The Beam Line

VOLUME 2, NO. 4 — Stanford Linear Accelerator Center — AUGUST 2, 1971

Family Day

Keep Saturday, September 18, open on your calendar, for SLAC's normally open gates will open even wider to welcome SLACers and their families to Family Day 1971.

All sorts of things are, at this writing, in the planning stages, and an all hands memo has been issued to recruit volunteers to help with the plans.

Picnic-style food will be provided, movies for kids (of all ages) will be shown in the Auditorium, and you'll have a chance to show your family the "real" accelerator by taking them down the sector 4 stairway into the accelerator housing. The Beam Switchyard, End Station A, and other interesting areas will be manned by people working and/or familiar with them.

You'll be able to drive your family

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SLACONTEST Winners

Ed Austin, Electronics Shops has won the "name the newspaper" contest with the entry "The Beam Line," while George Lee, Mechanical Engineering came up with the best emblem for the masthead.

Unfortunately, George's masterpiece isn't exhibited in this issue since he just returned from vacation and hasn't been able to produce a camera-ready version. This should adorn our next issue, in September.

The judges had a problem with the title contest — the first polling indicated a tie between Austin's suggestion and one submitted by someone else, entitled simply "The Beam." A second ballot resulted in "The Beam Line" winning. George Lee's entry won unanimously.

Our thanks go to all who entered.

Involvement Corps and Mike Emery

by Kathleen Maddern

A curious group of SLAC employees has been meeting for some time now in the SLAC cafeteria at noon. They aren't so curious when one realizes that their common concern is precisely in uniting their different talents and interests to become a coherent work force for the surrounding community. Toward this purpose, they are willing to pay from their own paychecks the salary of Mike Emery.

Why did Mike come to SLAC? He came because of the Involvement Corps. He is the Coordinator between the Involvement Corps, SLAC and the Stanford Mid-Peninsula Urban Coalition. The purpose of this article is to talk about the Involvement Corps, the Urban Coalition and SLAC's involvement through Mike.

INVOLVEMENT CORPS

The Corps was organized by an ex-militant black man, Scooter Akins, and a middle-class white man, Ellsworth Culver, who had a church background. Their purpose was to create a direct link between concerned citizens and the needy. They apply the power of capable, working citizens to a grassroots approach toward solving problems. For this, they first need an existing organization, for example, SLAC.

The Involvement Corps contacted SLAC and asked if we were interested. We were. Interested employees then became the SLAC Involvement Corps Task Force. The Involvement Corps then chose Mike Emery to be the SLAC "Corpsman" who would contact the Task Force to a problem-solving agency in the community. SLAC's Task Force chose the Stanford Mid-Peninsula Urban Coalition as their vehicle for direct action through Mike. Meanwhile, some vigorous recruiting has resulted in over 40 people joining the SLAC-based Task Force.

Mike Emery, SLAC's Involvement Corpsman, is a pleasant, soft-spoken man of 26. Born in Memphis, Tennessee, he graduated with an M.A. in English from San Francisco State in 1969. His background is quite varied — he's been almost everything from a Culligan Man to an encounter group leader. Most recently he spent time doing draft counselling.

Urban Coalition

A doctor, an East Palo Alto municipal council member, a bank president, the

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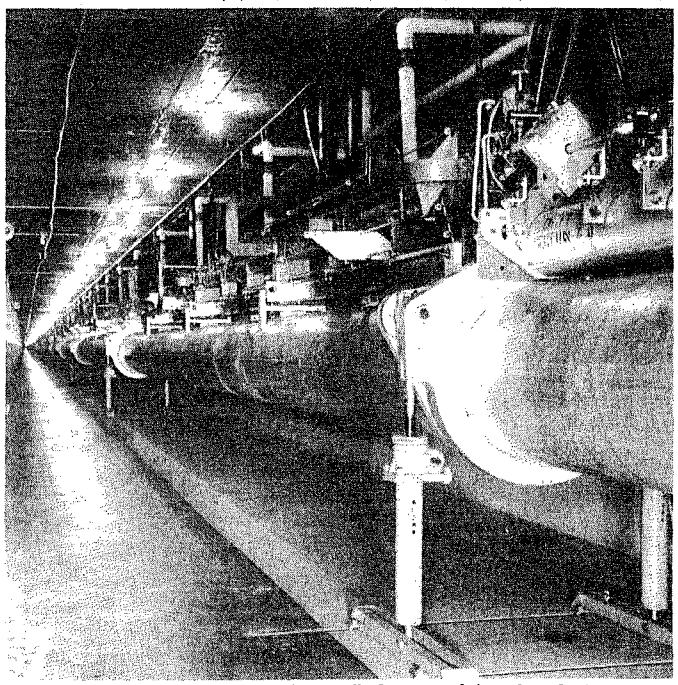
Dr. Panofsky introduces Involvement Corps representatives at an organizational meeting on April 29. Seated are (left to right) Ellsworth Culver, co-founder of the Involvement Corps; Mike Emery, SLAC Involvement Corpsman; and Steve Lindsley, Involvement Corps representative in Palo Alto.



The accelerator — it worked beautifully for a record six and one-half weeks.

April-May Accelerator Cycle- "The Greatest"

The last accelerator operating cycle of fiscal year 1971 was completed on May 28 and was the longest in SLAC's history in addition to being one of the most productive.

The cycle began on April 13 and the machine ran for about 6½ weeks. During that time a total of 32 experiments (including test and checkout runs) were conducted. A total of 3452 experimental hours were logged and almost 2 million bubble chamber pictures were taken in SLAC's 40 and 82 inch bubble chambers, a new record. (For more on bubble chamber operation this cycle, see the feature article on fast-pulsing the 40-inch chamber.) The "average" experiment received a better-than-average 81% of its scheduled beam hours. In fact beam was unavailable only 9.5% of the time.

One interesting innovation that occurred this cycle was the enhanced usefulness of a computer link between the XDS 925 in the Main Control Center (formerly called the Data Assembly Building) and the XDS 9300 in End Station A's Counting House. This link enabled the beam energy of the accelerator and switchyard to switch automatically from 19 GeV to 17 GeV, typically every half hour, for about three quarters of the run of Group C's E-66 experiment. This experiment involved the photoproduction of charged particles in End Station A.

We talked to Vernon Price (Head of AOG) and Jack Truher (Cycle Coordinator for the April/May period). They told us that it took the collective efforts of many people to start up and deliver such a complex schedule of beams. A diversity of engineers and specialists from several SLAC development groups have to be coupled into a functioning relationship to operations at beam time, and often share in the problems of operations, particularly in the check-out of new systems.

Recently AOG has extended development of the project-oriented method where a team of operators is put together before each cycle as the particular requirements of that cycle require. These teams revolve around the Cycle Coordinator who concentrates on assuring that all the proper communication links are made between groups of physicists in the Research Division and operations and support groups in the Technical Division. The Cycle Coordinator works with assigned AOG Operations Liaison Engineers (OLE) and Readiness Preparations Technicians (RPT).

One OLE is assigned to each experiment. His job is to understand the nature of the experiment so that he may anticipate the needs of the physicists. A RPT is assigned to a particular beam line, the path by which particles get to experimenters, and works on check-out of equipment making up the beam line (magnets, collimators, etc.). Sometimes a RPT will put together a very detailed dossier, with drawings and sketches, of the beam line equipment.

We learned that Bruce Walker and George Crane, both of AOG, went to work several days early in MCC to begin readiness preparations and uncovered a number of items which might have otherwise held up the start-up. Meanwhile, Bob Hanselman and a few others in the Central Control Room

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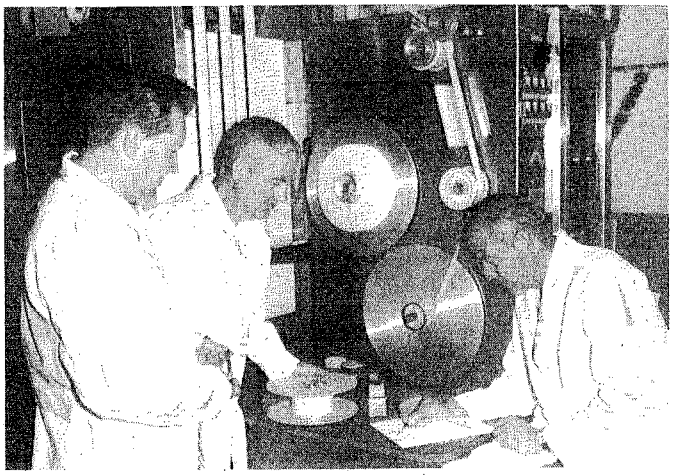


Film processing crew. From left to right Casey James, Cal Williams, and Phil Larrick.

SLAC Takes Over Own Film Processing

by Charles Oxley

A major part of SLAC's physics "output" is displayed on photographic film. This is especially true of the user community, whose output generally takes the form of bubble chamber, streamer chamber, or spark chamber photographs. For the last few years SLAC's film has been processed at the Lawrence Radiation Laboratory in Berkeley (LRL), with small quantities for Eastern users processed at Brookhaven National Laboratory, on Long Island, New York.

Last year, LRL decided to reduce their facility and SLAC was on its own. After a search for a film processor among the local industries was unsuccessful, SLAC decided to process its own film. Local industry was primarily geared to 16 mm color processing and was operating at near capacity for the local pornography industry. Berkeley had agreed to surplus to SLAC one of their two processing machines. Subsequently, a second machine became available from the inactivated Princeton-Penn accelerator.

SLAC bubble chambers took about 4 million pictures in FY 1970 and about 7 million in FY 71. It goes without saying that the accelerator and experimental time invested in setting up and running experiments makes imperative extremely careful processing of all the film.

The two machines and supporting equipment have been installed in Building 44A, the former Klystron Storage Shed. Three highly experienced photo technicians, Casey James, Phil Larrick, and Cal Williams, joined SLAC from LRL. In order to achieve the desired output with this greatly reduced staff (Berkeley has had up to 20 people in its film processing facility), the film is being processed on a production basis only. A standard process is being accorded all film. Also, under the technical direction of Bob Sukiennicki, the processing rate of the machine has been increased from 50 feet/minute to 55 and sometimes 60 feet/minute. The film arrives and is either immediately processed or stored in a freezer. The film that we use can suffer considerable image loss if it is left sitting around at room temperature for any length of time.

Two pollution problems were faced and solved in the installation. Due to the proximity of the Klystron Storage and Assembly Rooms, chemical dust and fumes had to be avoided. The air system of the building works with a slight negative pressure so that leaks will be inward and the effluent air is carefully filtered and scrubbed with water. The other problem was removal of toxic chemicals from the water before it entered the sewer. Silver salts are particularly toxic to marine life, so that extra care was exercised, and SLAC's effluent is considerably cleaner than current industrial standards.

The facility had its first full operation during the April/May cycle, when over 2 million feet of film were processed, with a loss of only 2000 feet (one-tenth of one percent).

The Hi-Speed machines used in this operation are considerably advanced beyond the home tank that we all know. Film is running continuously through the machine at relatively high temperatures, and is spliced in the dark. The solutions are sprayed on the film. The machines will accept any width of film up to 70 millimeters.

The Film Processing Group is part of the Bubble Chamber Development Group. If anybody is interested in visiting the facility, feel free to call Ann Greenwood, extension 2691, and she will arrange a visit between runs when things are a little more relaxed.

Taxes!

Do you and your spouse both work? If so, you could be facing a nasty tax bill next April 15, warns your friendly Internal Revenue Service.

Married couples who both work often find at the end of the year that not enough income tax has been withheld from their earnings. While this underwithholding of tax has been a problem for many years, it apparently is likely to be a more severe problem this year than in past years. The Internal Revenue Service has published a guide which couples can use to estimate the amount by which the tax withheld from their wages may fall short of the tax which they will owe at the end of the year, and gives advice as to how they may correct the problem now by increasing your withholding rate. Copies of this Internal Revenue Service publication are available in the Employee Relations Office, Room 238 of the A/E Building. Members of Employee Relations are not tax counsellors; they've simply agreed to stock the IRS publication. Questions beyond the scope of the IRS publication should be directed to a competent tax expert or the IRS, not Mr. Lighthouse and Co.

SERA and the Wolf

by Charlie Hoard

The SLAC Emergency Relief Association was formed to keep wolves (an endangered species) from doors. There are two basic questions: Is it really a wolf, or just a stray dog? And how big is it? The principal rules that SERA follows in answering these questions may be of sudden interest to you someday.

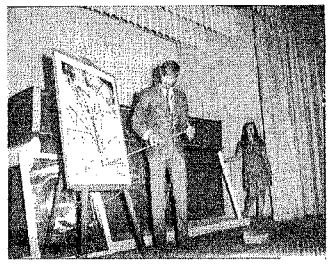
First, SERA considers only members of the SLAC community. Second, it must be a real wolf — a real emergency, that is. People with financial troubles find that food is the only flexible item in their budget, and postponing eating brings out a real wolf. What are the troubles? Illness or accident, especially with inadequate insurance; breakdown of the car that brings you to work; a funeral in the family; little problems that keep the rent or the mortgage from being paid. Third all other means have been exhausted; credit unions, other loans (SERA cannot lend), relatives, advances against salary, stretching out bill payments. Fourth, the wolf must not have been invited. This rule generates certain taboos: SERA will not help with legal expenses (including divorces) nor by paying for personal property. And if someone applies to SERA a second time, he'd better bring a new wolf. (SERA's form requires a balanced budget to be shown for the furture, so that if it is followed, the original wolf tries another door.) Fifth, SERA pays creditors, not the applicant.

All these rules don't make decisions easy. Some problems appear to some extent in every case and rules don't help. For example, take a car breakdown and no cash to rescue it from the garage and no other way to get to work. Should SERA consider the fact that payments are being made on a color TV? (Would it be all right if it were only a black and white TV?) How much consideration should be given to any savings that were used up first? In other words, do people who can't or don't save for a rainy day deserve the wolf? If the answer is yes, remember that for every size of door, there is a size larger wolf that may someday drop in.

Unlike most charities, SERA has no paid members and no overhead. But where does the money come from? And I'm glad you asked! From you, of course. Some send us checks from time to time, but most use a painless payroll deduction. As long as it totals $6.00 a per year, or more, you're a full member. That's only 50c a month and you'll never miss it. Call President Dorothy Ellison, x2723, and she will sen;you a little card right away. Join the wolf-herders!

SLACROSTIC II Answer

Hellman, HIGH ENERGY PHYSICS: "As recently as the mid nineteen-thirties, Lord Rutherford himself said quite specifically that nuclear physics could not possibly have any practical uses."



Last year's show at the Santa Clara County Fair featured Ted Willhite, explaining a bubble chamber photo after Priscilla Stephenson explained how the accelerator worked with the help of an electronic display.

SLAC at County Fair

For the second straight year, SLAC will be involved in the Industrial Participation Program at the Santa Clara County Fair. In addition four other organizations (IBM, NASA-Ames, United Technlogy Corp., and Pacific Telephone) will be participating.

Each organization trains two outstanding high school students to put on a 15-minute production relating to scientific and technological advances. The students are chosen upon recommendation of their science teachers.

The students chosen by SLAC are Kathy Mohr, of Cupertino, and Kim Rubin, of Los Altos Hills. Kathy will graduate in January from Cupterino High School and plans to attend either U.C. Santa Cruz or Stanford, beginning in the fall of 1972. Possible majors are anthropology and archeology. Aside from virtually perfect grades, Kathy has the distinction of having taken first place recently in the Santa Clara Valley Math Field Day Chalk Talk competition, which involved an impromptu presentation before several hundred people. Kathy's job at the Fair will be talk about SLAC's organization and purpose, and explain how the accelerator works, with the help of our ten-foot electronic accelerator model.

Kim will then take over and talk about some of SLAC's important experimental discoveries. He graduated this June From Los Altos High School and will be majoring in physics at U.C. Berkeley this fall. He managed, while in high school, to take a year of college physics at Foothill Junior College and, in addition to working at the Fair, is working as a volunteer in Group D under Al Odian. At last report he was working on photomultiplier tubes to be used in an upcoming streamer chamber experiment.

The Fair runs from August 13 through August 22 at the fairgrounds on Tully Road in San Jose. All SLACers are invited to see the Industrial Participation Program's show. Weekday (Monday through Thursday) show-times are 2:00 p.m. and 7:00 p.m., while on weekends shows will be given at 1:30, 5:00 and 7:30.

THE BEAM LINE
Stanford Linear Accelerator Center

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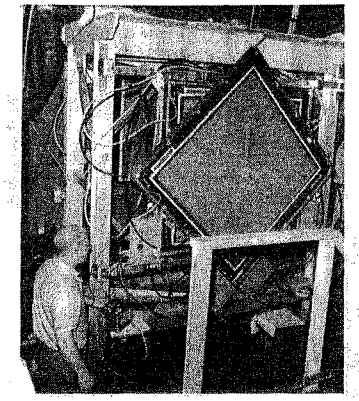
Forty-Inch Bubble Chamber-Now World's Fastest

During the recently-completed April—May operating cycle, SLAC's 40-inch bubble chamber expanded a record 8.1 million times in support of a hybrid experiment conducted by a Caltech-Lawrence Radiation Laboratory collaboration. During April, 600,000 expansions were achieved at rates of 3 and 4 per second, while in May 7,500,000 were recorded. The pulse rate was 4 per second until May 24. The cycle was completed at rates of 5 and then 6 per second. This gives SLAC the distinction of having the world's fastest production bubble chamber.

Bob Watt, head of Bubble Chamber Operations, told us, "This is a result of a continuing development program. When we get a new refrigeration system, the 40-inch chamber might pulse as often as 15 times per second." This would make possible some advanced kinds of experiments in the future.

Despite the fact that over 8 million expansions occurred, only 295,000 pictures were taken; thus, only about one expansion in 30 resulted in a picture. The chamber was triggered so that picture-taking occurred only when something interesting happened.

The reason that the experiment is called hybrid is that the experimentalists, under Charles Peck of Caltech, have successfully "married" a spark chamber spectrometer to the SLAC 40-inch chamber. The experiment, which is continuing during the July cycle, is a study of the way excited states, or "resonances," of the proton can be produced diffractively by energetic pi mesons.



Don Day, Bubble Chamber Operations, observing the first of the 12 wire spark chambers making up Caltech's spectrometer.

Diffraction, in optics, refers to the phenomenon whereby light, considered as a wave, bends around objects in its path. As used in this experiment, the incoming pi meson interacts with a proton in the hydrogen-filled chamber, striking a glancing blow and continuing essentially straight ahead after the collision. Meanwhile the energy transmitted to the proton can excite it into one of a number of very short-lived resonance states. The experimenters are studying this process and will compare their findings with some theoretical predictions.

The pions coming into the chamber have energies of 14 GeV each, and only those which can contribute to diffractive production are interesting and, as mentioned, these continue along at somewhat reduced energy almost straight ahead. To eliminate picture-taking of nondiffractive events, the experimenters set up a wire spark chamber spectrometer to "tell" the cameras to take a photo only when a fast forward pion is found going through the chambers. The technique is to feed spectrometer date into an XDS Sigma 2 computer while bubbles from the incoming beam are growing in the chamber. A decision is electronically made as to whether fast forward pions have lost energy in the chamber and, if so, an event is assumed to have taken place. Then the flash tubes are fired and three views of the possible event are taken simultaneously. This experimental method would have been difficult without the relatively slow growth for bubbles in hydrogen — typically about three thousandths of a second. Thus, the chamber has a memory which stores information for this time, giving the computer time to make initial calculations and decide whether the event is of interest and should be recorded on film. By taking pictures selectively, the number needed for the experiment is reduced ten times.

The spectrometer consists of 12 one-meter square wire spark chambers and a magnet. It allows measurement of the momentum of the fast forward pion to one-half percent. To achieve this kind of precision in a bubble chamber would require a chamber much longer than the one-meter chamber.

In addition to guiding the chamber, computer data is stored on tape and used in the event analysis. The data determines the position in the chamber of the track along which the event occurred to within 1 millimeter (.04 inches). The photograph itself allows determination of the decay particles of the excited proton.

In doing an experiment in which relatively rare events are selectively photographed, chamber cycling rate is important. Since SLAC's 40-inch chamber has been shown to take acceptable photos while running at 21,000 expansions per hour and hopes to cycle even faster, we can expect more experiments of this type in the future.

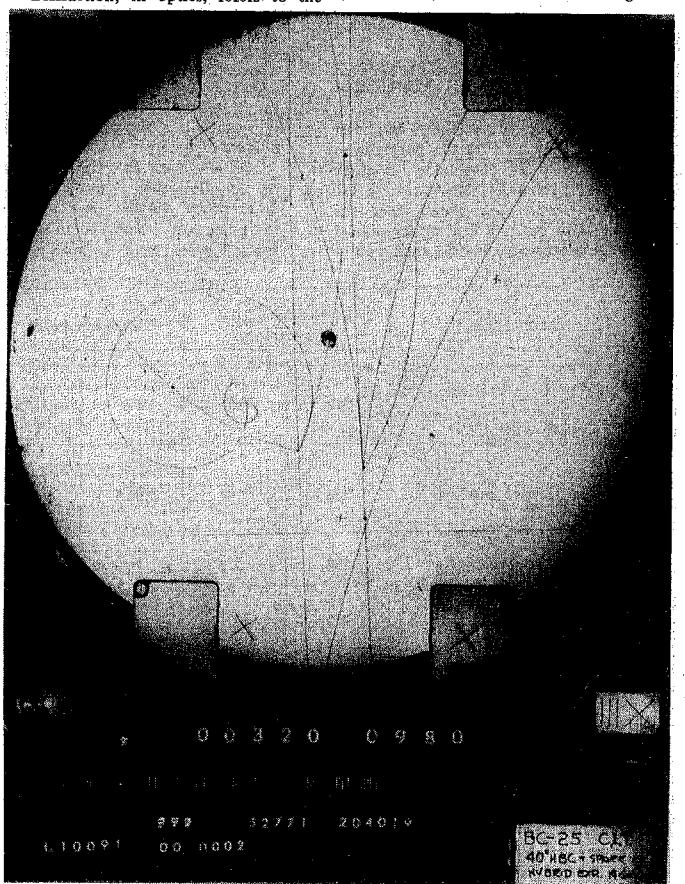
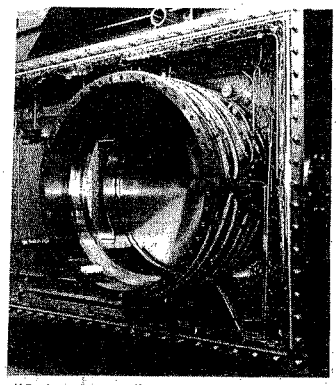


Photo of some "typical" events which triggered the bubble chamber cameras. Some 14 GeV pi mesons enter from below and two make glancing collisions with protons in the chamber, continuing almost straight ahead, but with slightly less energy. Analysis of the collision products will provide information about excited states of the proton.



"Stripped-down" view of SLAC's vertical 40-inch diameter bubble chamber.

Plant Office crew laying out the garden plots on July 7. From left to right, Reyes Valenzuela, Tony Perez, Ronald Pacheco, Juan Miranda (holding the wooden stakes), and Santiago Limon.

Letters to the Editor

Dear Editor:

In the days when names were OOG — AAA — and BARP there was a man whose name was WERR.

WERR was well liked in his community and a very busy person. He worked his 8 hour day, served as a Brownie Mother (emergency of course), taught Sunday School, acted as consultant to the town's legislature, sang in church, and other small items kept him busy.

Now — in thest times — towns elected their King (they hadn't heard of a President). They so loved and admired WERR that they elected WERR to be King.

The is the origin of WERRking.

Thought that you'd like to know.

Don West

Dear Editor:

I do not quite understand the motive of the "Commune member" who ambushed SLAC from behind a wall of anonymity by his letter in "The SLAC News" of June 2, 1971.

If his intent was purely a joke, coming from a sincere heart, believing that the people at SLAC could use a laugh at a time when the world is in turmoil, then he should step forward and be congratulated.

However, if he is probing to see whether the soil here has now become conditioned to extend this turmoil to SLAC, let me assure him, his effort was not even worth the paper his words were written on.

CharlesXuereb
Klystron Group

(The author of the letter did in fact do it as a joke, although a surprising number of people took the letter seriously.)

SLAC Grows Its Own

About 75 SLAC employees have taken advantage of a garden area instituted June 30 by employee relations. A hill area to the east of the computer complex has been plowed, and some 43 10x20 garden plots have been staked out and assigned to the interested. Although the area looks pretty barren right now, it soon should be blossoming with all manner of growing things, particularly vegetables.

The availability of the plots followed by only two weeks the initiation of the project by Robert Moulton, Associate Director of the Administrative Services Division and Bernie Lighthouse, Personnel. Helping with site selection were Bob Gould, Plant Engineering, and Harry Sanders, Director of Planning at Stanford. Approval was obtained from the AEC.

Marie Arnold of the Benefits Office is administering the program. She told us that all of the plots are currently spoken for. Manuel Gutierrez and his crew from thyPlant Office staked out the garden sites (see the photo).

WANT ADS

MOVING

SAILBOAT: 13½ ft. "Bluejay" with main, jib, spinnaker, trailer, etc. $800.

STEREO: McIntosh 1700 amp./tuner; KLH Model 12 speakers; Dual 1019 turntable. $1000.

COLOR TV: Heathkit GR227/custom cabinet. $350.

1967 FIAT: 850 green conv. $1100. exc. cond. (Call Don — 948-0130

Applications o

by Louis Rosen

(EDITOR'S NOTE: The author of this article is Louis Rosen — Director of the Los Alamos Meson Physics Facility. It is taken from a talk delivered at the Particle Accelerator Conference held in Chicago in March of this year and adapted for a more general audience, appearing in June's CERN COURIER. It is reprinted with the kind permission of the author and the CERN COURIER.)

There was a time, not long ago, when science and motherhood were beyond reproach. Today, both are under attack.

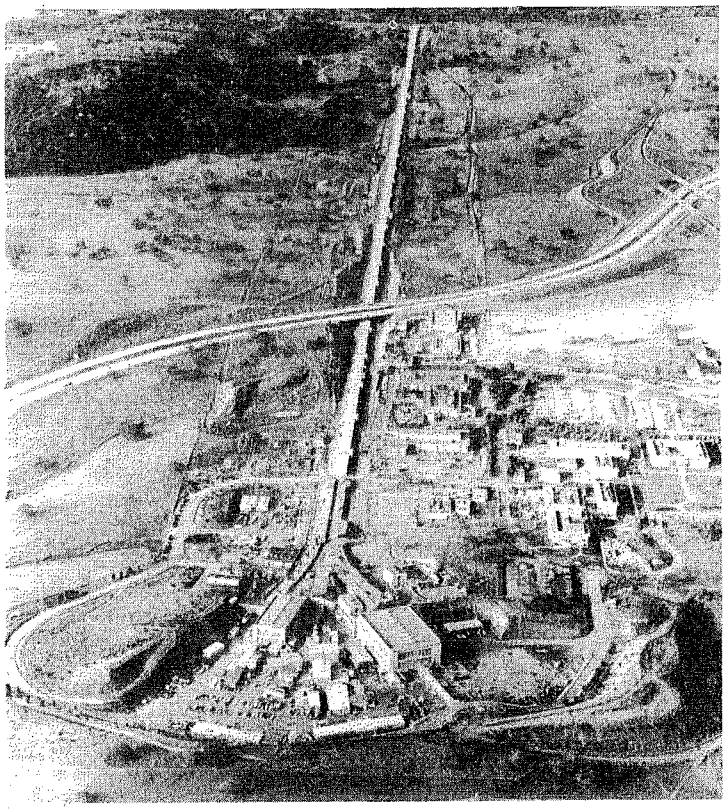
Much of the basis for the attack on science is emotional, even irrational. But not all of our troubles can be blamed on unreasoning critics; a substantial part of our misery is self-inflicted. We have not taken seriously that part of our responsibility to society which dictates that we explain, interpret and justify our activities in language understandable to the non-specialist. We and we alone can do that. We and we alone can provide the best advice on meaningful priorities based on the intellectual and practical worth of our pursuits. We and we alone can provide the best assessment that a given development will have a utilitarian purpose at an acceptable cost. We and we alone can develop the sophisticated phenomenological models which have some chance of predicting the interactions between technology, industry, education, society and our environment.

We are admonished from many quarters to start asking not what our society can do for science, but what science can do for our society. And it is precisely this question, to the extent it concerns particle accelerators, that I wish to discuss.

If we look at the world-wide inventory of particle accelerators, we could claim that they all have value for intellectual and educational pursuits. However, most of us feel that basic knowledge about the constituents of matter and about the forces that govern the most fundamental properties of sub-nuclear matter are most likely to arise from experiments at the highest energies, assuming that sufficient intensity is available to make statistically significant observations. It is the highest energy accelerators, particularly, that contribute to education and the acquisition of new basic knowledge.

To understand the importance of these contributions, we must recognize that one of the main distinguishing characteristics between man and the lower forms of animal life is his curiosity — curiosity about himself, his immediate surroundings and the universe. Curiosity is one of the elements of life which gives it substance and meaning, and one of the major ways to satisfy human curiosity is through the pursuit of science — the interrogation of nature. In order to pursue science, one must continually press on the frontiers which are usually at extremes: very high temperatures and very low temperatures; very high pressures and very good vacuums; the very large (cosmology) and the very small (nuclear and sub-nuclear entities). High energy particle accelerators permit us to explore the smallest quantities of matter and energy in nature.

In addition to these intellectual merits, we can point to other benefits from the construction and utilization of accelerators. For example, one that we will pass over briefly, is the promotion of international collaboration. The research is world-wide and, perhaps, in no other field is there such open, friendly and practical collaboration across frontiers.



Could THIS be relevant in the future? See Louis Rosen's comments in this article.

Let us push on further and get to some directly demonstrable application of accelerators. The history of science tells us that, up to now, the practical results alone have more than paid for all the scientific effort. Even the highest energy accelerators already have economic ramifications for they are producing technological spin-offs (for example in computer technology, cryogenics, vacuum technology, the art of constructing large magnetic fields, and of fabriacting materials which have no electrical resistance) all of which will have a decisive influence on the technologies required to sustain comfortable life on this planet in the future.

But let us examine not what might be but what already is, remembering that what today are considered low energy accelerators were yesterday characterized as high energy accelerators.

Accelerators in industry

If we look at the situation in the United States there are about 1000 accelerators of all kinds, representing about 50% of the world's inventory of accelerators. Less than 150 are devoted mainly to basic research. Of the remainder, about one-third are devoted to industry and medicine, and the rest to the applied sciences. Those devoted to industry and medicine represent a capital investment of 77 million dollars. The annual production of goods and services associated with these machines is about 2000 million dollars.

Non destructive testing

A growing use of accelerators is in the area of nondestructive testing. There are three main categories:

1) Radiographic inspection using x rays and gamma rays (e.g., inspection of pipeline welds)

2) Thickness gauges (alphas and betas have long been used for this purpose and now protons are beginning to show promise — using 147 MeV protons, the Harwell Group have shown that the thickness of graphite can be determined to an accuracy of 0.0015%, compared to 2% by conventional methods)

3) Activation analysis (mainly neutrons).

Radioisotope production

Two-thirds of all radioactive nuclei discovered via accelerator-in reactions. However, 80% of the curi now produced by reactors. This situ appears to be changing, especially i medical area to which we shall retur

Market statistics and predictio $M) for the sale of radiosotopes follows:

	1969	1970
Basic radionuclides	10	11
Radiochemicals	12	14
Radiopharmaceuticals	32	40
Sealed sources	5	6
	59	71

The point is that the sale substantial and the rate of incre large. The present marke cyclotron-produced isotopes is million dollars per year, and incr rapidly. It is estimated that a mark about twenty cyclotron facilities develop for radiosotopes by 1975. the economies are far less importan the pain and suffering these isotop prevent.

Power production

Accelerators have played and contir play a critical role in developme power sources based on nuclear This goes to the heart of problems conservation of fossil f environmental pollution and the q of life. Here are a few examples o nuclear cross-section measurements contributed:

1) Careful measurements of the of neutron capture to fission for P showed that an entire famil water-cooled plutonium-tueled rea would not be feasible as breeder rea thus preventing the waste of hundr millions of dollars.

2) Some years ago, I published r on the interaction of fast neutrons Li7, which showed that a cont thermonuclear reactor could opera the D-T cycle (which is much easie

Application	Number of Accelerators		Investment ($ M)	
	1964	1968	1964	1968
Nuclear science and engineering	282	297	101.4	129.7
X rays and neutrons	234	376	24.2	46.9
Radiation effects	225	315	26.3	36.4
Atomic and solid state physics	5	35	0.5	2.8
Radiation processing	36	60	3.7	6.5
Totals	782	1083	156.1	222.3

A list of some of the applications of accelerators, including investment costs (taken a report of the subpanel on Accelerators to the Nuclear Science Panel of the Ph Survey of the National Academy of Sciences).

the D-D cycle because the required temperature is lower) and produce more tritium than is consumed. It now appears likely that the first thermonuclear reactors will operate on the D-T cycle.

However, Rand McNally Jr. of ORNL has recently proposed the use of energetic protons (or deuterons, tritons and He) to ignite Li6 or Li6D fuel, thus avoiding the problem of heating incoming fuel material to fusion energies. One barrier to the pursuit of this idea is grossly incomplete knowledge of nuclear reaction cross-sections for light nuclei at low energies, which accelerators can provide.

It is a fact that particle accelerators provide the basic information for calculating nuclear properties of reactors. Much basic nuclear data are still needed, especially for fast reactors which make best use of our uranium resources. Annual fuel cost uncertainties, resulting from nuclear data uncertainties, are about $100 million in 1980, $300 million in 1990, and $700 million by the end of the century. Accelerators can clear these uncertainties.

Neutron and gamma-ray cross-sections are destined to play a crucial role in reactors for space applications, for desalination in the agro-industrial complexes and for process heat. The problems are mainly those of neutron economy and materials damage — another field for accelerators.

Radiation processing may be used to increase the melting point, tensile strength, durability, and adhesive property of materials. Of the 270 accelerators in private industry, 46 are devoted to radiation processing on a production scale (exclusive of food processing). The current value of irradiated products, not including food, is about $200 million per year, and much of this is due to electron accelerators. Radiation curing of coatings and finishes, especially for building materials, textiles and metals, is the area of greatest potential in the near future. Irradiation of plastics accounts for the largest share of capacity, with applications to packaging materials and electrical insulation showing great economic advantages and rapid commercial utilization.

As an example, pigmented monomers (without solvents) are processed by electron curing. The monomer is polymerized to produce a superior paint finish. The elimination of solvents from the paint industry should reduce the pollution problem.

Accelerators in defence

The role of accelerators in defence is not as great as it used to be, but it remains extremely important. Perhaps the most serious problem in this category is a bookkeeping one. It has to do with detection, control and monitoring of fissionable materials, mainly those produced in power reactors. We must have the capability of nondestructive interrogation of materials. Accelerators need to be developed which produce neutrons and gamma rays of appropriate energy and intensity and which can be used to interrogate sealed packages to deduce their contents.

By 1980, power reactors around the world will be producing plutonium at the rate of 200 pounds per day, sufficient for tens of nuclear weapons per day. Plutonium is now a commercial commodity, subject to private ownership. To monitor this situation simple, reliable methods must soon be developed for interrogating materials and accurately determining their makeup. Neutrons and gamma rays, produced by accelerators, offer one possibility and much has already been accomplished in this direction. Here, accelerators appear destined to play a central role for a long time to come.

Sooner or later there must evolve an all-inclusive international treaty for control of fissionable materials. Effective verification procedures are essential to the implementation of any agreement which involves production and distribution of fissionable materials and the limitation of development, production, and deployment of nuclear armaments. Highly specialized accelerators will certainly be part of the policing mechanism.

The nondestructive analysis techniques, particularly the accelerator-based active interrogation techniques which give promise of high accuracy and sensitivity, may be immediately applicable to the identification and control of pollution in air and water. Neutron activation techniques, in particular, offer an extremely sensitive method of tracing low-level contaminants in air, water and soil.

Accelerators for medical purposes

Perhaps in no area has accelerator development had such a marked impact on mankind as in medicine — in nuclear medicine and in radiation therapy. Radioisotopes are used in diagnostic medicine in connection with: thyroid uptake, blood volume determination, renal function, vitamin B-12 absorption, fat malabsorption, RBC survival, iron turnover, cardiac output, hepatic function. At the moment most of the isotopes are discovered with accelerators and manufactured with reactors. However, accelerator-produced isotopes are increasing in volume.

Of all isotope administrations, about one-third employ I 131. The use of I 123 for in vivo thyroid uptake studies, brain scans, blood volume measurements, and liver and lung scans, reduces the radiation exposure to patients by about a factor of 100 over I 131 because I 123 has no particulate radiation and has a much shorter half-life. This reduced dose is especially important in pediatric and obstetric cases.

The second most widely used radioisotope in organic function studies is accelerator-produced Co57 for vitamin B12 absorption tests. The reason is shorter half-life and greater counting efficiency for the lighter isotope.

The new Brookhaven linac and LAMPF can produce substantial amounts of Zn72. Preliminary studies indicate this nuclide may become a routine scanning agent to be used in all males, over middle age, for early detection of prostatic cancer. No such agent exists at the present time although prostatic cancer is currently the third most frequent cause of death in male cancer patients.

In 1968, 300,000 people were treated by radiotherapy, involving 3.5 million treatments, representing a 300,000 dollar effort towards the arrest of cancer.

Concluding remarks

I have described what has been and what is now. But what about the future?

Some trends in accelerator applications are discernible. I have already mentioned that new accelerators need to be developed in order to achieve nuclear energy sources on the one hand and help with the world-wide management of fissionable materials on the other. New types of accelerators are needed for uses in every sphere from the preservation of food to the sterilization of sewage.

The field of medicine appears to have an insatiable appetite for accelerators which are tailored to their purposes. Just now, six cyclotrons for isotope production of the short-lived isotopes 015, N13 and C11 (2, 10 and 20 minute half-lives) have been, or are in the process of being, installed in the USA.

With increased emphasis on nuclear medicine, the medical profession will be in a position to make use of new radionuclides which have properties more amendable to diagnostic procedures. Many of these can be provided by accelerators. Perhaps the most dramatic utilization of accelerators is in the treatment of malignancies where there are great advantages to be realized by using high-energy charged particles in radiation therapy. High-energy protons are much superior to x rays and we have been remiss in not using our high energy accelerators for this purpose. Our colleagues in the USSR are far ahead of us and I commend them for that.

In order to build LAMPF, a new accelerator structure had to be invented and developed. Very soon after, the feasibility, stability, and efficiency of this accelerator was demonstrated by building an electron prototype; the basic design features were adopted by industry, which is now producing them for x ray machines of 4 MeV (and higher) energy. At least five companies are building these machines; several dozen are already installed in hospitals, several dozen more are under construction.

Lest you worry that higher energy machines be left out of medical applications, let me assure you that this is not the case. The meson factories — LAMPF in USA, TRIUMF in Canada, and SIN in Switzerland — are scheduled to provide negative pions for radiation therapy.

The problem of determining the beam energy necessary to achieve stopped pions uniformly and at a prescribed depth in the tumor volume seems near solution and a suitable pion channel has been designed.

It now appears that muons too may be useful in medicine — in diagnostic medicine. It occurred to me, several years ago, that muons might be used to determine elemental composition in tissue just as neutron activation analysis is now used, but with less damage to the host organism. Recently some results have been obtained which are most encouraging.

The promise of pions and muons in medicine naturally raises the question of whether one might devise a very inexpensive, single-purpose meson factory. D.Nagle, E.Knapp, and D. Hagerman have given some thought to this question and have arrived at the concept shown in the drawing. A 3MeV pressurized Cockcroft-Walton feeds protons into a 400 MHz drift-tube linac which in turn ejects into a 1200 MHz side-coupled linac. The initial estimate is that a 500 MeV 0.5 mA average current, low-duty factor machine can be built for about $5 million. It is beginning to appear that two of the physicists most cherished particles are destined for a central role in diagnostic and therapeutic medicine.

I see particle accelerators assuming an ever more prominent role in our everyday life. It is not completely unreasonable to expect, within our life-time, the emergence of a mail order catalogue which would list:

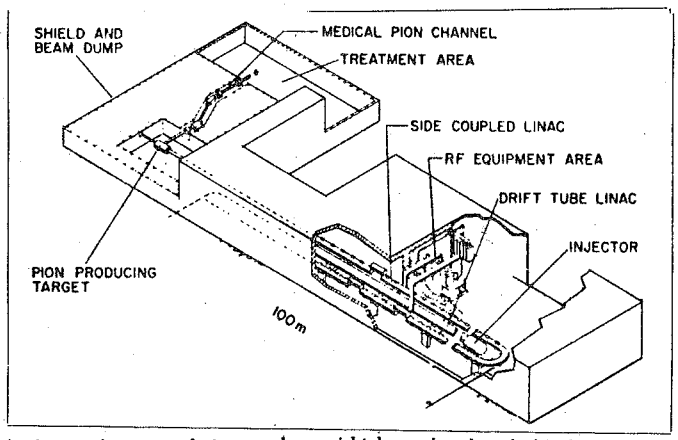
1) Electron linacs (1-100 MeV) for the inspection and surveillance of nuclear materials and polymerization of plastics;

2) Isochronous cyclotrons (100-400 MeV) for isotope production and radiation therapy with protons and alpha particles;

3) Meson factories for isotope production, radiation therapy with negative pions, and mu-activation analysis for medical diagnosis;

4) Electrostatic machine (0-100 MeV) for radiation damage with neutrons and charged particles, isotope production, neutron cross-section measurements, and neutron activation analysis;

5), 6), 7), etc. And more to come which we have not yet thought out.



An inexpensive meson factory, such as might be used exclusively for diagnostic and therapeutic medicine, as conceived by a Los Alamos group. A machine of this type could yield a 500 MeV, 0.5 mA proton beam for the production of intense beams of pions and muons.

Report on MAC's 1971 Interview Program

REPORT ON THE 1971 INTERVIEW PROGRAM OF THE MINORITY AFFAIRS COMMITTEE

The Minority Affairs Committee was instructed by the Director to attempt a broad survey of opinions among laboratory staff concerning the laboratory's policies and practices in regard to the employment of minorities. There was considerable discussion within the Committee as to the best method to employ in gathering this information. Discussions were held with various members of the SLAC Personnel Department and with Professor B. Cohen, Chairman of the Sociology Department at Stanford. As a consequence of these discussions, the Committee proceeded with a series of personal interviews based on a standard set of questions. Interviewees were selected at random from lists of employees and appointments made by the Personnel Department. The interviews were conducted by teams of two MAC members over a period of several weeks. Each interview lasted 30 minutes, and some 30 interviews were conducted. Additionally, the Committee met with a number of people who had expressed an interest in talking to the Committee, and with groups of supervisors, training program and work study program participants. After these initial interviews had been completed, MAC concluded that because the viewpoints expressed in these interviews were not very different, it was not worthwhile to extend the interviews to more people, and the series was discontinued.

It may be of value to discuss some possible reasons for this apparent similarity. We suggest four reasons for this seeming consensus:

(a) There is some social pressure to express opinions which are consistent with the expressed lab policy of affirmative action.

(b) There is some social pressure to be agreeable with the interviewers who are perceived as being supportive of the lab policies.

(c) The MAC members doing the interviewing were all amateurs at attitude surveys and may not have asked the right questions.

(d) Almost 20% of the people contacted for interview appointments declined to accept the appointment. No effort was made to ascertain the reasons but it is possible that those who perceived the laboratory policy as being contrary to their own opinions would be likely to decline to discuss the matter with MAC.

Having pointed out the problems in the interview program, there may still be some value in discussing some of the points brought out in the discussions:

The following 10 questions were asked verbally, not necessarily in the order they appear. Each was scored by those MAC members present with a number from one to five, with one indicating "worst" and five indicating "best."

1. Is your work interesting?
2. Is there opportunity for advancement?
3. Do you know enough about laboratory policy?
4. Is the amount of work expected reasonable?
5. Is the pay competitive with the outside world?
6. Are your supervisors good?
7. Do you know about SLAC's minority program?
8. Should special efforts be made to bring more minority people into the lab?
9. Is there sufficient opportunity for promotions of minority people at SLAC?
10. Should special efforts be made to upgrade minority group members who are regularly employed by SLAC?

Questions 1 through 5 were designed to be a kind of warm-up for the interview and to get an idea of the employee's feeling about SLAC as a place to work in general. There were no great differences in the answers of minority and white employees, and the general feeling seemed to be that SLAC is a pretty good place to work. Both the minority and white employees felt that they really did not know too much about SLAC's minority program. In the discussion we found that the "All Hands" memo method of communication does not seem to be very effective. There are difficulties in distribution, and many employees don't bother to read these things anyway. It appears that a SLAC newspaper would be a much more effective communications medium.

There was some difference of opinion between white employees and minority employees on two questions. Minority employees rated their supervisors as being somewhat less good than did white employees, and minorities were slightly more affirmative on question No. 10 on whether there should be special efforts to upgrade minority employees. With these exceptions, minority and white employees tended to express about the same opinion, generally being satisfied with their own working situation and being supportive of the lab programs in regard to minorities. Most employees felt their pay was competitive (score 3.4) and most felt minority employees did not have sufficient opportunity for promotions at SLAC (score 2.8), with little difference in the answer to this question between minority and white employees.

In the discussion, some of what might be contradictions in the answers turned up. Thus, while all (both white and minority employees) who responded favorably to question No. 10 (Should special efforts be made to upgrade minority employees?) agreed that special efforts had to be made in this area; some emphasized that this should not be done in such a way as to antagonize other employees, and others emphasized that promotions must be based on "fairness."

The interviews were of sufficient length to allow us to go behond the list of questions and discuss other matters which bear on the problems of minority employees at SLAC. Thus, both minority and white employees agreed that SLAC's greatest minority problem at this time is in the concentration of minority group members in the lowest job classifications. As the statistical data prepared by the Personnel Office show, SLAC has succeeded in increasing the total minority group employment in the laboratory but has not had much success in increasing minority employment in the higher job classifications. Many employees have pointed out that the solution to this problem is made much more difficult by the general unemployment problem on the Peninsula which has greatly decreased turnover in jobs at SLAC.

The bureaucratic jungle of job descriptions and job classification recently imposed on SLAC by the University has caused concern among some employees. We have discussed at length the relation of this new system to the problem of upgrading minority employees, and have come to the conclusion that it will probably increase the barriers to upgrading employees. While we have been told that part of the original pressures for detailed job description, job classification, and rigid salary schedules came from various minority groups, we feel, however, that the system which has been developed by the University is likely to create new barriers to employee mot[illegible] The potential problem is that not only are the employees in a group classified as to job description, but the jobs these employees fill in a group are also classified. Thus, for example, if a technician is to be promoted from Tech II to Tech III not only must the tech's skills have increased, but the group leader must also convince organization that the slot in his group should be upgraded to one requiring a Tech III rather than a Tech II. Not only must the employee meet the requirements for being advanced to a new level, but the slot he occupies in the group must also be advanced to the new level. It seems especially difficult to pass the barrier between Staff Assistant and Staff Associate because of what the University perceives as the requirements of Federal labor law for specialized classroom training for exempt employees. It seems to us that the written requirements for Staff Associate are based on an excessively narrow interpretation of Federal Law.

We have also found that SLAC's mechanism of posting all job openings in the laboratory in order to allow present employees to have a chance at more interesting work or a higher job classification, although good in principle, does not work as well in practice as it might. The problem seems to be that many employees feel that if they apply for a job in another group and do not succeed in obtaining that job, their present supervisor may feel that they have been "disloyal" and "make things hard" for them. Unfortunately, there seems to be more than a little bit of truth in these worries. This is a particularly unfortunate state of affairs since it defeats what is in principle an excellent mechanism to allow employee mobility.

A further bar to upgrading employees lies in the natural desire of a supervisor to keep someone who is doing his job well rather than to have to train a new man. Supervisors do not in general (there are exceptions) push their own people for higher level jobs in other groups. A few groups in the laboratory get around this problem by operating their own underground talent scout system, but this is by no means a general practice. It would help considerably in upgrading employees if the supervisors could be made to feel that it was to their credit when someone from their group was promoted, whether the promotion was inside or outside of their own group.

Up to this point we have not yet said anything about the existence of racism at SLAC. We have found that the word "racism" is itself a bar to understanding because its meaning is not the same to all groups at SLAC. To most whites, racism implies overt, bigoted, prejudice against other groups or cultures. To most members of minority groups, the definition of racism is not that simple and involves more subtle things. It would be witless to claim that there are no bigots among the employees at SLAC, tht those with such attitudes represent a very small minority of the SLAC population. There are, however, many at SLAC with false perceptions of the needs and experiences of minority people. In the hope of promoting more understanding between groups at SLAC we present below our definition of racism which at least has the virtue of being brief.

Racism in practice is the imposition on minority populations of programs and policies which are based on a view of the world which is unique to the majority culture. A significant part of what is called "racism" could be described by a less contentious word — "narrowmindedness." Difference in speech, dress, habits, attitudes, etc., so exist between groups. Racism enters when one group not only considers its own patterns to be superior to those of other groups (all groups consider their own patter[illegible] to be best), but also,

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First meeting of the 1971-72 Minority Affairs Committee, held July 14 in Dr. Panofsky's office. Seated, from left to right, are Cornell Watson (Accelerator Physics), John Harris (EFD), Ray Ynegas (EFD), and Janet Schnecke (Group B). Standing (left to right) are Willie Roberts (Klystron Group), Jim Ketcher (Crafts Shop), and Ralph Gaxiola (Central Lab Machine Shop). Not shown are Burt Richter (Group C) and Alex Tseng (Plant Engineering).

MAC's first Year

SLAC's Minority Affairs Committee (MAC) has recently completed an eventful first year. Organized in June, 1970, the committee handled four complaints, and made three written reports. (An investigation may be initiated by the Director, any SLAC employee, or by MAC or any member thereof.) A report on an interview program dealing with staff opinions on laboratory policy with regard to minority employment is printed in its entirety in this issue, while reports made by MAC on the Skills Training Program (STP) and Work Study Program will be available in the SLAC Library. The report on the STP has resulted in a reorganization of that program and is the subject of an article in this issue.

During its first year MAC (John Harris (EFD), Suzan Jerome (Public Information), Jim Moss (Group D). Burt Richter (Group C), and Ray Ynegas (EFD)) reported formally to the Personnel Department, but from now on it will act as an advisory body reporting to the Director's Office. For its second year MAC will consist of Ralph Gaxiola (Central Lab Machine Shop), Harris, Jim Ketcher (Crafts Shop), Richter, Willie Roberts (Klystron Group), Janet Schnecke (Group B), Alex Tseng (Plant Engineering), Cornell Watson (Accelerator Physics), and Ynegas.

Members of the SLAC staff are encouraged to communicate to the members of MAC any problems they consider relevant to the committee.

...and the Urban Coalition

Continued from Page 1

mayor of Sunnyvale, a housewife, a minister, a Stanford professor, a San Mateo Probation Department employee, the Director of the Western Conference of Teamsters.

What do they have in common?

In this case, they are all involved in the Stanford Mid-Peninsula Urban Coalition.

What is an Urban Coalition?

A group of responsible community leaders whose purpose is to enlist the help of existing organizations and find new sources of manpower and leadership so that the citizens themselves become the primary resource for solving major problems of racial and economic bias within the community.

How does it work? It consists of 3 main bodies: an Executive Committee, a Policy Committee, and six Task Forces working for improvement for minorities in (1) housing development (2) economic development, (3) employment, (4) fair housing, (5) law and justice, and (6) health.

Leaders and citizens in all segments of life in the Stanford area are brought together through the Coalition to focus attention on the disadvantaged portions of the community. That segment is most in need of the basic requirements of life — adequate food, medical care, jobs, decent shelter.

The Coalition functions similarly to a powerful steamship which is manned by a captain (executive committee) and his officers (policy committee and Task Forces).

However, the steamship moves toward its purpose only after being fully equipped with an able crew (everday citizens). Those vital crew members are the only people able to give the most informed feedback as to what needs to be fixed in the boiler or engineroom so the ship can move ahead.

Leaders from Los Altos, East Palo Alto and throughout the mid-peninsula area represent a powerful cross-section of society. Operating on the principle of "united we stand," it operates dynamically in resolving the pressure-cooker situation existing where disadvantaged members of the community have previously had little or no power to take action in changing their lives for the better.

After the Riots

The National and local Urban Coalition grew out of the reaction of many community leaders to the violence resulting from the frustration of squelched human potential. In contrast to rioters, the weapons used by Coalition members are willingness to learn about each other's problems, sincere desire to help out, patience, and a proven ability to resolve complex problems.

The problems harshly pointed out in riots by the angry people of the Mid-peninsula are now being worked on in a less-dramatic but more potent way by dedicated workers whose persistent energy is bringing about much needed changes. Their job is not easy. It requires the courage to face social barriers and crises with the hope of overcoming attitudes which perpetuate the poverty and discrimination cycles. Their combined efforts are like that of an architect who knows that with enough help and cooperation, he can build a new liveable house from the same foundation where he sees a crumbling shack.

Accomplishments of Coalition

Mike's assignment in the Coalition has been with the Housing Development Task Force, headed by Robert H. Moulton of SLAC, and the Law and Justice Task Force, headed by Thelton Henderson, Associate Dean of the Law School at Stanford.

The purpose of the Housing Development Task Force is to increase the supply of low to moderate income housing in the mid-peninsula area. Three sites have already been selected: (1) contruction has been completed in San Veron Park, a 32-unit townhouse development in Mountain View, (2) Colorado Park, a 60-unit development in Palo Alto — construction starts in August or September, and (3) Stanford campus, a 225-unit development — date for construction not fixed yet.

The purpose of the Law and Justice Task Force is to improve the quality of law and justice for low-income persons. In order to determine needs of the East Palo Alto community, a survey began July 22 to document minority attitudes toward police and the courts. In 1970, a Legal Referral Service was opened at the Info Center at 1849 Bay Road in East Palo Alto. It has fast become a vital contact point between low-income persons seeking legal help and existing legal channels in the mid-peninsula area.

Mike himself is involved in:

(1) coordination of Housing Development Task Force subgroups which are developing Coalition positions and action programs,

(2) development of SLAC Involvement Corps group,

(3) the upcoming survey of East Palo Alto residents, and

(4) serving as a Coalition Representative at various functions.

Included among the contributors to the Stanford Mid-Peninsula Urban Coalition during 1969 and 1970 are: Bank of America, Hewlett-Packard, Ampex, Crocker-Citizens National Bank, Varian Associates, Wells Fargo Bank, and the YWCA.

A few of the people involved in the 1970 policy-making for the Coalition are: W.K.H. Panofsky, SLAC Director; Robert H. Moulton, Associate Director, SLAC; Richard Lyman, Stanford President; Jing Lyman, president of Mid-Peninsula Citizens for Fair Housing; Leo Bazile, President of Stanford BSU; Herbert Rhodes, Chairman of East Palo Alto Municipal's Council; Edward Becks, Chairman of Economic Opportunity Commission, San Mateo County; Charles Thrower, Editor of Peninsula Bulletin; Thelton Henderson, Associate Dean at Stanford School of Law; Arjay Miller, Dean of Stanford Graduate School of Business; Fred Alvarez, President of MECHA at Stanford; and Charles Anderson, President of SRI. Numerous others helping make policies include the mayor or a chamber of commerce member of all surrounding communities, religious leaders, and citizens of divergent background all working for a common solution.

The Executive Director for the Stanford Mid-Peninsula Urban Coalition is Ira Hall, a recently elected Stanford trustee. Also serving on the Executive Committee is Edward Ginzton, formerly of SLAC (now Chairman of the Board, Varian Associates).

Through the Coalition, people of completely different backgrounds with diverse needs are able to side with each other instead of against each other to reach solutions for the common good.

If you would like to learn more, come meet Mike Emery and other involved SLAC people in the SLAC cafeteria at noon. Please call Louise Addis (X2411), Bill Kirk (x2605), Ron Cochran (x2324) or Charles Zahn (x2624) for further information.

MAC Report

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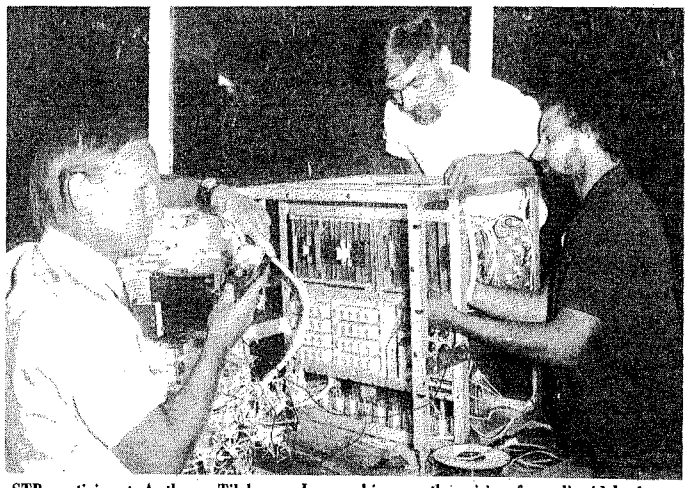
considers members of other groups to be inferior as people rather than just different in style. (We have wondered whether accusing someone of being a "Narrowminded Pig" rather than accusing him of being a "Racist Pig" might not contribute to a better understanding of the accusation.) To run an institution in the expectation that measures for education, job training and personnel procedures which have served for the majority population inthe past will serve equally well the interest of minority people may be a form instutitional racism. To continue those procedures if it becomes evident that they do not serve the interests of minority people is overt racism. Similarly, to expect conformance to behavior patterns, not related to work performance, which are majority cultural preferences is a form of oppression which is likely to prevent the full realization of opportunity for people of different cultures.

The committee concludes that, in general, the attitudes of the majority employees at SLAC do not constitute a major barrier to the provisions of equal opportunity for minorities. The employees of the laboratory support the efforts of the management to upgrade the minority employees when they understand those efforts. We have also found, however, that programs instituted by the management are not nearly as effective as they might be because of a lack of feedback from the employees about the actual workings of, and problems with, these programs. We have cited above some examples of programs and policies which could have been improved by early feedback from employees and supervisors.

We note that the management seems to have recognized this problem, and has begun to take steps to improve the feedback. This MAC study which was initiated by the Director is an example of this recognition, and the committee on the Skills Training Program set up in response to our draft report on that program is another example (the Skills-Training Committee includes representatives of the trainees, instructors, supervisors, and management).



STP participant Anthony Tilghman, Jr., working on the wiring for a liquid hydrogen target control and monitoring panel. Helping is his supervisor, Bill Pierce, left, who is in charge of instrumentation for the Hydrogen Target Group. Ted Jenkins, new STP Coordinator, observes.

STP Reorganization

For about three years, there has been a program at SLAC with the title of Skills Training Program (STP) and the goal of upgrading the work skills of disadvantaged people. However, while there has been much effort and noise in the gears, the motion seems to have been occasionally stationary. Dr. Panofsky, MAC (Minority Affairs Committee), and others determined that STP was in need of reconstruction. As presently constituted, STP contained serious deficiencies, such as lack of coordination and poor lines of communication. The opinions of the trainees as well as of the supervisors were solicited, resulting in a number of recommendations concerning guide lines for accomplishment and the selection of trainees. Also, the need for a selection process of equal cogency for supervisors was recognized. Another of the recommendations was that the trainees be prepared for jobs existent at SLAC, not just the cold impersonal outside job market.

These recommendations culminated with the appointment of a coordinator for the S.T. Program, whose job it is to see that the good intentions of good men somehow are made mature and clear enough to accommodate their inheritors. Now it rests with this coordinator to take the Skills Training Program in hand, and hopefully guide it as the committee recommended.

To this end, the trainees have been placed in permanent jobs at SLAC. They will continue with on-the-job training supplemented by formal classroom work; only the training will be checked by the training coordinator. New trainees will be screened for scientific aptitude before acceptance into the program. Each department that is assigned a trainee will have its head count increased by that one person. Thus, the trainee will be paid as well as supervised by the group into which he is placed. And, as already noted, the trainee is guaranteed a job at SLAC upon graduation.

The new training coordinator, Ted Jenkins, is expected to devote half-time to this job, though he states that "Right now, with all the loose ends of the program and so much to learn, this figure is more like 90 percent." He will be devoting most of his time to interviewing prospective supervisors in search of training locations, working up training schedules with these supervisors, and setting criteria for this training. Once he has identified these job locations, he states, he will begin a search for a few new trainees.

April-May Cycle-

Continued from Page 1

(CCR) made similar efforts.

Hanselman and Jim Sirois (AOG) worked with Price to implement a newly systematized accelerator turn-on program, which worked well. Some of those responsible for the success of the E-66 beam in End Station A were Roger Miller (Accelerator Physics), Ralph Johnson (AP), Gerry Nelson (AOG), Larry Stein (AOG), and Joan Piccioni (EFD). John Jasberg and Gordon Gilbert (AOG) reproduced a great deal of carefully documented instructional tools for the Beam Authorization Sheet, a set of instructions from Health Physics to the accelerator operators concerning safe operation of the various beams. Ken Crook and his staff from Accelerator Physics installed and tested some new radiation safety electrocnics, and installed in short order some special-purpose electronics for protection agaainst beam-induced vacuum failures.

While we've been concentrating on the contribution of the Technical Division, it must be realized that the success of this cycle could not have been achieved without the work of the experimental groups themselves in meeting the demanding schedules and in making maximum use of the available beams.

To summarize, successful operation of the April-May cycle may be attributed to a large number of people, working both individually and in groups, bringing to the enterprise both self-motivated individuality and a coordinated team effort.

Family Day

Continued from Page 1

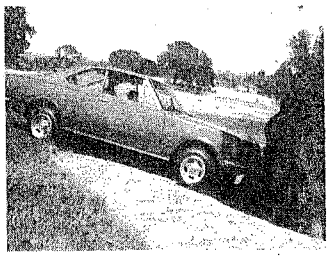
around the site yourself (if you bring your TLD, so don't forget it — it's all you need to get through the sector 30 gate). In addition, a shuttle bus, with running commentary, will be available.

Tentatively scheduled (tours, food and movies are definite!) are an art show, sports events, live music and explanatory displays.

The Family Day Program is being organized by a committee headed by Bette Reed of the Data Analysis Department. If you haven't returned your questionnaire to her already, please do so.

CORRECTION: The Family Day Questionnaire-memo said that friends may be invited. This was an error. The activities are designed only for those employed at SLAC and their families.

Tree Meets Car



Summer weather brings shady parking places under trees — or is it into trees? A red car belonging to a fellow worker at SLAC rolled down the hill behind the cafeteria to make close acquaintance with one oak tree above the parking lot. The tree, being an agreeable sort, was glad to oblige not only the car, but also several lucky people at SLAC whose cars were parked in the lot just below the tree. The little red car, with very good luck, ran into an oak instead of a truck. The grass was slippery and damage was nil, so red car was merely towed back up the hill. The oak tree was staunch and stood brave for the part — he is now recommended for the SLAC purple heart.

Two Retire in June

Dr. Panofsky congratulating Pat Kilpatrick upon his retirement.

"Pat" Kilpatric

The retirement of J.C. "Pat" Kilpatrick was feted at a supper June 28 hosted by the Panofsky's. Pat is leaving the position of Group Leader of the Electronics Shops after nearly ten years at SLAC and after nearly 100 profitable poker games.

Pat was born at the head of Grand Traverse Bay in the wilds of upper Michigan. At the age of 16 he joined the Western Electric Company to perform installation and maintenance of toll and central office telephone equipment. During the 1920's, he moved to California to take a similar position with the Pacific Telephone Company.

From 1930 until World War II was underway, Pat was part of Hollywood's heyday. He was employed for 12 years by Warner Brothers Studios where he designed and installed sound recording and reproducing systems for motion pictures.

As the war began, Pat joined the University of California Radiation Laboratory's Electronics Department. Dr. E.O. Lawrence was beginning the development of the electromagnetic system for separating Uranium 235 from uranium ore. When it was decided in 1943 to install the system at Oak Ridge, Pat and his wife moved to Tennesee where he became manager of electronics installation and maintenance for the system.

It was at Oak Ridge in 1944, that Pat became both a grandfather for the first time and a father for the second time, all in the same month. While his daughter Jane was giving birth to Pat's first grandson, Pat's wife, whose name is pronounced (but not spelled) "Magee" with emphasis on the second syllable, was giving birth to their daughter, Maria.

During their two-year tenure at Oak Ridge, Pat often had to make trips to Chicago both to check on subcontracts and to obtain replenishment of the dry-county installation's beverage supply.

After the war, the family returned to UCRL where he remained until 1959. During this period Pat worked on several accelerator projects including the 184-inch cyclotron, the 40-foot Linac, and the Bevatron. His last 5 years at UCRL were as Head of the Electronics Engineering Department at Livermore.

In 1958, Pat and a few colleagues founded their own electronics company in Livermore, a company of which he was Vice President and General Manager for nearly 3 years.

It was in 1961 that the family moved to Robin Hood Lane in Los Altos and Pat first set foot in the old "M" buildings where he started in as systems coordinator for Test Stands. He became Group Leader of SLAC's Electronics Assembly and Maintenance Group in 1964.

The Kilpatrick's daughter Maria (Mrs. John Henning) lives in San Jose with her husband and Pat's two young grandsons, Eric and Adam.

Very shortly, Pat and his Mrs. will be starting out on a protracted and leisurely trip through Mexico and Central and South America. As Dick Neal has put it, "We will miss Pat personally; he has been a good friend and wise counsellor to many of us."

Dorothy Curran

by Anna Laura Berg

Dorothy Curran retired on June 3 from her position in SLAC's Shipping and Receiving Department after 24 years at Stanford — ten years of this time spent at SLAC.

In discussing her work, she stresses that her job has been a great satisfaction to her always and that she particularly cherishes the association over the years with her co-workers, most of whom, by the way, characterize her as "wonderful."

Dorothy is a native San Franciscan. Her childhood, she says, was a quietly happy one. She recalled picnics on Russian Hill and excursions into Marin County to climb Mt. Tamalpais.

After completing her high school work, Doroth attended Gallagher-March Business College in the City and then became Chief Stenographer in the General Accounting Office of the Pacific Telephone and Telegraph Company. She stayed there ten years. Then, having met and married John J. Curran, who worked at Moffett Field, she moved with him to Menlo Park. To this marriage, one son was born, Jack.

Mr. Curran died in 1947, and in that year Dorothy went to work at Stanford, in Receiving which was then located, along with the Police Department, in the old Corp Yard adjacent to Tressider Union. She moved to the Purchasing Department, lcoated in the basement of Stanford University Medical Center, in 1959 as a Receiving Clerk. During 1962, she and others formed a nucleus of the present Purchasing Department. They were furnished to SLAC on a loan basis until they were formally transferred to SLAC as of September 1962. The others from the University Purchasing Department who made this same move were Dan Littlefield, Wilson Becker, Ralph Dane, Helen Marquardt, Addie Marden and Jean Paist.

Dorothy's ninety-year-old mother lives with her in her Menlo Park home. Her son's family, which includes eight children, will very soon be moving from the East to the West Coast, an event which Dorothy is eagerly anticipating.

Dorothy says she is not a "joiner" and that she presently has no travel plans. She has many things to "catch up on" around her home and garden, so her retirement, to begin with at least, will consist of quiet enjoyment of her home, listening to music, and looking after her mother.

Our best wishes go with Dorothy in this new phase of her life. Her cheerful spirit will be much missed by those who have long worked beside her.

Dr. Panofsky presenting Dorothy Curran with a "beam tree" at a lunch June 3. From left to right, F.V.L. Pindar, Dr. Panofsky, Dorothy Curran, Betty Rowe and Ralph Hashagen. Forty others attended the lunch.

Spanish Surname Group Forms

by Ray Ynegas

Spanish surnamed employees at SLAC have been meeting in recent weeks to organize a mutual assistance group, one which will serve not only to keep open the lines of communication between the minority group members and management but also to bring to light the needs of our people.

Of prime importance on the agenda are training, job openings, and an opportunity to advance professionally and socially in a highly technical society based on individual ability and not on color, creed or political viewpoints.

Needless to say the group activities and/or discussions will serve to enhance the individual's "identity" and to bring together those employees who have forgotten that they have "Latino"—based roots.

Paul Regalado and Ray Ynegas are heading the group and its functions. All Latinos are urged to attend meetings and offer assistance and/or suggestions for the betterment of our people. Efforts by all SLAC employees will be greatly appreciated.