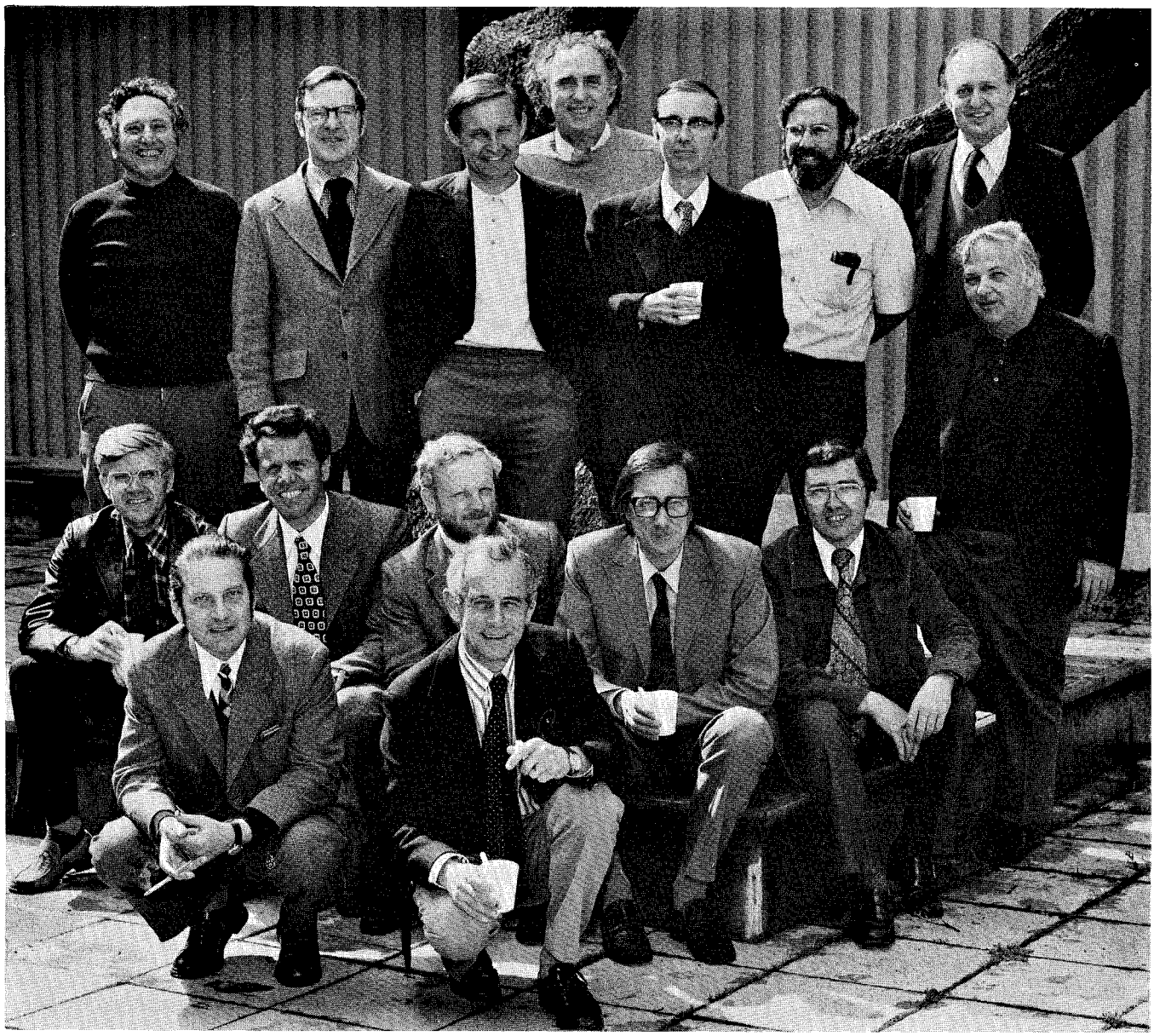
SLAC BEAM LINE

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

Volume 6, Number 4 *April 1975*



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This photo by Joe Faust. See page 2 for a description and for the Contents of this issue.

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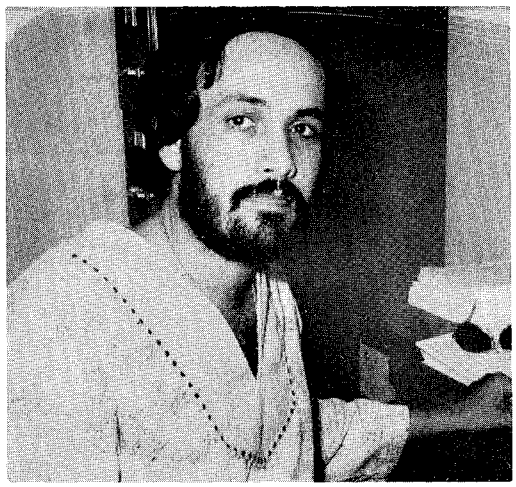
Special Section:

A world community *AWC 1-8*

Cover photo. The cover picture was taken on March 8, the day on which the non-Stanford people shown were visiting SLAC after having attended the *International Topical Seminar on Perspectives in High Energy Physics* (wow) held in New Orleans on March 3-7. This *Seminar* was a continuation of a series of meetings, started about eight years ago, among laboratory directors and senior scientists from the US, from Western Europe, from the Soviet Union, and from some of the Eastern European nations. Japanese high-energy physics interests were also represented at this most recent meeting. The intent of these meetings is to exchange information and to promote international cooperation in high-energy physics at all levels.

1975 SUMMER SCIENCE PROGRAM AT SLAC



--Photo by Carol Colon

This is Dr. Vicente Llamas, who will be the Associate Director of SLAC's Summer Science Program for 1975. Dr. Llamas is an Associate Professor of Physics at New Mexico Highlands University. Dr. Llamas recently provided us with the information about the Summer Science Program that is given in the following article.

1. The Summer Science Program at SLAC is an expression of the Laboratory's commitment to further the education of promising young scientists from disadvantaged or culturally different backgrounds.

2. The SSP was initiated in 1969 as an adjunct to SLAC's existing summer employment program.

3. Since 1969, SSP has had 137 student participants (some of these were repeats). These students have been drawn primarily from among minority students throughout the United States who have shown unusual scientific aptitude at their home institutions.

4. Partial support for SSP comes from the Associated Western Universities, Inc., under the direction of Dr. Victor G. Beard. The balance of the support is provided by SLAC.

5. An essential aspect of SSP is the placement of each student with a SLAC technical group which can provide meaningful experience in the Laboratory's research and development activities. *Groups from the Research and Technical Divisions who are interested in supervising an SSP student are invited to submit a Personnel Requisition that describes the work they could provide and the skills that such work may require.* Please send these requisitions to Gerry Renner in the Personnel Office (Bin 11).

6. The work of matching students to available jobs will be done by the following SLAC people:

Ron Koontz, x2527 (Technical Division)
Rich Blumberg, x2692 (Research Division)
Bill Kirk, x2605

Please feel free to discuss any questions you may have about the Program with any of these people.

7. The SSP work experience will be supplemented by an academic program, which will include seminars in Modern Physics, Mathematics and Computer Science. These seminars are usually taught by visiting scientists who are associated with the Program. Some are given by minority professors from various universities throughout the United States.

8. In 1975 the SSP will again be directed by Dr. Ernest Coleman, who is presently the Head of the Central Laboratory Research Section of ERDA.

FIRE DAMAGE IN THE WEST EXPERIMENTAL AREA AT SPEAR

On Sunday evening, March 16, there was a fire in the west experimental area at the SPEAR storage ring. The fire began in one of the pulsed high-voltage power supplies that is used to drive some of the particle detectors (muon chambers) associated with the large magnetic detector. The fire destroyed the four pulsers that were housed together in two adjacent electronics cabinets, and also severely damaged parts of the muon chambers themselves and some nearby cabling. (see photos). Neither the SLAC accelerator nor the SPEAR storage ring were damaged, although both were automatically shut down by the alarm system that sensed the fire. Accelerator operations were resumed the next day, and SPEAR was turned back on for experimental use on March 27. The collaborative LBL-SLAC experiment which uses the large magnetic detector is expected to be delayed until about April 8, when the detector should again be ready for operation.

An early estimate of the damage incurred is about $20,000 for new materials. The *Beam Line* will follow up the repair work with another story within the next month or two.

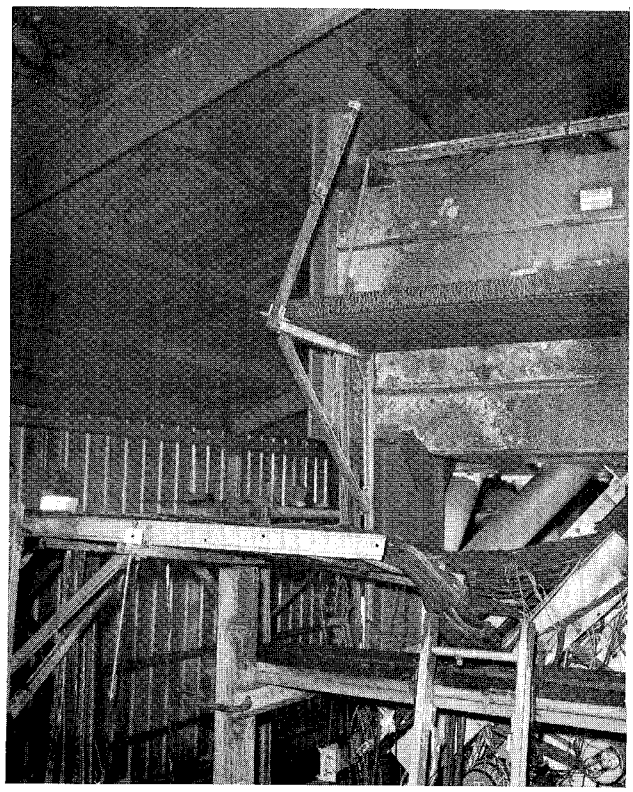


Photo by Walter Zawojski

This photo shows the north end of the large magnetic detector in the west experimental area at SPEAR immediately after the fire on the evening of March 16. The roof of the experimental building is blackened and charred. The wooden platform is also charred, but the prior treatment of the wood with a fire-retarding chemical apparently prevented it from burning. The detection apparatus (muon chambers) located on top of the detector was severely damaged by the fire, as was the bundle of phototube cables shown in the foreground.

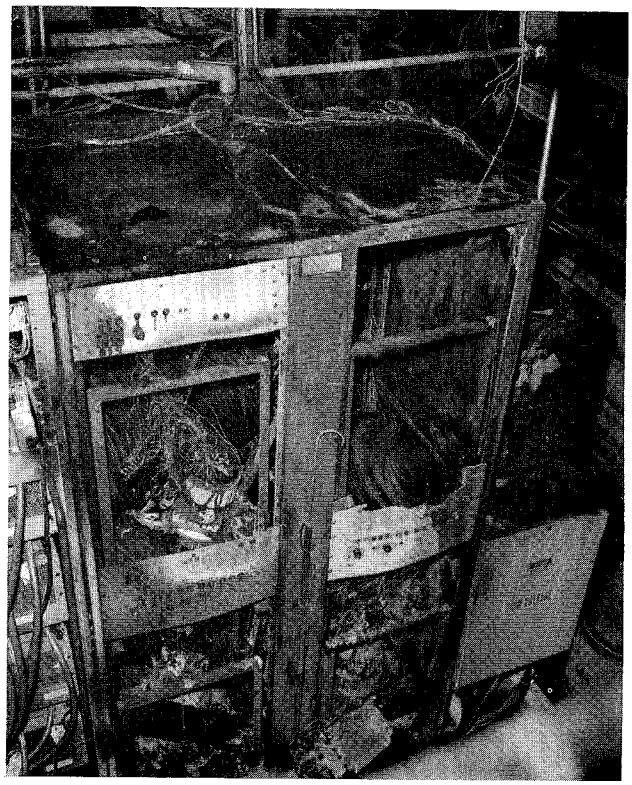


Photo by Walter Zawojski

The fire started in one of the pulsed high-voltage power supplies (pulsers) that is used to operate the muon chambers. This photo shows the two electronics racks in which the pulsers were located. Each rack held two pulsers, and all four of the pulsers were completely destroyed. The other electronics in the cabinet on the right was badly damaged, while that in the left cabinet required only a thorough cleaning to put it back into operation.

The SPEAR storage ring went back into operation on March 27 and ran without difficulty. The large magnetic detector is scheduled to resume operation on April 8. Some of the pulsers used for other purposes will be switched over to run the muon chambers while new pulsers are being built.

ANDY CHAPIN RETIRES

In 1927, the year that Lindbergh flew the Atlantic, Andy Chapin built and flew his first airplane. He was 15 years old at that time, but it was all perfectly legal because the Feds didn't get around to issuing flying licenses until two years later. Aircraft have remained Andy's vocation or his avocation ever since.

In 1928, Andy worked on a fleet of Fokker D-5's that were left over from World War I, replacing their rusty Mercedes engines with new Hall-Scott's. Renovating the Fokkers was a job that some fellow named Howard Hughes wanted done for a motion picture he was filming, *Hell's Angels*, on the tide flats of Oakland.

Andy (his nickname was "Ted" back in those days) next worked on racing designs for a pilot named Keith Ryder, starting with plywood-and-fabric and then evolving into a design with metal fuselage and plywood wings that had the world's first retractable landing gear. He continued his work on a plywood flying wing until the crash--economic, that is, not aeronautical --after which he took on the job of flying and maintaining a DC-2 for the Aviation Division of Standard Oil Company.

In 1935, Pan American Airways soaked up the old pilots from Standard Oil, and Andy became Pan Am's Chief of Maintenance in Honolulu. During World War II, the military did the same thing to Pan Am, and Andy found himself Chief of Naval Aircraft Maintenance in San Francisco, responsible for the care and feeding of the Navy's PB2Y3's and PBM's. It wasn't all ground school for Andy, though; he also flew in the South Pacific and ferried planes to Accra (Africa) on their way to Karachi (India) and thence over the "hump" into China.

(Among those who also traveled the same route from Pan Am to the Navy and eventually to SLAC are Ray Jones, Ed McNerney, John McKee and John Grant--whose brother-in-law was at one time Andy's assistant.)

As a co-pilot for Honolulu Oil Company after the war, Andy carried some big names, such as Herbert Hoover and his son. The connection that led to this flight was the fact that Hoover had been a Stanford classmate of Honolulu Oil's president, a man named Bert Matty.

In 1949 Andy decided to relegate his flying to the status of a hobby so that he could spend more time with his family (the eldest of his three sons was recovering from polio at that time). He went to work on nuclear devices at the University of California, where his first job was with a Dr. Suricho Sagane of Japan and with a young physicist named Panofsky. Andy handled magnetic measurements and high-speed

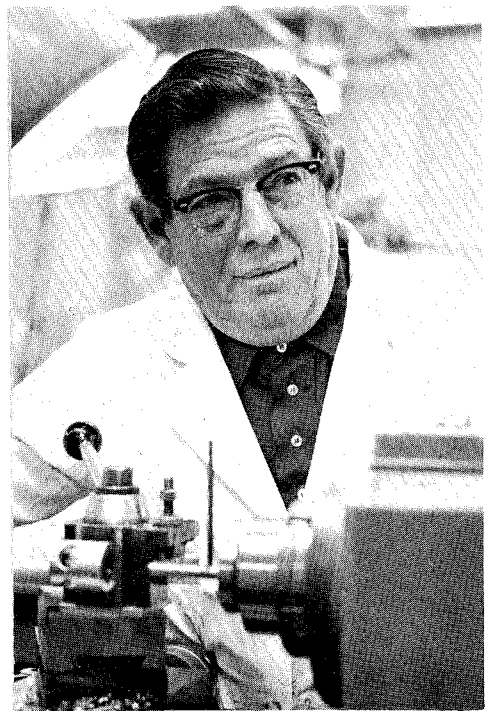


Photo by Joe Faust

photography in this particular work. The photography took him to Camp Mercury, Nevada, where he shared quarters with Bill Brobeck (E. O. Lawrence's Chief Engineer) and with Herb York (who later directed all of the Defense Dept.'s R&D activities).

The first steam engine ever built for an aircraft was made by a man named Charles Bessler. After Bessler bought the old Doble Steam Car factory in Oakland, in 1955, Andy Chapin used the facilities of that plant to build the second aircraft steam engine; plane and engine are now in the Smithsonian Instutute. Andy also rebuilt three "Irwin Meteor" planes, one for the Oakland Museum, one for the Smithsonian, and one that was bought by Boeing Aircraft. The "Meteor" was the first aircraft that was mass-produced ($1200, flyaway).

The General Electric Co. at one time had a plant on a corner of the Stanford farm that later became the site of the present Varian Associates. Andy Chapin and Evan Marshall of SLAC were the first two technicians hired by G. E. to work on low-noise radar tubes, eventually switching over (with Larry Didier of SLAC) to klystron work. After that, Andy's work shifted out to the G. E. installation at Vallecitos, which is where he first met Bill Lusebrink.

Andy's career at SLAC began in 1963, when he was hired by Ken Copenhagen. His first assign-

(continued on page 5)

ment was to Leroy Schwarcz in the Research Division. That assignment lasted for twenty minutes before he was reassigned to Ed Garwin. When Andy is asked why he only lasted twenty minutes with Leroy, he gives that deep chuckle of his and says only, "Leroy is a very smart man."

In more than a decade with Garwin's Physical Electronics Group, Andy has worked with everything from wood to tantalum and from linen to cyanoacrylate. He has built instruments, cryogenic apparatus, optical equipment, electronic gadgets of all kinds, and you-name-it.

What is it like to work with Andy Chapin? Well, the following scene, although fictitious (to protect the guilty) is probably pretty true to life:

Andy (poking one finger at a drawing): Now this screw was the hard one. It says *(peering at drawing)* one-half deep. That takes it halfway into the quartz window. *(A quick glance with a pleased smile.)* I had to make a special tap for that.

Engineer: Oh, no! You tapped into the quartz? Good Lord, that's terrible! That's my error. That ruins the window and the case, too. We'll have to start all over. *(His ears are turning red.)*

Andy: Maybe you wanted it down here where it would miss the window? *(Points with finger.)*

Engineer: Oh, Lord, yes! How could that happen? The window doesn't show in this view, that's why. *(Entire face is now red.)* It'll take four weeks for a new window!

Andy: Yeah. Well *(sly grin)*, down there's where I put it. I would have checked with you but you weren't here yesterday and I knew you wanted it today. *(Lifts drawing to reveal polished steel and crystal.)* Here, it's all ready.

Engineer (slowly deflating toward the floor): Ah-h-h-h-h-h-h!

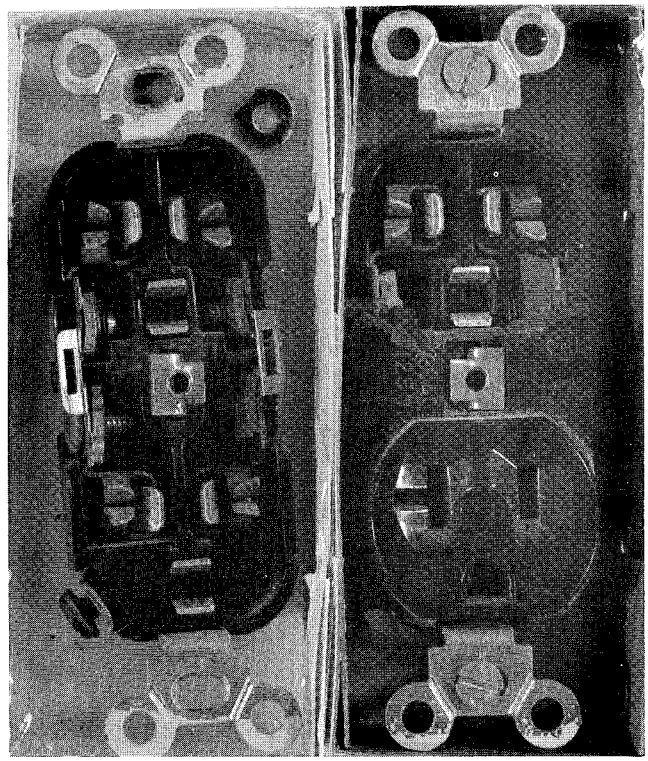
Andy's story is so interesting that we haven't yet got around to mentioning his recent retirement from SLAC. But even retired, there will be no lack of things for Andy to do. For example, he and a friend (a former RAF pilot) are presently engaged in building two Great Lakes training planes--open cockpit biplanes.

On March 26 a group of Andy's coworkers and friends from SLAC got together with him for a farewell luncheon. We presented him with a plaque on which was mounted a piece of polished agate and a gold-plated spike. And engraved on the plaque was the punch line:

With a rock and a spike Andy can make anything.

He can, and he has, and he will again.

--Charlie Hoard



DON'T FRY SMALL FRY

The 120-volt receptacles shown in the photo were recently removed from two hallway locations in the Central Laboratory at SLAC. The damage probably came from such things as floor-buffing machines, furniture being dragged along the halls, and whatnot. Most everyone over, say, six or eight years of age would recnize that receptacles in the condition shown are *dangerous*, but that doesn't completely solve the problem. Younger children are often present at SLAC; in fact, the Central Lab hallways sometimes look like "Romper Room" on the weekends.

At least two useful things can be done: The first is that metal cover plates can be substituted for plastic plates in order to give more mechanical protection to the receptacles. That idea is already starting to be acted upon.

The second useful thing is for people to report damaged electrical stuff when they see it. Who should report? Well, how about

YOU

Who should the report be made to? Well, any one of the following would see to it that the problem got fixed:

1. Plant Maint. & Util. x2371
2. Plant Engineering x2524
3. The local Building Manager
4. Your Group Leader
5. The nearest group secretary
6. Safety Office x2221

Please don't be shy. Try somebody.

WOMEN IN NON-TRADITIONAL JOBS

--NOTES ON A DEPARTMENT OF LABOR SEMINAR

During the next ten-year period some women are going to have to change career aspirations.

Although at the present time the Bay Area work force is 41.3% women, these women are concentrated in a handful of "traditional" occupations, *i.e.*, clerical, teaching, nursing, social work and such. Mainly because of the poor economic outlook for the next several years, and since the majority of women (married and single) work because of economic need, the work-force participation rate for women is expected to continue to grow. There will not be sufficient traditional jobs for women and, at the same time, the Department of Labor predicts shortages of workers in many of the "men's" jobs. Many low-level or routine clerical jobs can be done more efficiently and cheaply with computer programs; teaching is already overloaded. For this reason the Department of Labor in the period from 1975 to 1985 is embarking on a push directed at employers and unions to get more women started in apprenticeships.

It is also felt that only by getting substantial numbers of women into non-traditional jobs can the relative salary distance between men and women be lessened.

Several years ago, the average salary paid to a woman was about 60% of the salary paid to a man; this distance has now widened so that in California the average woman's salary is now around 50% of the average man's salary. A fully employed woman who has completed high school averages less than 60% of the salary paid to to a fully employed man who has not completed elementary school. A woman with four years of college makes about the same amount of money as a minority male with a high school education, which is about the same as the salary paid to a white male with an eighth-grade education. Although the woman in a "man's" job still makes considerably less on the average than a man in the same job (especially in the more highly paid jobs), the woman in such a non-traditional job will nevertheless make a great deal more money on the average than a woman in a more traditional job. For example, a journeyman auto mechanic in the Bay Area makes from $8.50 to $12.50 per hour; in addition, salary discrimination in the crafts is less than in most other occupations.

It should be noted that there have actually been women working in the crafts since as early as the 1910's; however, except for war-time periods, there have been no significant increases in the number of women working in such jobs.

Women need better career-planning assistance; mis-education of women needs to be stopped, preferably at the elementary-school level.

Most six-year-old girls still think that girls grow up to be nurses and boys grow up to be doctors. High school girls, we are told, still think that they are just going to work a few years, then get married and have children and live happily ever after. As a child she played with dolls and helped at home by washing dishes, while her brother put together model airplanes, played with mechanical building sets, helped his father fix the car, and used a hammer and saw to build things. In high school she took typing and home economics classes, while her brother took shop, math and science classes. In college, she was a Liberal Arts major. Her experiences have been so limited that she has no conception of what is involved in most jobs and is not prepared for any. Unable to visualize herself as a successful printer, florist, mechanic, electronics technician, die-maker, etc., she won't consider an apprenticeship. So she goes to work as a clerk, because that's the only job she can get (and besides, it will only be for a few years).

But the facts are different: 9 out of every 10 girls now under the age of 18 will work sometime during their lives; and even if the dream does come true and she does get married and so forth, she will spend 20 to 25 years in the work force. In addition, the chances that she will wind up supporting herself and her children are high; and, as a matter of fact, the divorce rate for non-working wives is higher than for working wives. In her thirties and forties, she realizes that a lifetime of typing is not particularly satisfying, and she wants to make more money anyway. But change at this point is difficult. Since she is working because of economic necessity, taking a cut in pay in order to begin a more satisfying and eventually higher paying job is difficult, if not impossible. Keeping her present job and trying to take classes besides is also difficult because she has more demands on her time outside of work than a man (about 25 hours/week for housework plus the time that is needed for her children). Thirdly, she has no confidence in her ability to succeed in a "strange" job,

not having seen other women in such jobs, nor having had much experience with tools--and besides, people will think she's not "feminine."

Many, perhaps most, of the women successfully entering non-traditional jobs, despite the many difficulties (some of which are mentioned above), do appear to be women past 30 years of age. More schools need to embark on programs (like Berkeley's "Change for Children") to counteract some of the mis-education that girls are barraged with from Readers and other school books, from advertising, and from television. Realistic counseling is needed, not just for school girls but also for women already in the job market. And of course parents need to make special efforts to enlarge the experiences of their daughters and to ensure that their daughters are exposed to models of women who are successfully doing non-traditional jobs, if their daughters are to avoid spending years working at unrewarding, low-paying, dead-end jobs.

Employer attitudes need to be changed.

The myth that most women work for "pocket money" is still believed by some people, despite all the evidence to the contrary. Other myths keep women from being considered for promotion and for training opportunities, since the woman worker is considered by many employers still to be either working for just a short time or somehow less "serious" about her work than a man is. And of course employers (both men and women) have been exposed to the mis-education discussed earlier and simply can't conceive of women breaking societal taboos and working in certain jobs.

Women must be more aggressive in finding and getting non-traditional jobs.

Having the legislation is not enough; women must press for enforcement. Women should not expect the higher paid jobs to be simply handed to them; more militancy is needed on the part of women if significant numbers of them are to enter the non-traditional jobs.

--Marie LaBelle

We have been informed by DEC that a bug in the normalization algorithm used in three MACRO instructions (FADL, FSBL and FMPL) can cause a FORTRAN double-precision compare to give incorrect results. A double precision compare should be accurate to 16 digits. This bug can cause the compare to give incorrect results in the ninth digit. We will notify all users as soon as we receive a solution to the problem from DEC.

--Memo from the computer service division of the Harvard Business School

Our digits are accurate all the way up to 10.

SLAC VEHICLES TEST WOOD ALCOHOL

If Indianapolis race cars can run on wood alcohol, why not our own cars? Well, the Indy cars are specially designed to run on 100% methanol (another name for wood alcohol), whereas a conventional car might run satisfactorily with methanol-gas mixtures up to about 15% methanol. The reason for the interest in such mixtures is that methanol can be manufactured from coal, wood and agricultural wastes--and even from municipal garbage. Any substitution of methanol for gasoline would reduce the consumption of that increasingly expensive fuel, and there are also certain fringe benefits. Methanol has an octane rating of 98, so adding it to gasoline will raise the overall octane rating of the combined fuel. With only moderate additions of methanol, remarkable improvements in car performance and in reduction of undesirable emissions have been observed.

Since this is so, why aren't gas stations selling a mixture of methanol and gasoline? For one thing, the present production of methanol is only a drop in the bucket compared to gasoline production. For another, the automobile manufacturers haven't yet got around to determining standards for methanol-gasoline mixtures. So for the time being at least, no one seems eager to start building any large-scale methanol plants.

What does all this have to do with SLAC? Well, we've been asked to reduce our gasoline consumption by about 15%, and this fact, together with the attractive fringe benefits, has resulted in a test program that was started about two months ago by the SLAC Plant Office. During this time 7 of the government vehicles assigned to SLAC (pickup trucks) have been running with 10% methanol added to the gasoline. The test vehicles were not modified in any way, and so far there have not been any problems--in fact, it would be difficult for the drivers to notice any particular difference.

The plan is to monitor the performance of these test vehicles for a period of six months and then to make a detailed comparison of the results with those previously obtained with pure gasoline. We'll report the completed comparison in a future issue of the *Beam Line*.

As an auded note, grain alcohol (ethanol) would work just as well as methanol, but ethanol finds other uses in such things as your favorite cocktail, while methanol is a deadly poison.

--G. Ratliff & H. Weidner

The American oil product for the past six years is estimated at about 11,640,670 barrels. In 1859 the product was 325 barrels.

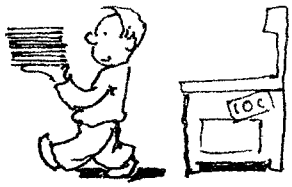
--*Scientific American*, May 1867

NOTICES

Attn: OWNERS OF CARTRIVISION VIDEO RECORDERS. Let's get together to discuss problems--interfacing, etc. Contact W. Johnson or L. Genova at ext. 2341 or Bin 54.

Attn: GO PLAYERS. If you are interested in finding other Go players, please meet in the northwest corner of the Cafeteria between 12:00 and 12:30 on Tuesday, April 15. Or call Bob Beebe (ext. 2428) or Tom Meyer (ext. 2457).

Copy Machine: There is a copy machine now available on the SLAC site to meet your personal copy needs. This machine will copy paper sizes up to 8½" by 14". The machine



is located in the Shops Dining Room, between the Fabrication and Electronics Bldgs. The cost is 10¢ per sheet.

Attn: SHARE A KILN? After a good response to our last ad, we're still looking for a few more SLAC people interested in sharing a hobby kiln at SLAC. Please contact Tom Hostetler at Bin 55 or ext. 2157.

SLAC Beam Line (Bin 80)
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Stanford, California 94305

Published monthly on about the 10th day of the month. The deadline for material to appear in the next issue is the 1st day of the month.

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CREDIT UNION AT SLAC?

For the past several months, the Stanford Federal Credit Union has been sending a representative to the SLAC Cafeteria on Thursdays, from 11:30 to 1:30, to meet with any SLAC person who had some business to transact or who wanted to obtain some information. This arrangement has not produced much action, so the Credit Union had decided to cancel it and try some different approach. They would like to receive any suggestions that SLAC people may have about a better way to handle this matter. If you have any suggestions, please phone them in to

Irene Boyd
ext. (8)7-1116

at the Credit Union sometime within the next week or so.

SERA: A REMINDER

Since mid-1968 the SLAC Emergency Relief Association, SERA, has been an active partner in the SLAC community. In its six and a half years of existence, SERA has provided emergency financial aid to 33 members of SLAC: persons who through no particular fault of their own have experienced an emergency situation which threatened their ability to bear the essential costs of living, but for whom all other sources of financial aid had been exhausted.

The work of SERA is carried out by three Directors who are elected by the membership. The present Directors are

President - Connie Logg (Group A)
Vice Pres.- Jim Ketcher (Dir. Off.)
Secretary - Ed Keyser (EFD)

If you are new at SLAC, or if you have any questions about SERA, any of these people would be pleased to tell you about SERA.

SERA has approximately 200 contributing members, and unlike most assistance groups SERA is almost 100% efficient; there are no paid employees, and the overhead is minor.

The present Directors of SERA would like to extend their deep appreciation for the support and confidence of the membership. To those at SLAC who are not members, we encourage your consideration of SERA as a working community organization that can provide help to a fellow worker when help is really needed.

--Ed Keyser

Beam Line Dist.													
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V. Weisskopf, *Physics Today*, November 1974: I always feel a little uneasy when people discuss the scientific achievements of one region compared to another. . . . There is only one science, and one science community. I would like to make a very strong plea to consider the scientific community as

A World Community.

Aerial view of the European Organization for Nuclear Research (CERN) looking toward the city of Geneva, Switzerland, in the middle distance and the French Alps beyond. The dashed circle indicates the location of the SPS, a 400 GeV proton synchrotron that is expected to begin operating in 1976. The wedge-shaped area to the right of the SPS is CERN "Lab I," the site of the 28 GeV PS machine and also of the proton-proton colliding-beam storage ring called the ISR. The work at CERN is supported through the contributions of 12 European Member States. CERN epitomizes international cooperation in scientific research; it is, by any reasonable standard, the center of the high-energy physics world. (Photo CERN.)

1975 PARTICLE ACCELERATOR CONFERENCE

More than 30 engineers and physicists from SLAC were among the approximately 500 persons who attended the 1975 Particle Accelerator Conference held at the Shoreham Hotel in Washington, D.C., on March 12-14. This conference, which has been held bi-annually since 1965, drew participants not only from government-sponsored laboratories and from commercial companies in the U.S. but also attracted a significant number of accelerator scientists from Canada, Europe, Japan, and the Soviet Union.

Three of the 15 sessions of the conference were devoted to the relatively new conference technique of communicating technical information by means of specially prepared posters. The advantage of this method is that interested conference participants can communicate in detail and at length with the author of a technical report at the site of his poster display, where the posters present the technical results or status of the work in a concise pictorial manner. A second evident advantage of this method is that it allows the presentation of a larger number of reports during the limited time of a conference than would be possible by the usual oral presentations to a large audience.

Another innovation at the 1975 conference was the presence of display booths at which commercial companies were able to exhibit accelerator-related products and to distribute data sheets and literature about their products.

Sessions of the conference were devoted to the following general subjects: (1) collective acceleration and intense beams, (2) controls, (3) beam transfer, (4) radioactivity, (5) cryogenics and superconductivity, (6) engineering and technology, (7) storage rings, (8) meson factories, (9) ion sources and heavy ion accelerators, (10) general uses of accelerators, and (11) beam dynamics. In addition, an enlightening panel discussion on "Medical Uses of Accelerators" was presented during a special evening session.

Altogether 100 papers were presented orally at the conference and another 77 were presented in the poster sessions. An additional 89 papers were accepted "for publication only" and will appear in the conference proceedings.

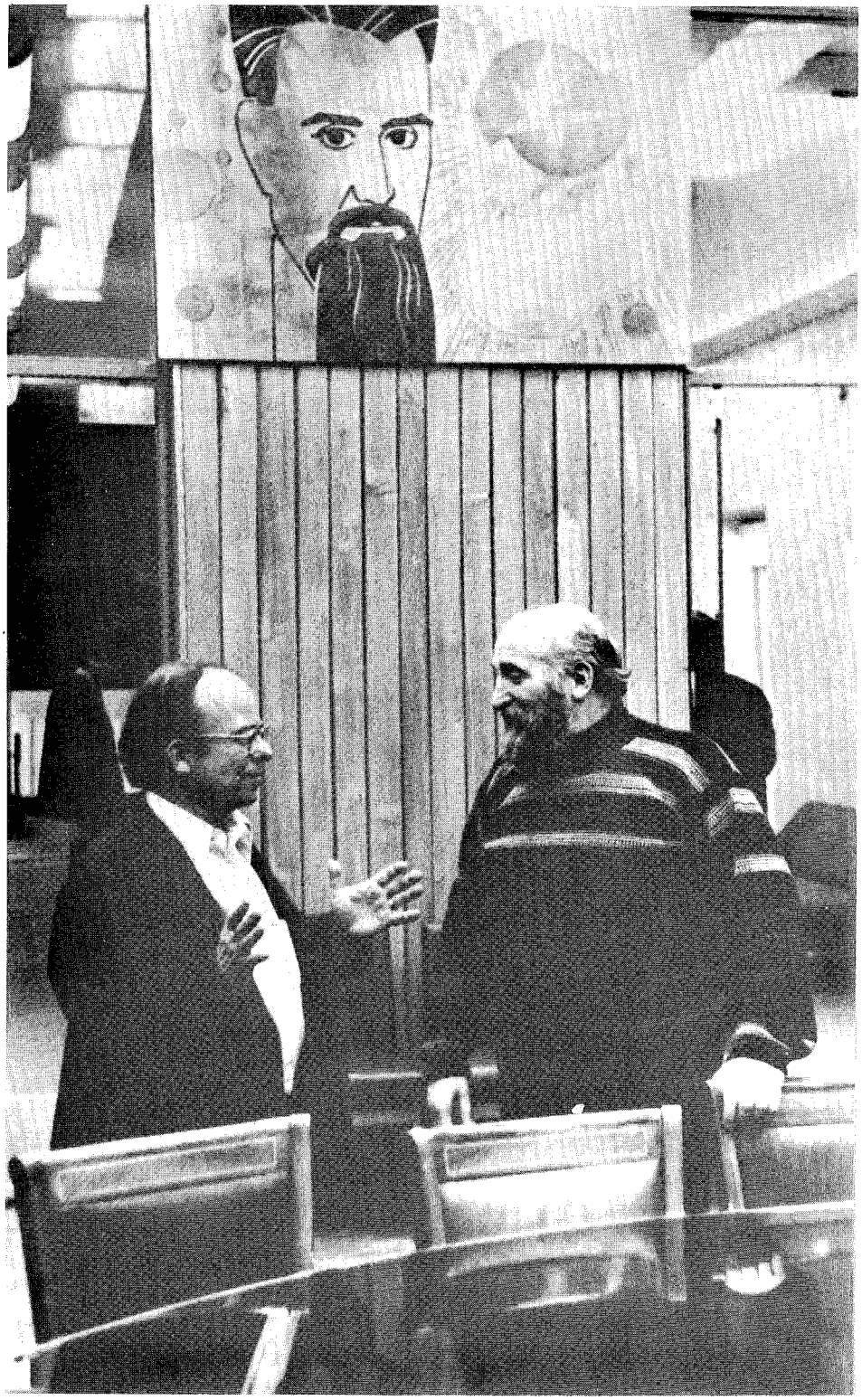
A social highlight of the conference was the banquet on Thursday evening which was followed by an address by Dr. John Teem, Assistant Administrator of the Energy Research and Development Administration. Dr. Teem's talk covered ERDA's program in the fields of medium and high energy physics, including projections for the proposed construction of new facilities such as PEP at SLAC, ISABELLE at Brookhaven National Laboratory, and the Energy Doubler at Fermilab.

--Dick Neal

LARGE ACCELERATORS & STORAGE RINGS

NAME	LOCATION	BEAM ENERGY* (GeV)
**For storage rings, the energy of one beam.*		
( ) = Presently under construction.		
A. Proton Synchrotrons		
Saturne	Saclay, France	3
Bevatron	Berkeley, USA	6.2
Nimrod	England	8
ITEP	Moscow, USSR	10
JINR	Dubna, USSR	10
(Jap. Nat. Lab)	Tsukuba, Japan	10
ANL-ZGS	Chicago, USA	12.7
CERN-PS	Geneva, Switz.	28
BNL-AGS	New York, USA	33
IHEP	Serpukhov, USSR	76
Fermilab	Chicago, USA	400
(CERN-SPS)	Geneva, Switz.	400
B. Proton Linear Accelerator		
LAMPF	Los Alamos, USA	0.8
C. Electron Synchrotrons		
Frascati	Frascati, Italy	1.1
Lund	Lund, Sweden	1.2
Tokyo	Tokyo, Japan	1.3
Syrius	Tomsk, USSR	1.5
Bonn	Bonn, Germany	2.5
Nina	England	5.1
ARUS	Yerevan, USSR	6.1
DESY	Hamburg, Germany	7.5
Cornell	New York, USA	12.2
D. Electron Linear Accelerators		
HEPL	Stanford, USA	1.2
Orsay	Orsay, France	2.0
Kharkov	Kharkov, USSR	2.0
SLAC	Stanford, USA	22.7
E. Proton-Proton Storage Ring		
CERN-ISR	Geneva, Switz.	28
F. Electron-Positron Storage Rings		
ACO	Orsay, France	0.5
Adone	Frascati, Italy	1.5
DCI	Orsay, France	1.8
VEPP-3	Novosibirsk, USSR	3.0
DORIS	Hamburg, Germany	3.5
SPEAR II	Stanford, USA	4.2
(VEPP-4)	Novosibirsk, USSR	7-8

PANOFSKY VISITS SOVIET UNION



SLAC's Director, W. K. H. Panofsky, is shown here talking with G. I. Budker in the nuclear physics institute in Novosibirsk, Siberia, that Budker directs. The poster on the wall is a likeness of I. V. Kurchatov, who was one of the pioneers in the study of atomic energy in the Soviet Union.

The Director of SLAC, Wolfgang Panofsky, recently spent six days in the Soviet Union. The first three days were in the vicinity of Moscow, where Panofsky visited several labs engaged in high-energy physics research and in other branches of the physical sciences. On the third day Panofsky gave a lecture on the new psi particles, and on that same evening he appeared on a television program called *The Obvious and the Impossible*--one of a continuing series on scientific matters.

Panofsky flew from Moscow to the city of Novosibirsk ("new Siberia") on February 20, the fourth day of his visit. The laboratory he visited there has a formidible name--the "Institute for Nuclear Physics of the Siberian Department of the Academy of Sciences of the U.S.S.R"--but just saying "Novosibirsk" is enough to identify the place to high-energy physicists. The Novosibirsk laboratory is well-known for its imaginative work in the field of colliding-beam storage rings.

Two electron-positron rings are presently in operation at the laboratory: VEPP-II-M, with an energy of 700 MeV (each beam) and VEPP-III, with an energy of 3 GeV. A larger machine called VEPP-IV is presently being constructed for single-beam energies of about 7 to 8 GeV.

The scientists at Novosibirsk also work on other aspects of advanced accelerator development, including a complex scheme called "electron cooling." There is also work on controlled thermonuclear reactions (fusion) aimed at the long-term goal of power generation.

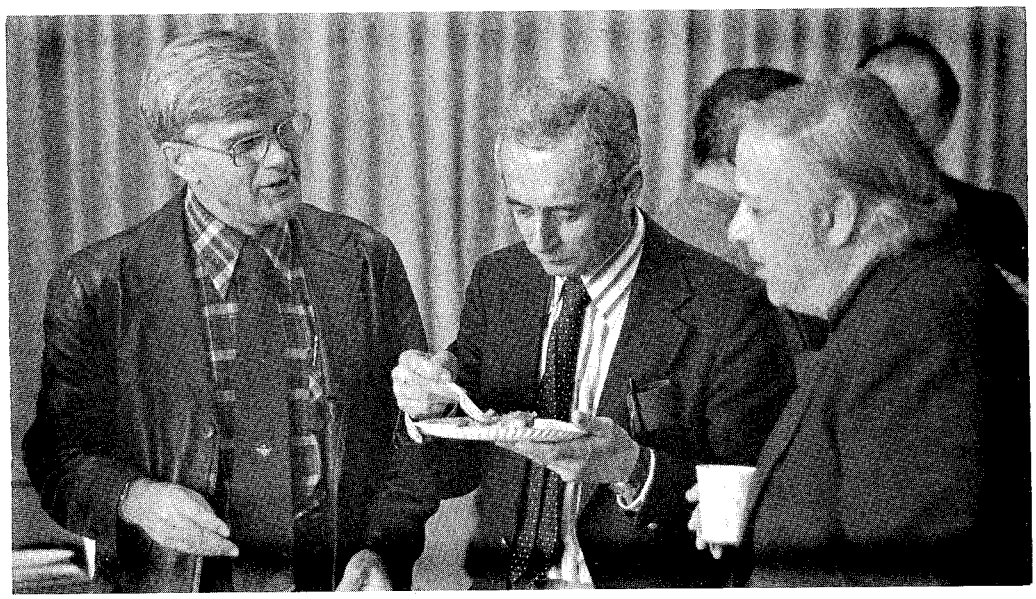
The Director of the Novosibirsk laboratory is G. I. Budker (shown on the left.) The lab's Deputy Director, A. N. Skrinskij, recently visited SLAC for a few days.

From left:

J. C. Sens
University of Utrecht
Netherlands

G. Bellettini
Laboratori Nazionali
di Frascati
Frascati, Italy

M. Perl
SLAC



From left:

K. Johnsen
CERN

G. von Dardel
University of Lund
Sweden

B. Richter
SLAC

From left:

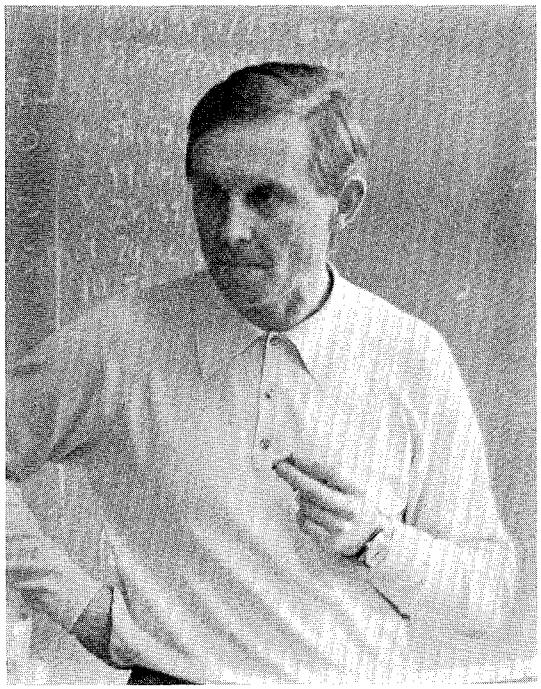
D. Kiss
Central Research
Instit. for Physics
Budapest, Hungary

J. Ballam
SLAC

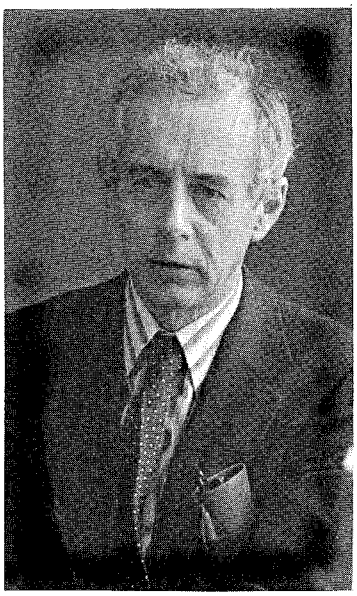
AFTER THE
NEW ORLEANS
SEMINAR

Photos by Joe Faust

W. O. Lock (left)
K. Johnsen
CERN



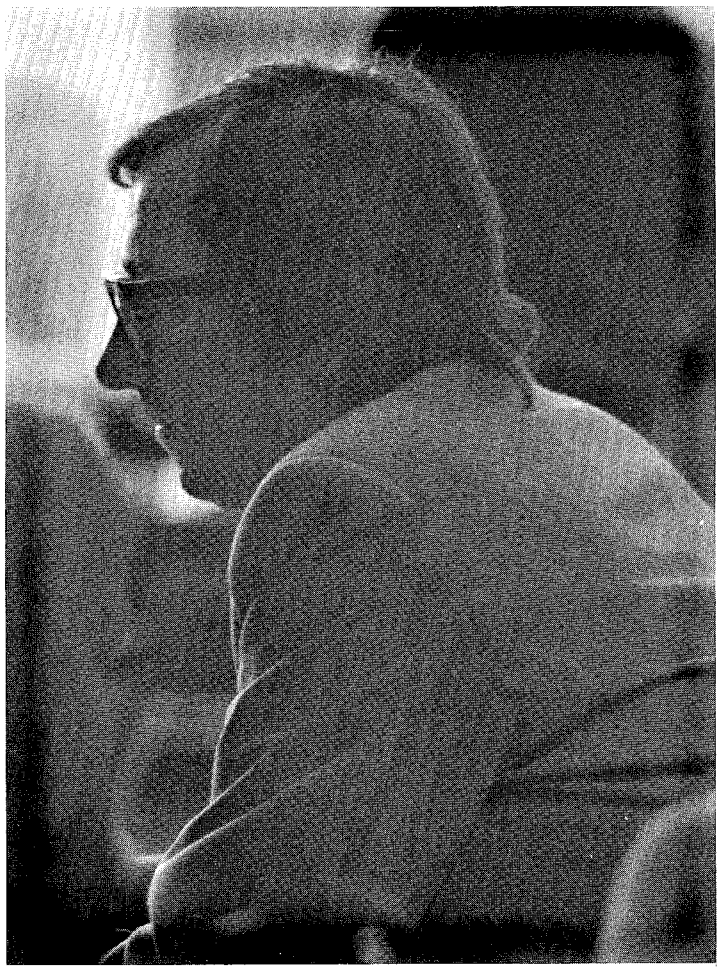
R. Sosnovski, Institute for Nuclear Research, Warsaw, Poland



G. von Dardel
Univ. of Lund
Sweden

AFTER THE NEW ORLEANS SEMINAR

J. C. Sens, University of Utrecht, Netherlands



J. H. Mulvey
CERN

Photos by Joe Faust

Chandasekhar
Zeeman
Galvani
Mendelyeev
Nagoaka
Lorentz
Alfvén
Klein
Ampère
Wu
Hertz
Poincaré
Maxwell
Heitler
Veksler
Casimir
Wigner
Democritus
Meitner
Priestly
Huygens

Dalton

They also assume another earth, opposite to ours, which they [the followers of Pythagoras] call "counter-earth," as they do not with regard to phenomema seek for their reasons, but forcibly make the phenomena fit their opinions and preconceived notions . . . As ten is the perfect number, they maintain that there must be ten bodies moving in the universe, and as only nine are visible they make counter-earth the tenth.

--Aristotle

Alchemy may be compared to the man who told his sons that he had left them gold buried somewhere in the vineyard; where they by digging found no gold, but by turning up the mould above the roots of the vines, procured a plentiful vintage. So the search and endeavors to make gold have brought many useful inventions and instructive experiments to light.

--Francis Bacon

There is in this world a devil of a Newton who has found out how much the sun weighs, and of what color are the rays that compose light. This strange man has turned my head. [He is] the greatest man who ever lived.

--Voltaire

. . . the concept of the quantum had led gradually to a systematic classification of the types of stationary binding of any electron in an atom, offering a complete explanation of the remarkable relationships between the physical and chemical properties of the elements, as expressed in the famous periodic table of Mendelyeev. Such an interpretation of the properties of matter appeared as a realisation, even surpassing the dreams of the Pythagoreans, of the ancient ideal of reducing nature to . . . pure numbers.

--Neils Bohr

Don't become an expert, because of two reasons: First, you become a virtuoso of formalism and forget about real nature, and second, if you become an expert, you risk that you are not working for anything interesting anymore.

--W. Pauli to V. Weisskopf

. . . I have sought to understand how number rules the flux.

--Bertrand Russell

Lavoisier

Sommerfeld
Kapitza
Davisson
Majorana
Moseley
Debye
Weyl
Jeans
von Laue
Faraday
Curie
Landau
Bhabha
Wideröe
Bragg
von Neuman
Yukawa
Minkowski
Volta
Ehrenfest
Avogadro

Albert Einstein
Old Grove Rd.
Nassau Point
Peconic, Long Island

August 2nd, 1939

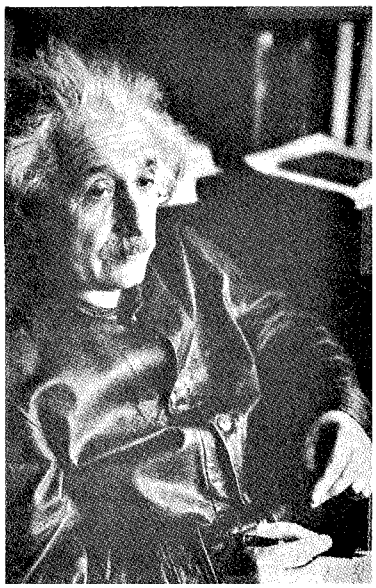
F. D. Roosevelt
President of the United States
White House
Washington, D.C.

Sir:

Some recent work by E. Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable--through the work of Joliot in France as well as Fermi and Szilard in America--that it may become possible to set up a nuclear chain reaction in a large mass of uranium, by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

This new phenomenon would also lead to the construction of bombs, and it is conceivable--though much less certain--that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove too heavy for transportation by air.



Albert Einstein, who signed the letter.

Leo Szilard, who wrote the letter.

The United States has only very poor ores of uranium in moderate quantity. There is some good ore in Canada and the former Czechoslovakia, while the most important source of uranium is Belgian Congo.

In view of this situation you may think it desirable to have some permanent contact maintained between the Administration and the group of physicists working on chain reactions in America. One possible way of achieving this might be for you to entrust with this task a person who has your confidence and who could perhaps serve in an inofficial capacity. His task might comprise the following:

a) to approach Government Departments, keep them informed of the further development, and put forward recommendations for Government action, giving particular attention to the problem of securing a supply of uranium ore for the United States;

b) to speed up the experimental work, which is at present being carried on within the limits of the budgets of University laboratories, by providing funds, if such funds be required, through his contacts with private persons who are willing to make contributions for this cause, and perhaps also by obtaining the co-operation of industrial laboratories which have the necessary equipment.

I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

Yours very truly,
A. Einstein

安生：

周培源先生不时转来你寄给他的一些新材料。这些材料对我们都有兴趣。谢谢你对国内工作的关心。

问曾太太好。请代向Panofsky夫妇，Richter，Drell，Ballam，蔡永昭，李焉丁及其他朋友好。祝Richter组的工作取得成就。

衣先

春节愉快

張文裕

75年1月25日

Alex Tseng of SLAC recently received the letter shown on the left from Professor Chang Wen-Yu, of the Institute of High Energy Physics, Academia Sinica, Peking, China. Professor Chang was the leader of a group of scientists from the Peoples' Republic of China who visited SLAC in June 1973.

In the letter Professor Chang extends his regards to Dr. and Mrs. Panofsky and to Drs. Richter, Drell, Ballam and Tsai. The rest of the message is directed primarily toward Burt Richter, and according to Alex Tseng, who translated, it reads as follows:

Congratulate you and your team's accomplishment on the findings of the new psi particles.

And all we can say to that is

張教授：

謝谢您的鼓勵.

SLAC工作人員一同敬賀

$\mathcal{E} = mc^2$

"You're saying there's more horsepower in a lump of coal than in the whole Prussian cavalry," they complained. "If this were true, why hasn't it been noticed before?"

"If a man who is fabulously rich never spent or gave away a cent," Einstein replied, then no one could tell how rich he was or even whether he had any money at all. It is the same with matter. So long as none of the energy is given off externally, it cannot be observed."

"And how do you propose to release all this hidden energy?"

"There is not the slightest indication that the energy will ever be obtainable," said Einstein. "It would mean that the atom would have to be shattered at will. . . . We see atom disintegration only where nature herself presents it. . . ."

--Peter Michelmore
Biography of Einstein

The complete conversion of one pound of matter into energy would supply all the electric power needs of the United States for five days.