communication:* Better methods

Attendance is open to supervisors and managers. For reservations, for locations of the meetings, and to suggest future topics, please call Helen Perigo or Carol Colon, Ext. 2353.

--Gerry Renner



Randy Champion has left SLAC to continue his graduate studies at Stanford. He expects to be working in solar energy research, a field of major interest to him.

FLU SHOTS

Flu shots are now available, at no cost, in the Medical Department for all SLAC employees who want them. Only one shot is needed, *but* if you are allergic to eggs, chicken feathers, or chicken meat, you should not have it. To be effective, flu shots must be taken before

November 15

MINORITY AND WOMEN'S COMMITTEE

The Minority and Women's Committee, appointed by the Director of SLAC, gives minority and women employees an opportunity to bring up any job-related problems which they feel result, directly or indirectly, from their minority or women status. The MWC also assists the Director by carrying out assignments that provide information about the relationships between minorities and non-minorities, and by suggesting ways to improve these relationships. Any employee who feels hesitant about approaching the Committee as a whole may contact members on an individual basis. The Committee members and their telephone numbers are listed below:

Viola Belton	2223	Paul Regalado	2472
John Brown	2284	Mario Smalls	2784
Tiana Hunter	2328	Joe Sodja	2163
Dick Jeong	2451	Ken Stewart	2739
Marie LaBelle	2748	Anthony Tilghman	2488
Frankie McLaughlin	2864	John Valverde	2371
Lucy Wilson	2681		

RANDY CHAMPION LEAVES SLAC FOR GRADUATE STUDY

Friends and co-workers of Randy Champion gathered on September 27 to bid him farewell and wish him luck in his future career. Randy recently received a Master's Degree in Electrical Engineering through the Stanford Special M.S. Program, and he is leaving SLAC in order to become a Research Assistant, and Ph.D. candidate, at Stanford under Professor Richard Bube of the Materials Science and EE Departments.

Randy first joined SLAC in 1968 as an electronics technician working in the liquid-hydrogen target group under Bill Pierce. His performance in this work was consistently outstanding, and he contributed a great deal to the successful development of a series of target systems. He began his advanced studies in 1971, first at Foothill College, then later at Stanford under Professor Louis Padulo, with the work culminating in the recent award of the MSEE. During this period of study Randy continued working at SLAC on a 2/3 time basis. Even with this busy schedule he found time to assist as a lab supervisor for the Skills Training Program, as well as to give occasional special lectures on semiconductor theory. He was particularly helpful in teaching one of the members of the STP who has since become a full-time technician at SLAC.

In late 1973 Randy was assigned on loan to the LASS project, where he worked with David Hutchinson on the capacitor-diode-readout spark chamber system--primarily on the readout electronics and on computer interfacing. At LASS he has continued his excellent work while also coping successfully with his academic studies.

Randy is very much interested in pursuing a research and advanced study program at Stanford in the field of solar energy. He has a deep concern for the societal implications of a severe energy shortage, and a conviction that solar conversion represents the most promising source of long-term, non-polluting energy.

Randy has impressed his co-workers with his dedication and exceptional abilities, both on the job and in his studies. SLAC has been fortunate to have him here during these past six years, and we extend to him our congratulations for a job well done and our best wishes for continued success in his future career.

--Ray Larsen

~~HERB TIEDEMANN LEAVING SLAC~~

There was a story in the Summer issue of the *Beam Line* about Herb Tiedemann's plans to leave his post as SLAC's Payroll Supervisor. Much as we usually hate to put out bad information, this is one occasion on which we're happy to report that the earlier story isn't true. Herb has changed his mind and decided to stay on. Amen.

Gail Venables

One of the Personnel Department's shining lights, Gail Venables, is leaving SLAC in mid-October to take up residence---in Maine!

Gail began her SLAC career in May 1966 in Personnel as secretary to Gerry Renner. Her skills and abilities eventually led to her present position as Employment Representative.

Getting away from it all is what the Venables family has in mind. They chose Maine feeling that it best represents their desire to live at a more relaxed pace. Gail says "It's beautiful, clean, and much less congested". They have no specific destination within the state but plan to survey it all. Managing an inn may be a possibility (future vacationers please note).

According to Gail she has enjoyed her stay at SLAC very much, doesn't take her departure lightly, and wouldn't leave for any reason other than the enticements noted previously.

We will miss Gail and wish her happiness and full realization of her hopes.

-- Dorothy Ellison

For Whom The Bell Tolls

Caracas, Venezuela

Two funeral home employees were killed yesterday while speeding from the scene of a fatal accident to the victims' homes to get the contract for the burials. . . .

--*San Francisco Chronicle*
August 30, 1974

Photography: All of the photos in this issue of the *Beam Line*, except the large photo on Page 11, were taken by Joe Faust.

Acrostic puzzle from the September 15 edition of the San Francisco Chronicle

1 W	2 H	3 I	4 C	5 H		6 W	7 O	8 U	9 L
10 D		11 Y	12 O	13 U		14 R	15 A	16 T	17 H
18 E	19 R		20 L	21 I	22 V	23 E		24 N	25 E
26 X	27 T		28 D	29 O	30 O	31 R		32 T	33 O
	34 A		35 B	36 R	37 I	38 L	39 L	40 I	41 A
42 N	43 T		44 N	45 U	46 C	47 L	48 E	49 A	50 R
	51 P	52 H	53 Y	54 S	55 I	56 C	57 I	58 S	59 T
	60 O	61 R		62 A		63 M	64 A	65 S	66 T
67 E	68 R		69 P	70 L	71 U	72 M	73 B	74 E	75 R
	76 H	77 O	78 W		79 M	80 A	81 N	82 Y	
83 T	84 I	85 M	86 E	87 S		88 D	89 O		90 Y
91 O	92 U		93 G	94 E	95 T		96 U	97 P	
98 I	99 N		100 T	101 H	102 E		103 M	104 I	105 D
106 D	107 L	108 E		109 O	110 F		111 T	112 H	113 E
	114 N	115 I	116 G	117 H	118 T		119 A	120 N	121 D
	122 S	123 A	124 Y		125 M	126 Y		127 G	128 O
129 D		130 W	131 E		132 N	133 E	134 E	135 D	
136 A		137 B	138 R	139 I	140 L	141 L	142 I	143 A	144 N
145 T		146 N	147 U	148 C	149 L	150 E	151 A	152 R	
153 P	154 H	155 Y	156 S	157 I	158 C	159 I	160 S	161 T	

LEDERMAN'S TALK AT FERMILAB DEDICATION

Editor's Note: The following article is the text of a speech given by Professor Leon Lederman of Columbia University at the dedication ceremonies of the Fermi National Accelerator Laboratory ("FermiLab") on May 11, 1974. It is reprinted here with Professor Lederman's kind permission. Since this talk is quite long, we have taken the liberty of adding a few section headings simply to break up the visual monotony of the pages. We found Professor Lederman's talk informative, funny, inspiriting, and beautifully suited to its purpose. We hope that many Beam Line *readers will also enjoy it.*

Dr. Bacher, ladies and gentlemen. I tend to agree with all the previous speakers except for the business about [FermiLab's Director] Bob Wilson. He is the one who got me up here, freezing, insecure, without a blackboard, without slides to show, and in a situation in which I feel totally uncomfortable.

It may not seem entirely believable, but I come before you as someone who has never, ever been involved in the dedication of a 400-billion volt accelerator. Until the telephone call came which commanded me here, and threatened to cut off our protons, I hadn't even known that those protons were coming from an undedicated accelerator.

Recovering from that shock, I faced an even more disturbing problem. How does one dedicate? Suppose it fails, suppose the dedication doesn't work? All this effort, all this money, and the dedication doesn't take. This is, so far as I was able to learn, unprecedented. I am a more or less active user, a customer of the laboratory, and users shouldn't be called upon for such things. Dedicators, I thought, were older people, statesmen, philosophers, or skilled administrators. They would know how to address this vast and diverse audience of legislators, of government officials, of distinguished guests, foreign and domestic, of the builders and the operators, and their families. Many of you, in your respective ways, have made crucial contributions to the creation of this magnificent instrument of scientific research.

You deserve a more polished and warmer dedication. After the dedication had been properly done, then we users would swarm all over the machine and do our thing. But unconventionality is the norm at the National Accelerator Laboratory, so I prepared a list of things to discuss.

Some History

On my list is the history of this project--the first ideas about accelerating protons to hundreds of billions of volts came, so far as I know, from Matthew Sands and his colleagues at Caltech, well over 15 years ago. Then, as we began to learn from the 30 billion volt accelerators at Brookhaven and at CERN in Geneva, it soon became evident that a vast complexity had been exposed in the properties of matter at the subnuclear level, a complexity that our Scientific Culture insisted must be superficial. We had to believe in an underlying order and simplicity. For this, another energy step was required.

The serious technological study of 200 billion volt acceleration was undertaken officially at the Radiation Laboratory in Berkeley (now the E. O. Lawrence Berkeley Laboratory after the inventor of the cyclotron)--Berkeley, California, the birthplace of the entire tradition of modern high energy physics.

I must skim quickly over the kaleidoscope of events that ensued after the announcement that a site was being considered for a 200-billion volt accelerator: the organization of the 45 universities, now 52, into the URA [Universities Research Association]; the search for a director; the redesign with reduced scope, which reduced 200 billion volts to 400 billion volts; all leading to the authorization by the Congress in 1968, beam in 1972, and perhaps the dedication today.

The search for a site deserves special mention on my list. I helped inspect sites in the swamps and plains of Louisiana and Mississippi and the offices of their Governors. We watched communities in tortured response to the Atomic Energy Commission's perceptive questionnaire. The Commission asked, "Show your educational, your social, and your cultural worthiness to receive into your community the somewhat curious breed of people who will come with it. Eighty-five communities from 46 states rushed forward to compete. The catalytic effect of their subsequent self-examination in the light of the AEC questionnaire was one of the first invaluable social spinoffs of this project.

What Use Is It?

On my list are the concerns and doubts often expressed by many of you, by your friends, or by the gifted young students who have, in the past six or so years, deserted in alarming numbers this traditionally irresistible discipline. Of what use, we have been asked, is this adventure, concerned as it is with matters so remote from the human environment? Of what use is this extensive enterprise when society itself is in such disarray? There was even among us the haunting fear that God in his infinite wisdom would not know how to behave at 400 billion volts; that in effect we would be creating puzzles for our own amusement and at public expense.

On my list, then, is to reassure you that what you have done here is good and beautiful by any reasonable assessment of the activities of a civilized society, that your dedication to this

continued

project in all the diversity gathered here, that your long and hard hours, that your periods of deep discouragement when everything seemed to fail in sequence, that the 3:00 a.m. phone call you took for your husband who had just come home from work an hour ago, that your inner doubts in voting these huge monies when there were so many demands, that this effort, this instrument, the fruit of your genius and your labor and your love, that this monument to an incredible faith will indeed serve humanity in the very highest and the most general sense. In other words, to quote [earlier speaker] Father Paul, "Don't worry!"

Practical Applications

If practical applications reassure you, then don't worry. The technological spinoffs from basic research, translated into the gross national product, have paid for the research many times over. In the special instance of accelerator building, we can compile an impressive list of items pioneered for the accelerator needs but which find applications in our industries--for example, high-power vacuum tubes, strong-focusing microscopy, ultra-high vacuum techniques, rf surgical tools, waveguides for therapeutic X-rays and promising use of pion beams in cancer therapy, superconductivity, the production of radioisotopes.

If we include instruments associated with the use of the accelerators, then the list grows very long--for example, the circuitry that powers computers, the techniques of pattern recognition and of data processing, the use of the new proportional wire chambers for high resolution X-ray diagnostics, and so on--so "don't worry."

To some of you, the above response may only deepen your concern. After all, this is technology, and much of our social crisis is driven by technology that we already own. We have overpopulation and poverty, and shortages of food, and pollution of the natural environment, and the energy crisis, and the crisis of armaments. And, we add, these are only the terrors of the 20th century. Certainly we do not pretend that this accelerator will solve these problems, but we do say that solutions to some of these may come in inexplicable ways from what we do here. We do say that some of the young students out there will provide the new ideas that a more humane and wiser society can deploy to alleviate these crises. And we do say that it may well be that we just do not yet know enough about nature to cope with the terrors of the 21st century, and here our confidence in what we do in this laboratory is in harmony with history. For in fact most of you do understand that it is the same spirit and the same quest, the same motivations as we have here which have, in the past hundred years or so, "mastered the sky and the space above, and drawn communication from the electron, power from the nucleus, doubled the span of life, halved the working day, and created the possibility for enriched leisure, and supported the vast increase in the world's population, and made the night bright, and high fidelity and electric toothbrushes," There is, in all of this, at least a potential for greater human fulfillment.

To the unconvinced, to the skeptic who says, "Yes, but what have you with your hundred billion volts done for us lately?" I do have an anecdote.

> Data from Brookhaven about two years ago unsettled the world of physics. In certain properties of K-mesons, the symmetry of charge and parity taken together was violated. Subsequent experiments in many labs provided no elucidation of this esthetically disturbing fact. Motivated by a desire make this situation more beautiful, T. D. Lee and Giancarlo Wick recently explored the consequences of a highly abstract speculation about the the structure of the vacuum--that space in which all the particles of the world are embedded. By a sequence of steps, their investigations led to the properties of nuclear matter under abnormal conditions --conditions which could perhaps be duplicated under laboratory conditions. T. D. Lee wrote: "Hitherto, in high energy physics, we have concentrated on experiments in which we distribute higher and higher energy into a region with smaller and smaller dimensions. In order to study the questions of 'vacuum' we must turn to a different direction; we should investigate some 'bulk' phenomena by distributing high energy over a relatively large volume . . . abnormal states may be created in which the nucleon mass may be very different from its normal value . . . it is conceivable that within the volume of the abnormal state, some of the symmetry properties may become changed or even that the usual role of the strong and weak interactions may become altered . . ."

The possible implications of these ideas are indeed striking, not only in the radical modification of the very basic notion of the vacuum, the vacuum of Einstein and Dirac, and hence, abstract and philosophical, but also for possible applications. The abnormal nuclear matter of Lee and Wick raises at least the possibil- of energy sources up to one hundred times more efficient than nuclear fusion. This theory is speculative and needs much discussion, but an experimental road is clear. An early attempt to glean some confirmation will be made at this accelerator. I cite this note to raise hopes, but only as an excellent example of the surprises that could be in store for us.

Particles And The Universe

On my list also is to reassure you about God and 400 billion volts. If you look up there,

continued

you discover, or our astronomical colleagues have discovered, that the universe is very much concerned with what happens at 400 billion volts, even at a thousand billion volts. Particles occasionally strike this planet with one thousand million times the energy of even this great accelerator. We learn that a significant fraction of the energy flux out there lies in and above the energies we are now beginning to study. It was, in fact, Enrico Fermi who earlier proposed a mechanism for cosmic acceleration of these objects. It is likely that there is no way to understand the origins of our universe from the first moments of explosive creation, without a more profound knowledge than we now have of the particles that we will be studying in this laboratory.

Neutrinos

I have on my list to tell you about other researches that are being done here and their connections with facts of our existence as humans on this planet. Let me illustrate this: What could be more abstract, more far out, than the neutrino, a particle of no mass, no charge, of only weak force, proposed by Pauli in 1930, named by Enrico Fermi as the necessary ingredient in his still incisive theory of radioactivity presented to us so long ago.

The properties of neutrinos were greatly elucidated by years of experiments, culminating at Brookhaven, the tiny 30 billion volt ancestor of this machine. Armed with these facts, astrophysicists were able to understand the life cycle of the stars. Nature makes good use of neutrinos--they are for carrying vast amounts of energy out of the hot stellar interiors--they are for cooling. The ultimate clarifications are still to be made but recent results from this laboratory, following closely on reports from our colleagues at CERN, suggest a new property of neutrinos: the ability to collide with nuclei without producing any change in the internal state of the struck nucleus. This so-called neutral current force, if confirmed by presently ongoing research here at NAL, may help explain one of the mysteries of our own environment: We know that elements are cooked in the sun--but only light elements are cooked in our relatively young sun. How then do we account for the vast amounts of heavy nuclei on earth, for example, the iron that composes our magnets and constitutes a vital part of our own bodies? The fascinating possibility has been suggested that a fierce wind of energetic neutrinos, issuing from collapsing neutron stars may, via the agency of the neutral current force, drive out the inrushing heavy elements, themselves cooked in the last stages of the dying star. The dispersed heavy elements would then drift through space to where relatively young stars can warm planets now furnished with the variety of elements that make life possible. These are the connections of apparently remote phenomena that we find so exciting, so beautiful.

FermiLab Experiments

My list tells of many exciting activities in this young laboratory, where the last monthly account lists 45 experiments representing 300 scientists and students from more than 80 institutions around the world.

In the relatively brief period of its operation much has already been learned.

We now know that anti-particles behave more and more like particles as their energy increases.

We have learned that the weak force continues to increase in strength as the energy is raised, a trend predicted by Fermi but which cannot continue indefinitely according to one of the most sacred of physical principles.

We have searched for quarks, the supposed basic constituent of all matter. So far, direct production has not been observed, although indirect evidence of the existence of quarks flits in and out of our experiments with a maddening elusiveness. So, experiments done here on the emission of energetic particles from the core of the proton suggest quarks, whereas the recent detection of electrons and muons under similar conditions reminds us of a baffling result from the Stanford Linear Accelerator Center, our sister institution, where the quark theory triumphs in one section of the laboratory but suffers a fatal disease in another area. These are some of the exciting connections which we find so interesting.

We are here looking for all kinds of esoteric particles; for intermediate bosons, and monopoles, and new forms of electrons and muons, all motivated by the suggestions of a greater order and simplicity. To illustrate why new objects can result in simplicity, I could point out all the 100-odd elements that can be built up from just three particles, the electron, proton, and neutron. But this great simplification couldn't possibly hold together if we lacked the discovery of just one of these three particles.

Much order has already emerged from the jungle of elementary particles and a grand new synthesis sometimes seems close, and yet, here and there, in the corridors of this magnificent building and in its vastly improved cafeteria, one hears rumors that things are not what they're supposed to be.

The 400 GeV Accelerator

It is on my list to say that this facility is nothing short of magnificent. Let me try to elucidate. A beam of protons of never before achieved intensity is extracted from the accelerator ring, and transported about two miles through a tortuous series of magnets which bend it, squeeze it, shrink it, peel off parts for experiments, and finally deliver it--striking a target only a few thousandths of an inch across --a marvel of engineering and organization.

continued

I worked with neutrinos at Brookhaven, where the first experiment in 1962 gave us one neutrino event per several days. At Brookhaven, this has now been increased enormously, but here, thousands of reactions a day are observed with neutrino energies larger than 50 billion volts! Pion beams, beams of charged and neutral kaons, anti-proton beams, beams of particles of such short lifetime that the distance they cover, only inches in previous generations of accelerators, is now extended by both the relativity principle and by higher energy to many yards, making incisive experiments possible.

The list can go on, but it is appropriate here to recall the following historical facts. Every new accelerator, new in the energy domain covered, has yielded discoveries totally undreamed and unmentioned in the plans and in the designs. This machine with its unprecedented energy and intensity, its flexibility and diversity of ancillary facilities, cannot fail to maintain the tradition.

The Users

And we, the users, my colleagues and I, will endeavor to do our share. We come together here under diverse conditions and from many places. We are graduate students--[Professor I. I.]Rabi calls them "poor beasts of burden"--appearing now in very slowly increasing numbers after a bad period of concern with relevance and hopefully with a new recognition that these things too are relevant. We are professors also burdened with obligations of university citizenship, with teaching and with social concerns that make it essential for men of science to be involved. We are laboratory scientists, trying to squeeze in some research between long and arduous obligations to provide service to the academic community.

We are moved by this pause in our activities, this pause to contemplate what it is that is being given to us. This great machine and this beautiful laboratory. It is with awe and humility (the humility being probably temporary) that we add up our gratitudes to the various builders, to the science agencies of the government, to the wise men of the Congress, and also in no small measure to our Director, whose charisma and artistry and impudence and unflagging optimism have alternately driven us up the wall but also occasionally to some heights of pleasure.

Like It Is

In the annals of "I wish I had said that," no quotation looms larger for me than the following excerpt from one of the annual Congressional inquisitions that Laboratory Directors must suffer:

> Senator Pastore: "Is there anything connected with the hopes of this accelerator that in any way involves the security of the country?"
>
> Dr. Wilson: "No, sir; I do not believe so."
>
> Senator Pastore: "Nothing at all?"
>
> Dr. Wilson: "Nothing at all."
>
> Senator Pastore: "It has no value in that respect?"
>
> Dr. Wilson: "It only has to do with the respect with which we regard one another, the dignity of men, our love of culture. It has to do with those things. It has to do with, are we good painters, good sculptors, great poets? I mean all the things that we really venerate and honor in our country and are patriotic about. It has nothing to do directly with defending our country except to help make it worth defending."

Fermi's Challenge

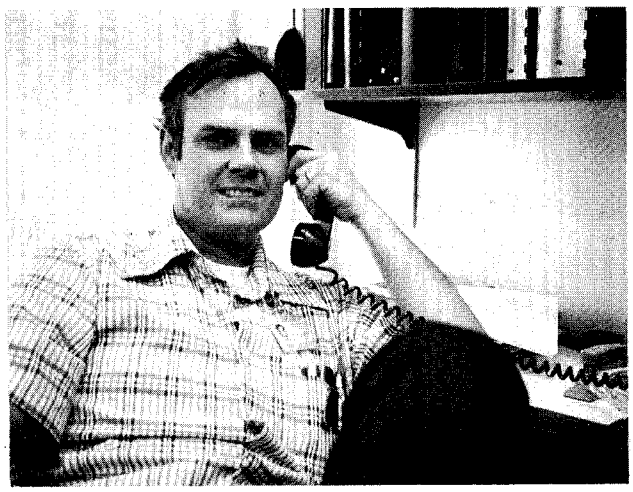
Robert Wilson and his long suffering but magnificent staff have responded to the challenge put forth years ago by Enrico Fermi--whose voice you will now hear, through the generosity of the American Institute of Physics Center for the History of Physics:

> Fellow physicists, in the twenty-year period since the foundation of the Institute, nuclear physics has been advancing perhaps as much as any other branch of our science. Twenty years ago, the neutron had not yet been discovered, the atomic nucleus was supposed to be--or at least a favored hypothesis to the structure of the atomic nucleus--was that it consisted of protons and electrons. This very fact may give you some idea of the exponential progress of our rate of advance. Perhaps to give you another . . . to think of another reference mark, think that 40 years ago was just about when the discovery of the nucleus was announced by Rutherford.
>
> Like in all branches in our time there have been advances in very many directions. There have been advances in the techniques, there have been advances in the fundamental knowledge, usually not to be distinguished because the one determining the other. And just to go very briefly through the list of this kind of development, let me point out that over the period about which we are talking, the voltages achieved in the accelerating machines have been going up in steps roughly of 10--10^6, 10^7, 10^8, and very soon, we hope, 10^9 electron volts. Of course the cosmos is still way ahead and it is a good challenge for the constructors of high energy machines to try to overcome this rival.

This accelerator is an interim answer. . . This accelerator we're dedicating today is an interim answer to the challenge laid down by Enrico Fermi in 1952. Thank you.

--Leon Lederman

Jack [Miljan] Of All Trades – Master Of Many



Jack Miljan is leaving SLAC next week to spend about two years at Fresno State College in quest of an engineering degree. His first try at college was interrupted by three years in the Signal Corps, during which he worked on the installation, maintenance and operation of radio and radar equipment. He tried again, part time, while also managing the family ranch (avocados and rabbits) and working in the local fire department. The next interruption was three years in the Highway Patrol and the Los Angeles Police Department. He then returned to the field of electronics with a position at General Atomics, where he built equipment and, coincidently, performed the incoming inspection on a linear accelerator that GA had bought from ARCO.

Jack came to SLAC in 1962, spending his first few months as an operator-technician at the Mark IV accelerator in the Microwave Lab on the Stanford campus. Soon after that he became a member of the fledgling I&C group that was then forming for the task of building the SLAC accelerator, and he has remained in I&C ever since.

Jack is probably best known at SLAC for the responsibility he has taken, and the initiative he has shown, in developing sound protection systems. He has had a major role in the Personnel Protection System, the beam-dump disaster monitors, and the beam shutoff ion chamber system. The last big system he installed was a major extension of the Personnel Protection System to the new Stanford Synchrotron Radiation Project. Jack also maintained the telephone system within the radiation area during the time when this equipment was owned by SLAC. He then supervised its conversion to PTT-owned equipment, and he has since provided engineering liaison and preliminary trouble-shooting services for the telephone company. Jack has also been responsible for SLAC's operational radio network, and he recently installed the dial-paging system.

Another example of Jack's versatility (we've just started to scratch the surface) is the fact that he served as the Chief of SLAC's Volunteer Fire Department for three years. And it was also Jack who organized SLAC's participation in the San Mateo County emergency radio network, and for a time was in charge of the Emergency Communications Center at the SLAC Fire House.

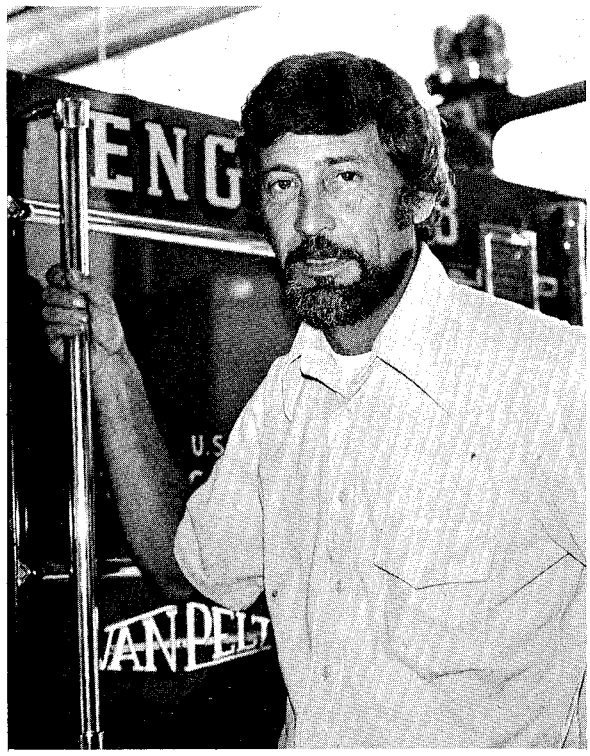
Moving on, we now turn to Jack's well-known skills in designing and building model trains (a talent he never let us exploit at SLAC). It all started with a summer job at the 20th Century Fox studios; continued in a shop in San Diego where he built models for train-wreck movie scenes and was one of the early importers of superbly crafted Japanese scale models; and showed up again when he became part-time manager of the large *Trains* hobby shop in San Mateo. Jack is a member of the Golden Gate Live Steamers model railroad club, and he is a member and past President of the West Valley Live Steamers. He has also helped several SLACers to build their own live-steam locomotives, and at present he is working on a model of one of those clank-and-rumble little backwoods engines, called a "Climax," which he intends to finish up while he is in Fresno.

Although Jack's father, during a 35-year movie career, eventually decided that villain roles were more rewarding, Jack himself apparently prefers to play the hero. At least it looks that way to Jack's co-workers at SLAC, who have seen him go through months when he spent more evening and weekend hours performing emergency repairs and checking out protection and communication equipment than he spent with his wife and children. We'll miss Jack very much (all 5 of him), but we think that going back to college is a wise decision on his part, and we wish him the very best of luck.

--Ken Mallory

CHANGE OF FIRE CHIEFS AT SLAC

Former SLAC Chief Harry Lund



New SLAC Fire Chief Pat Cady

Stanford University Fire Department Asst. Chief Harry Lund is completing his tour of duty here at SLAC. He expects to be reassigned to a post on the Stanford campus sometime within the next month or so. We are extremely grateful to Harry for his constant interest and dedication on SLAC's behalf. We truly appreciate his zeal, and we join all SLAC people in thanking him for his special efforts.

Assistant Chief Pat Cady is the new Chief Officer at SLAC. For the past three years, Pat has served as Fire Marshall for the University. Chief Cady is well qualified by training and experience to promote fire safety at SLAC in an effective manner. We look forward to our association with him.

--Fred Peregoy

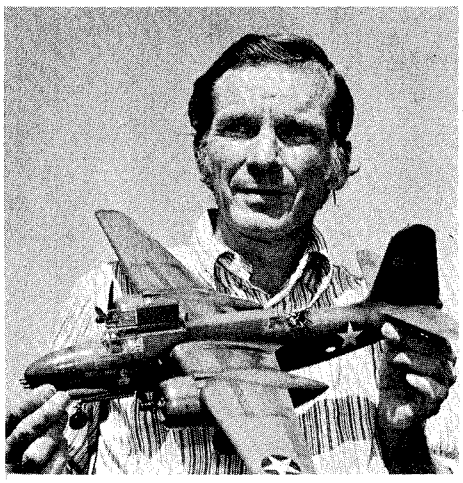
Don't Forget:

Family Day At SLAC
October 12

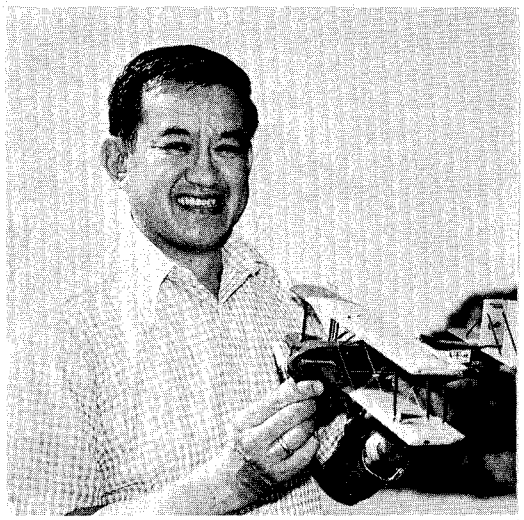
ALCORN & LEE WIN NATIONAL MODELING PRIZES

John Alcorn and George Lee of SLAC have recently won top awards for their remarkable work in model-building. The model competition occurred at the National Convention of the International Plastic Modelers' Society which was held in Anaheim, California, about a month ago. Some idea of the caliber of the competition can be gained from the fact that there were hundreds of different entries, in some 25 different categories, submitted by outstanding model builders from all parts of the United States.

An engineer who devotes his working hours to the LASS project at SLAC, John captured the coveted *Best of Show* award for his model of a Douglas A-20A *Havoc* attack bomber from the World War II period. John estimates that he spent about 2500 hours (about a year's worth of sleeping for most of us) on this model, spread over 28 months.



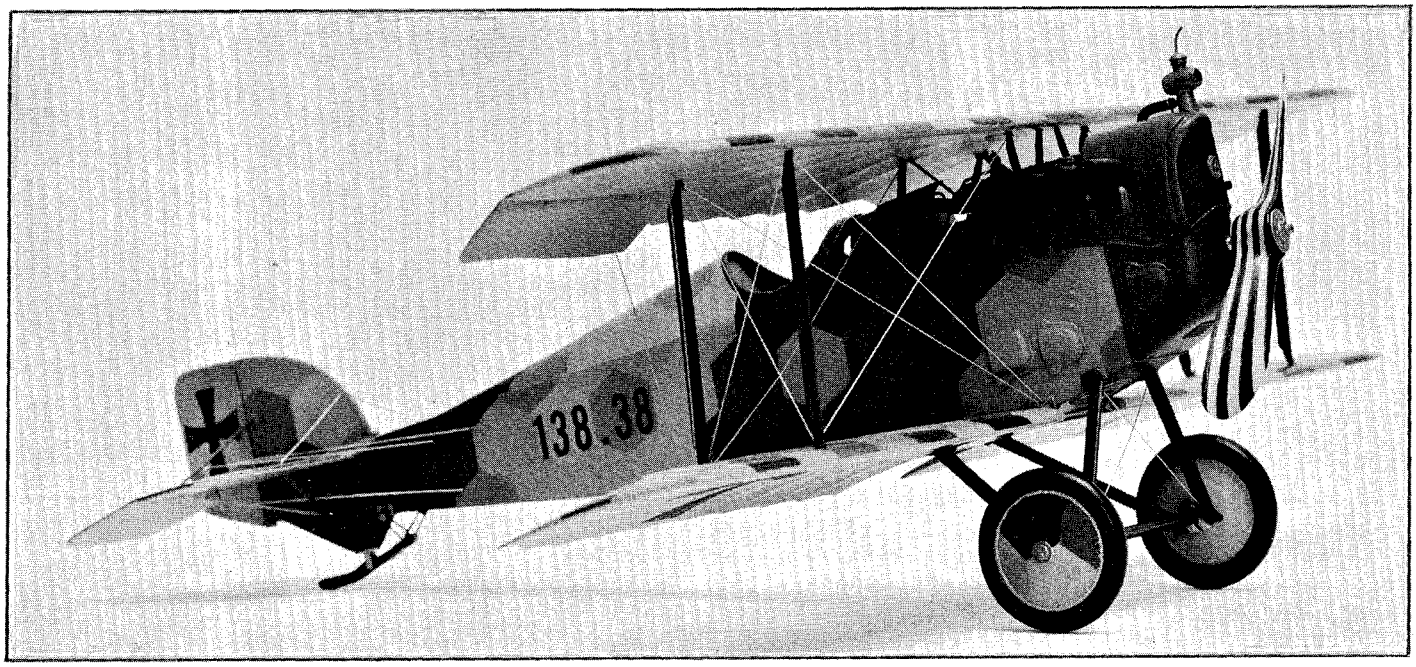
John Alcorn with his 1974 Best in Show *model of the World War II vintage Douglas A-20A bomber.*

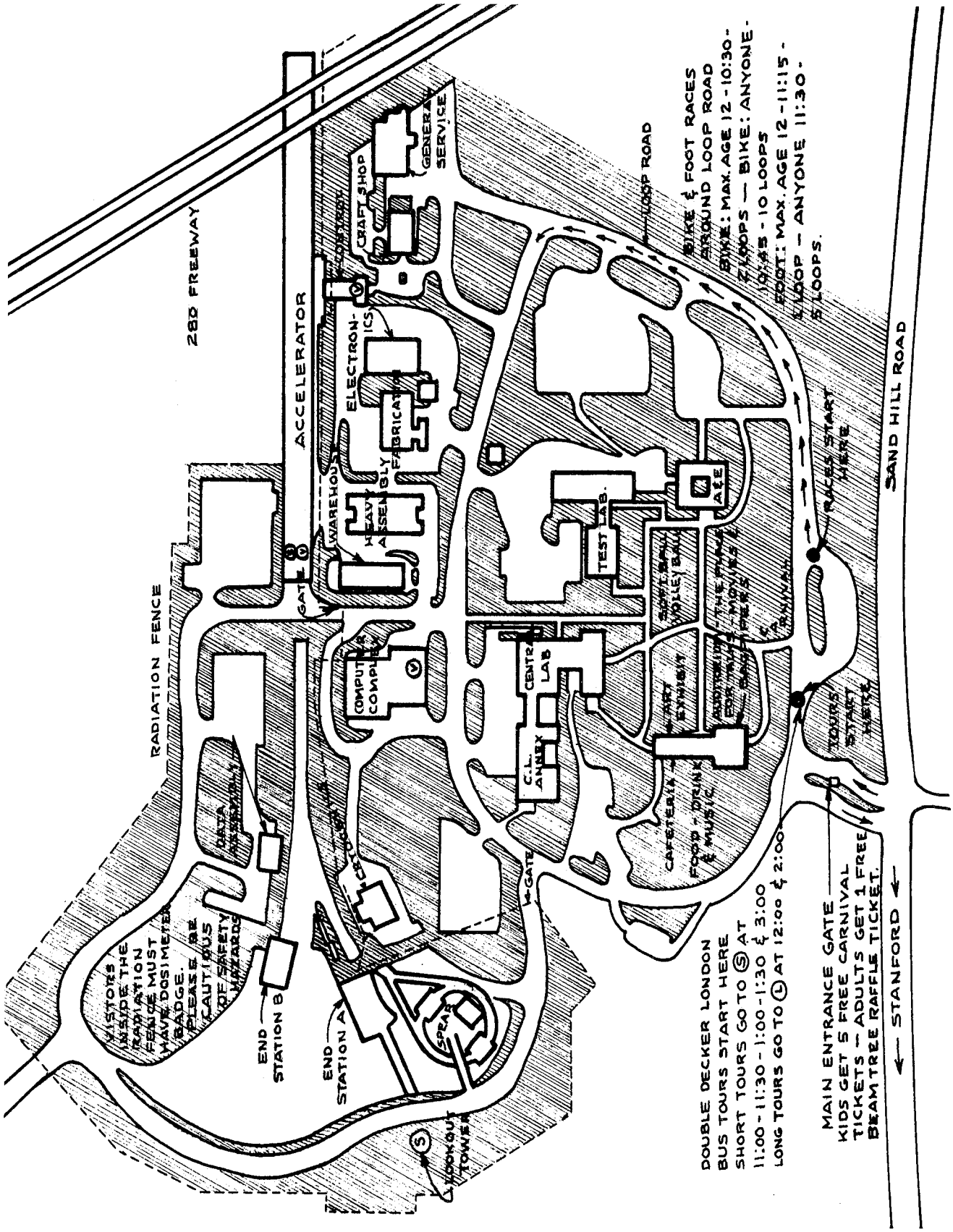


George Lee holds his model of a 1925 mail plane that won a First Prize in the 1974 competition.

George is a designer in SLAC's Mechanical Engineering Department. His entries in the same show won two first-place awards in different categories. The first award was for his model of a Curtiss *Carrier Pigeon*, a mail plane that was built in 1925; while his second award was given to a model of an International *Mark VIII* tank, which was heavy armor during World War I. These prizes are something of a repeat performance for George, whose model of a WW I Austrian biplane, the Aviatik D.1 *Berg*, was the *Best of Show* winner two years ago when the same contest was held in Atlanta, Georgia.

World War I biplane model that won Best in Show *for George Lee at the 1972 National Convention.*





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