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 stage, 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 pathway 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 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.

Involvement Corps

The Corps was organized by an ex-militant black man, Scooter Akins, and a middle-class white man, Ellisworth Calver, 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

SLAC

CONTEST 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 prepare 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.

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 3 and the machine ran for about 8½ weeks. During that time a total of 32 experiments (including test and checkout runs) were conducted. A total of 5452 experimental hours were logged and almost 2 million bubble chamber pictures were taken in SLAC’s 40 and 62 inch bubble chambers, a new record. (For more on bubble chamber operation this cycle, see the feature article on fast-pulsing the 40-inch chambers.) The “average” experiment received a better-than-average 81% of its scheduled beam hours. In fact beam was unavailable only 9.6% of the time.

One interesting innovation that occurred this cycle was the enhanced usefulness of a computer link between the XDS 935 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 production 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 Operational 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 Hunsaker and a few others in the Central Control Room

Continued to Page 8

INVOLVEMENT CORPS

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(to be continued on Page 7)

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 paycheck 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

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(to be continued on Page 7)
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 film. Berkeley had agreed to surplus a machine that could be used to process 70 mm film. 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.

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 they will owe at the end of the year, and gives advice as to how they may correct the problem now by increasing their withholding rate. Copies of this Internal Revenue Service publication are available in the Employee Relations Office.

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 use."

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 Telephone Corp., and Pacific Telephone) will be setting up booths.

Each organization trains two outstanding high school students to put on a 15-minute presentation 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 June from Cupertino High School and plans to attend either U.C. Santa Cruz or Stanford, beginning in the fall of 1972. Possible majors are anthropology and biology. 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 to 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 May 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, 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.
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 push as often as 18 times per second," This would make possible some advanced kind 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 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 diffusively by energetic photons.

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 photon interacts with a proton in the hydrogen-filled 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 11 GeV each, and only those which can contribute to diffusive production are interesting, as mentioned, these continue along at somewhat reduced energy almost straight ahead. To eliminate picture-taking of nondiffusive 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 chamber. The technique is to feed spectrometer data 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 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 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 (0.04 inches). The photographic yourself 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.

Letters to the Editor

Dear Editor:

The days when names were OOG - A&A and RARP 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 courses), taught Sunday School, acted as consultant to the town's legislature, sang in church, and other small items kept him busy.

Now - in these 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 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 anti-submarine propaganda 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, he assure him, hit effort was not even worth the paper his words were written on.

Charles Xavier Kistner Group

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

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

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 45 10-by-20 foot 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 Mouton, Associate Director of the Administrative Services Division and Bernie Lighthouse, Personnel. Helping with site selection were Bob Good, Plant Engineering, and Harry Sanders, Director of Planning at Stanford. Approval was obtained from the AEC.

Marie Arnoldl 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 the Plant Office staked out the garden sites (see the photo).

Want Ads

MOVING

SAILBOAT: 13 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 convy, $1100 ex cond. (Call Don - 948-0130)

(Slack the "Striped-down" view of SLAC's vertical 40-inch diameter bubble chamber.)
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 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 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 and 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 — curiously about himself, his immediate surroundings and the universe. Curiosity is one of the elements of life which give it substance and meaning, and one of the major ways to satisfy human curiosity is through the pursuit of science — the exploration 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.

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 the fabrication of 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 100 are devoted mainly to basic research. Of the remainder, about one-third are devoted to industry and 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.

Radioisotope production

Two-thirds of all radioactive nuclei discovered via accelerator reactions. However, 80% of the cost now produced by reactors. This site appears to be changing, especially a medical area to which we shall return. Market statistics and prediction $60 million for the sale of radioisotopes follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Basic radionuclides</th>
<th>Radionuclides</th>
<th>Radiochemicals</th>
<th>Radipharmaceuticals</th>
<th>Sealed sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>10 11</td>
<td>12 14</td>
<td>32 40</td>
<td>5 6</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>59 71</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

The point is that the sale substantial and the rate of increase is large. The present market for cyclotron-produced isotopes is million dollars per year, and increasing. It is estimated that a mark about twenty cyclotron facilities develop for radioisotopes by 1975.

Power production

Accelerators have played and continue to play a critical role in developing power sources based on nuclear fusion. This goes to the heart of problems of conservation of fossil fuel and environmental pollution and the quality of life. Here are a few examples of nuclear cross-section measurements contributed:

1. Careful measurements of the neutron capture of fissile for showed that a entire fuel blanket water-cooled plutonium-tungsten reactor would not be feasible as breeder reactor, thus preventing the waste of hundreds of millions of dollars.

2. By years ago, I published a table on the interaction of fast neutrons and lithium, which showed that a certain thermonuclear reactor could operate the D-T cycle (which is much easier...

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

A list of some of the applications of accelerators, including investment costs (taken as a survey of the 1969-70 survey report of the Accelerators to the Nuclear Science Panel of the P.S. 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 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 because the required temperature is lower) and produce more tritium than is consumed.

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 in that reactors which make best use of our uranium resources. Annual fuel cost uncertainties, resulting from nuclear data uncertainties, are about $500 million in 1965, $700 million in 1990, and $730 million by the end of the century. Accelerators can clear these uncertainties.

Neutrons and gamma-ray cross-sections are destined to play a crucial role in reactors for space applications, for desalination in the agronomic-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 the materials. The 270 accelerators in private industry, 45 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, plastics and 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 to defend

The role of accelerators in defense is not as great as it was 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 licensing of fissileable 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 power at the rate of 200 TW, and it is likely, sufficient for tens of nuclear weapon per day. Plutonium is now a commercial commodity, subject to government control. To monitor the 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 fissileable materials. Effective verification procedures are essential to the implementation of any agreement which involves production and distribution of fissileable 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 especially important in pediatric and obstetric cases.

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

The new Brookhaven linac and LAMF can produce substantial amounts of 107Zr. Preliminary studies indicate this nuclide may become a routine scanning agent to be used in all male, over middle age, for early detection of prostate cancer. No such agent exists at the present time although prostate 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 fissileable materials on the other. New types of accelerators are needed for uses in every sphere from the 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 LAMF, 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 incorporated 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.

Let you worry that higher energy machines be left out of medical applications, let me assure you that this is not so. The reason for this — LAMF in USA, TRUMP in Canada, and SIN in Switzerland — are scheduled to provide negative pions for radiotherapy.

The problem of determining the beam energy necessary to achieve stopped pions uniformly and at a prescribed depth in the tumor volume is solved 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. Knopp, and D. Hagerman have given thought to this question and have arrived at the concept shown in the drawing. A 3 MeV pressurized Cockcroft-Walton feeds protons into a 400 MHz drift-tube linac which in turn ejects into a 1200 MHz side-coupled linac. One result 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 in the future, the 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 lifetime, the emergence of a mail order catalogue which would list:

1) Electron linacs (1-100 MeV) for the inspection and inspection 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, with negative pions, and mu-activation analysis for medical diagnosis;
4) Electromagnetic (3-100 MeV) for radiation therapy 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.
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 on the work of the laboratory's policies and practices in regard to the employment of minorities. These opinions were obtained in a meeting with 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 the plan of personal interviews based on a standard set of questions.

Interviewees were selected at random from the employees and appointment 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 a total of 36 interviews were conducted. Additionally, the Committee met with a number of people who had supervisory positions and asked to discuss the Committee, and with groups of supervisors, training program and work study staff.

By the time these initial interviews had been completed, MAC concluded that because the viewpoints and experiences of different laboratories were not very different, it was not worthwhile to extend the interviews to more laboratories, 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 harmonious consensus:

(a) There is a need for 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 interviews are active in attitude surveys and may have heard from the interviewees.

(d) Almost 20% of the people contacted for interview appointments decline to do the interview. No effort was made to secure the refusal or reasons for the refusal, but it is possible that those who perceived the interview as being of some value contrary to their own opinions would be more 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 appeared. Each was scored by those MAC members who did not know anything about what the person being interviewed was doing. The questions 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 did not know too much about SLAC's minority program. In the discussion we found that the 'few examples' and the general method of communication do 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 communication 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 agreed to the same opinion, generally being satisfied with their own working situation and being supportive of the laboratory's policy in regard to minorities. Most employees felt their laboratory's pattern of advancement was competitive (score 3.4) and most felt minority employment did not have sufficient opportunity for promotion (score 2.9), 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 the 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 often emphasized that promotions had to be based on merit. The interviews were of sufficient length to allow us to go beyond the list of questions and discuss other items 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 requirements recently imposed on SLAC by the University has caused concern among some employees. We should recall that in the length of the interview program that diversity of the new system is 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 the new requirements for original pressures for detailed job description, job classification, and rigid salary scales came as a shock to the minority groups, we feel, however, that the organization which has been developed by the University is likely to evolve new barriers to employee mobility.

The potential problem is that not only are the employees in a group classified as to job description, but the jobs those employees fill are also classified. For example, if a technician is to be promoted from Tech II to Tech III not only must his skills have increased, but the group leader must also certify 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 the new level, but the slot he occupies in the group must also be advanced to the new level. SLAC, in such a way as to antagonize other employees. The problem seems to be that the written requirements for Staff Associate are based on an excessively narrow interpretation of Federal law.

We have also found that SLAC's mechanisms 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 the job, their present supervisor may feel that they have been "disloyal" and "make things hard" for them. Unfortunately, this seems to be more than a little bit of truth in these worries. This is a particularly unfortunate state of affairs since it defines 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. Some groups in the laboratory get around this problem by operating their own unclassified 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 person moved inside or outside of their own group.

To this point we have not yet added anything about the existence of racism in 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 is a concept which is black and white, present in other groups or cultures. To most members of minority groups, the definition of racism is not that simple and involves much more subtle things. It would be wise to claim that there are no bigots among the employees at SLAC, but those with such attitudes represent a very small minority of the SLAC population.

There are, however, many at SLAC who hold 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 minorities of programs and policies which are based on a view of the world which is unique to the majority culture. Among these programs and policies which are called racism could be described by a less contemptuous word - "narrow interpretation of Federal 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.

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

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 any member of the Laboratory.) 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 received a number of suggestions and is the subject of an article in this issue.

During its first year MAC (John Harris (EFD), Susan Jerome (Public Information), Jim Moss (Group D), Burt Richter (Group C), and Ray Yngvesson (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 Laboratory), Dennis Harris, Jim Ketcher (Crafts Shop), Richter, Willie Roberts (Klystron Group), Janet Schenkel (Plant Engineering), Cornell Watson (Accelerator Physics), and Yngvesson.

Members of the SLAC staff are encouraged to communicate to the Minority Affairs Committee any problems they consider relevant to the committee.

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 Yngvesson (EFD), and Janet Schenkel (Group B). Standing (left to right) are Willie Roberts (Klystron Group), Jim Ketcher (Crafts Shop), and Ralph Gaxiola (Central Laboratory). Not shown are Burt Richter (Group C) and Alex Tsang (Plant Engineering).
...and the Urban Coalition

Continued from Page 6

In order to determine needs of the East Palo Alto community, a survey began July 22 to document minority attitudes toward the Palo Alto community. That segment is most in need of the basic requirements of life — food, medical care, jobs, decent shelter.

The Purpose of the Law and Justice Task Force...
April-May Cycle

Continued from Page 1

Hanselman and Jim Sirois (AOG) worked with Price to implement a newly developed steer-accelerator turn-on program, which worked well. Some of those responsible for the success of the E-beam in Red SLAC A were Roger Miller (Accelerator Physics), Ralph Johnson (AP), Gerry Nelson (AOG), Larry Stein (AOG), and Joan Piccioni (EFD). John Ansborg and Gordon Gilbert (AOG) agreed to a great deal of carefully documented instructional tools for the Beam Authorization Sheet, a set of instructions from Health Physics to the accelerator operator concerning safe operation of the various beams. Ken Crean and his staff from Accelerator Physics installed and tested some new radiation safety electronics, and installed in short order some special-purpose electronics for protection against 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 demands of scheduled and/or maximum use of the available beams.

To summarize, successful operation of the facility is of course vested in a large number of people, working both individually and in groups, to bring to a successful end self-motivated individuality and a coordinated team effort.

Family Day

Continued from Page 1 around the site yourself (if you bring your TDL, 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 Bev McDonald of Data Analysis Department. If you haven't returned your questionnaire to her already, please do so.

**Correction:** The Family Day Questionnaire was prepared in error. Several 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 steady parking places under trees — is it in trees? A red car belonging to a fellow worker at SLAC rolled down the hill behind the castle. Some good fortune - and that same tree where one oak tree above the parking lot. The tree, being an agreeable sort, was glad to oblige by only the quiet spot and several lucky people at SLAC whose cars were parked in the lot just below the tree. The little tree was good luck, a red oak 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 stanch and stood brave for the part — he is now recommended for the SLAC purple heart.

"Pat" Kilpatrick

The retirement of J.C. "Pat" Kilpatrick was marked at a supper June 30 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 tele 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 13 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 radioelectronic system for separating Uranium 235 from uranium ore. When it was decided in 1942 to install the system at Oak Ridge, Pat and his wife moved to Tennessee 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) "Maye" 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 subcontractors 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 with 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's first set foot in the old "M" buildings where he started in as systems coordinator for Test Subs. He became Group Leader of SLAC's Electronics Assembly and Maintenance Group in 1964.

Family Day Program is underway, Pat was part of Hollywood's heyday. He was employed for 13 years by Warner Brothers Studios where he designed and installed sound recording and reproducing systems for motion pictures.

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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 SLAC — ten years of this time spent at SLAC.

In discussing her work, the 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, Dorothy attended Goughgh-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 three years. Then, having met and married John J. Curran, who worked at Moffett Field, she moved with him to Merlo Park. To this marriage, one son was born, Jack.

Mr. Curran died in 1947, and in that year Dorothy returned to work at Stanford, in Receiving which was then located, along with the Police Department, in the Old Corp Yard adjacent to Twaddler Union. She moved to the Purchasing Department, located 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 this past February when they were transferred to SLAC as of September 1962. The others from the University Purchasing Department who joined Dorothy in this same move were Dan Littlefield, Wilson Becker, Ralph Dale, Helen Marquardt, Addie Macdonald and Jean Paul.

Dorothy's ninety-year-old mother lives with her in her Merlo 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 managed to "catch up out" around her home and garden, so her retirement, to begin with at least, will consist of quiet enjoyment of reading, 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.

Spanish Surname Group Forms

by Ray Yneges

Spanish surname 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 Regaldo and Ray Yneges 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 Latinos in this area will be greatly appreciated.®