PUB-677
Vol. 3a
July 1990

JOURNAL OF

GLENN T. SEABORG

1971-

January 1, 1974 - May 31, 1974

Lawrence Berkeley Laboratory
University of California

Prepared for the U.S. Department of Energy under Contract DE-AC03-76SF00098

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This work was supported by the U.S. Department of Energy
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The co-discoverers of Element 106 at the HILAC:
Matti Nurmia, Jose R. Alonso, Albert Ghiorso, E. Kenneth Hulet,
Carol T. Alonso, Ronald W. Lougheed, Seaborg, Joachim M. Nitschke

Preface

I have kept a journal since I was a boy, most of the time recording the daily events in an organized manner each day. For the rest of the time the events were recorded in a non-systematic manner, with the intention that all of the material could be organized at a later date in a systematic daily journal. These volumes fall into the former category.

My life can be logically divided into eight periods. These volumes cover the eighth, and probably final, period, beginning in November 1971.

The eight periods can be summarized as follows:

I. Childhood in Ishpeming, Michigan, 1912-1922 (10.5 years)
This period is not covered in a journal. It is described in the prelude to the first volume of my journal (January 1, 1927-August 10, 1934).

II. Youth in Southern California, 1922-1934 (12 years).
The first four years of this period are not covered in my journal; a brief description is given in the prelude to the first volume of my journal. My systematic journal begins on January 1, 1927, the middle of my sophomore year in high school in David Starr Jordan High School in the Watts District of Los Angeles. The period concludes with my graduation from UCLA in 1934.

III. Early Days at the University of California in Berkeley, 1934-1942 (8 years)
This period is covered in the second (August 11, 1934-June 30, 1939) and third (July 1, 1939-April 17, 1942) volumes of my journal. This includes the time of my graduate work at the University of California at Berkeley (1934-1937), service as the personal research assistant of Gilbert N. Lewis (1937-1939) and as instructor (1939-1941) and assistant professor (1941). Highlights of my research during this period include my participation in the discovery of plutonium and its fissionable isotope (mass number 239) and a number of isotopes very useful in the diagnosis and treatment of disease (such as ^{131}I, ^{60}Co and ^{99m}Tc).

IV. Wartime Metallurgical Laboratory, University of Chicago, April 19, 1942- May 19, 1946 (4 years)
During this period I was responsible for the development of the chemical processes used in the production of plutonium and participated in the discovery of the elements americium (atomic number 95) and curium (atomic number 96). This period is covered by four volumes: April 1942- April 1943, May 1943- April 1944, May 1944- April 1945, and May 1945- May 1946.

V. University of California at Berkeley, May 20, 1946- June 30, 1958 (12 years)
During this time I served as Professor of Chemistry and Director of the Division of Nuclear Chemistry of the Radiation Laboratory. I participated in the discovery

of berkelium (atomic number 97), californium (98), einsteinium (99), fermium (100), mendelevium (101), and nobelium (102). Other responsibilities included service during the second half of this period as the faculty athletic representative for the Berkeley campus to the Pacific Coast Intercollegiate Athletic Conference. The journal material for this period was not assembled on a current daily basis, has in the meantime been assembled and is now in the process of publication.

VI. Chancellor, University of California at Berkeley, covering the period July 1, 1958 - January 31, 1961 (2.5 years)
Unusually successful in athletics, Berkeley teams won the NCAA basketball championship in 1959; the football team played in the Rose Bowl on January 1, 1959; the rowing team won the National Intercollegiate Regatta Association championship in 1960; the baseball team won the California Intercollegiate Baseball Association championship in 1960; and the water polo teams won the AAWU water polo championships in 1959 and 1960.

Buildings completed during my tenure were Kroeber Hall, the Lowie Museum of Anthropology, Campbell Hall, the first eight residence halls and the Strawberry Canyon recreational complex; and plans were made for building the Student Union complex, married student housing, Latimer Hall, Barrows Hall, Tolman Hall, the University Art Museum, the biochemistry building and the virus laboratory. The College of Environmental Design was established; the Space Sciences Laboratory had its origin as well as the Earl Warren Legal Center and the Laboratory of Chemical Biodynamics; also established were a variety of new research institutes, centers and facilities in diverse fields. This period, for which the material was assembled from my extensive notes and supporting material, is covered in three journals: July 1, 1958-June 30, 1959; July 1, 1959-June 30, 1960; and July 1, 1960-January 31, 1961.

VII. Chairman, U.S. Atomic Energy Commission, covering period February 1, 1961 - November 6, 1971 (10.5 years)
The systematic journal covering this period has been published in 26 volumes (with one more volume in preparation). The topics covered in these volumes include the Limited Test Ban Treaty (LTBT), the Non-Proliferation Treaty (NPT), the Strategic Arms Limitation Treaty (SALT) and ABM Treaty, the Cuban Missile Crisis, the program of international cooperation (including my visits to 60 countries), the program for support of research, the Los Alamos Meson Facility and the 200 Bev Accelerator, the National Transplutonium Production Program, the civilian nuclear power reactor program, the Raw Materials Program, the Gas Centrifuge Program, the Cutback in Production of Fissionable Materials, the Regulatory Program, the Radioisotopes Program, the nuclear power in space program, the nuclear weapons testing program, the Plowshare Program, the

Controlled Thermonuclear Research Program (CTR), the Nuclear Education and Training Program, and the Technical Information and Exhibits Program.

VIII. The University of California, Berkeley, November 7, 1971- These volumes of a systematic journal begin with November 7, 1971, and are being issued as they are prepared for publication.

It is interesting to try to rank these periods in terms of which I have found most exciting. Certainly the period of highest excitement would be Period IV, the time of my wartime work at the Metallurgical Laboratory. Next would come Period III, the time of discovery of plutonium, followed by Period V, the time of discovery of numerous other transuranium elements. Next would come Period VII, the time of my chairmanship of the U.S. Atomic Energy Commission and then Period VI, the time of my chancellorship at Berkeley. The other Periods I, II, and VIII would be difficult to rate on such a scale.

The colors of the covers of my journals for the various periods range from red, across the optical spectrum, to blue. Thus the three volumes covering Periods II and III have red covers. The four volumes covering period IV will, when reprinted, have red-orange covers; the supply of the present printing in brown covers has been exhausted. The twelve or so volumes covering the twelve years of Period V will have orange covers. The three volumes covering Period VI have yellow covers. The 27 volumes covering period VII have green covers. The estimated 20 (and more) volumes covering Period VIII will have blue covers. The total of the number of volumes will be more than 70, and they average some 500-600 pages each. This averages close to one volume per year for the 63.5 years covered (so far) by my journal.

The source material and backup material for these more than 70 volumes consists of hundreds of thousands of documents that are available because I have saved and preserved essentially all my documents throughout my career, beginning with my kindergarten days. The majority of these documents are being transferred to the Library of Congress, although some of the early documents will be housed in the Bancroft Library of the University of California at Berkeley. Copies of the journals will be housed in a number of libraries and repositories. For example, the 27 volumes corresponding to Period VII (Chairman, U.S. Atomic Energy Commission, 1961-1971) are being placed in the Kennedy, Johnson and Nixon Presidential Libraries, the Bancroft Library at Berkeley, the Main Library at UCLA, the History of Science library at the University of California at Berkeley, the Department of History at the University of California at Santa Barbara, The Department of Energy - History Division, the U.S. Nuclear Regulatory Commission, the Seaborg Center at Northern Michigan University, the Library of Congress, the Hoover Institute of Stanford University, and the National Historical Publications and Records Commission (National Archives).

This set of my journals covers Period VIII of my life, beginning on November 7, 1971, upon my return from Washington, D.C., where I had served as Chairman of the U.S. Atomic Energy Commission for some ten and one-half years.

INTRODUCTION

Soon after my return to the University of California at Berkeley, I was appointed University Professor of Chemistry (a title held by some dozen professors throughout the statewide nine-campus University of California with its 7,500 faculty members. I was also appointed head of the Nuclear Chemistry Division (soon to become the Nuclear Science Division) of the Lawrence Radiation Laboratory (soon to become the Lawrence Berkeley Laboratory) in which position I served until 1975, when I was appointed Associate Director at Large of the Lawrence Berkeley Laboratory, a position that I have held since. I resumed my collaboration in research with my long-time associate Albert Ghiorso and joined his associates Mike Nitschke, Matti Nurmia, Bob Silva, Almon Larsh, James Harris, and Robert Main in some of my research program. Iz Perlman and Sam Markowitz also participated to some extent. Diana Lee, who joined my research group in 1974, played a central role in assisting and collaborating with the researchers.

During this period I conducted research with a group of graduate and undergraduate students, and visiting and postdoctoral scientists. My graduate students and their Ph.D. theses included:

Irwin Binder, "A Radiochemical Study of the Reactions of Heavy Ions with Gold", December 1977

David J. Morrissey, "Study of the Role of Complete Fusion in the Reaction of ^{48}Ca and ^{56}Fe with Cerium and Terbium," June 1978

Kimberly E. Williams, "Radiochemical Studies of Neutron Deficient Actinide Isotopes," December 1978

Elizabeth A. Rauscher, "Coupled Channel Alpha Decay Theory for Even- and Odd-Mass Light and Heavy Nuclei," December 1979

Rodney H. Banks, "Preparation and Spectroscopic Properties of Three New Actinide IV Borohydrides," June 1980

Kenneth E. Thomas, III, "Transfer Products from the Reactions of Heavy Ions with Heavy Nuclei," June 1980

Rose M. McFarland, "Recoil Range Studies of Heavy Products of Multinucleon Transfer from ^{18}O to ^{245}Cm + ^{249}Cf," September 1982

L. Patrick Somerville, "Observation of New Spontaneous Fission Activities from Elements 100 to 105," June 1982

Yoshi Morita, "Angular Distributions of Target Fragments from the Reactions of 292 MeV - 25.2 GeV ^{12}C with ^{197}Au and ^{238}U" May 1983

Patrick L. McGaughey, "Intermediate and High Energy Reactions of Uranium with Iron and Carbon," June 1983

Kenton J. Moody, "Actinide Production in the Reactions of Heavy Ions with Curium-248," June 1983

Saburo Yashita, "The Identification of New Astatine Isotopes Using the Gas-Filled Magnetic Separator, SASSY," February 1984

Ronald S. Shinomoto, "Methyltrihydroborate Complexes of the Lanthanides and Actinides," August 1984

Robert B. Welch, "Actinide Production from Xenon Bombardments," January 1985

Kenneth E. Gregorich, "Actinide Production in ^{136}Xe Bombardments of ^{249}Cf," August 1985

P. A. Wilmarth, "Beta-Delayed Proton Emission in Neutron-Deficient Lanthanide Isotopes," September 1988

Wing Kot, "Optical and Magnetic Properties of Some Actinide Ions," 1990.

Students who obtained Master's degrees working with me included:

Steven Blau, "Effects of Particle Evaporation on Angular Momentum of the Emitting Fragment for Deep Inelastic and Compound Nuclear Reactions"

Charles Mark Phillips (Plan II- No Thesis)

Edward Henry Sebesta, "Analysis and Development of FACE Automatic Apparatus for Rapid Identification of Transuranium Isotopes"

Among the postdoctoral scientists and visiting graduate students were Carol and Jose Alonso (1972-74), Patricia Baisden (1975-78), Coreen Casey (various visits 1985-89), Luo Cheng (1980-81), Burkhard Fricke (1972, 1975), Hisaako Kudo (1981-82), R. Eric Leber (1976-77), C. H. Lee (1984), Wenxin Li (1982-84), David Morrissey (1978-80), Chris Ortel (1979-81), Roland J. Otto (1974-78), L. Sihver (1985, 1987), and Satoru Tanaka (1982-83). Among the visiting scientists (some from foreign countries) were Kjell Aleklett (1978-79, and many times in the 1980s), Reinhard Brandt (many times in the 1980s), William R. Daniels (1972), Gerhard Dersch (1984), Gerhard Feige (1984), Malcolm M. Fowler (1974-75), Heinz Gäggeler (many times in the 1980s), H. Groening (1981), Darleane C. Hoffman (1978-79), James Hogan (1978-79), Phil Horwitz (1972), Won Mak Jae (1978-80), Jens Kratz (1972-74, 1986, 1988), P. Lemmertz (many times in the 1980s), Jol Liljenzin (1972-73), Yuan-Fang Liu (1980-81), Walter Loveland (1976-77, 1980, 1983-84, and very many other times), Nicolai Mikheev (1977), Ted Norris (1973-74), Toisto Raunemaa (1973-74), Michel de Saint Simon (1977), Mathias Schädel (many times in the 1980s), N. Trautmann (1972 and other visits), Hans von Gunten (1980-81), Kurt Wolfsberg (1972), Z. Xu (1986-87), Yu-wen Yu (summers 1982-84), and Ivo Zvara (1976). We have also had interesting visits from G. N. Flerov and Yuri Oganessian of the Soviet Dubna Laboratory. Undergraduate research students included Elissa Bicknese, Judith Brodkin, Jose Carvalho, Wayne Chan, Simon Chin, Michela DiCasa, Elaine Dong, Dana Dunlavey, Linda England, Jeff Frank, Larry Frank, Carolyn Gottsteinn, Barbara V. Jacak, Patricia Juergens, Mike Kilroy, Robert Klein, Joy Kobayashi, R. H. Kraus, Walter Kwan, Huan Le, Cynthia Lee, Wayne Marsh, Hung Nguyen, Bonner Nishida, Michael Perry, Marilyn Rodder, Martin Schulman, and Huy Trinh.

The accelerators used in connection with this research were the SuperHILAC and the 88-Inch Cyclotron. In addition, research was conducted using the Bevatron and Bevalac (the combination of the SuperHILAC, as injector, and the Bevatron--this combination was built as a result of the suggestion of Ghiorso) with heavy ions in the areas of intermediate and relativistic energies.

The research program was concerned largely with an investigation of the nuclear properties of the heavy transuranium elements, the synthesis and identification of new isotopes of the transuranium elements, the study of the chemical properties of the transuranium elements and the attempts to synthesize and identify new transuranium elements including superheavy elements (elements in the region of atomic number 114 and neutron number 184). The research program also encompassed a broad and diverse radiochemical study of heavy-ion-induced reactions, which included one of the earliest observations and investigation of the inelastic transfer interaction. At various times Roland Otto, David Morrissey, and Darleane Hoffman shared in the direction of the research.

In 1974 I was associated with a group that succeeded in synthesizing and identifying an isotope of the new element with the atomic number 106; the group consisted of Albert Ghiorso, Mike Nitschke, Jose Alonso, Carol Alonso and Matti Nurmia of the Lawrence Berkeley Laboratory and Ken Hulet and Ron Lougheed of the Lawrence Livermore National Laboratory.

More recently Ghiorso has been attempting to synthesize and identify an isotope or number of isotopes of element 110 with the help of Pat Somerville, Diana Lee, and a few others.

My collaboration with Walter Loveland, which has includeed use of the Bevatron and Bevalac and accelerators in other laboratories, began in 1976 when he spent a sabbatical leave in Berkeley and has continued to date (1990). Our collaborative research program has involved: (a) the use of radiochemical techniques to study the mechanism of nucleus-nucleus collisions and (b) critical reviews of the status of heavy element research. Research in the former area began with measurements of the target fragment mass distributions in relativistic heavy ion reactions, culminating in seminal papers in 1976 and 1989 explaining, respectively, the shape of these distributions and the concept of total kinetic energy scaling. The radiochemical techniques, however, were most appropriately applied to the study of intermediate energy (10-100 MeV/nucleon) collisions because of the larger particle beam intensities available in this energy region. In studies of intermediate energy reactions, the superior (Z,A) resolution and the lack of energy thresholds in the radiochemical techniques led to the discovery of the principal reaction channel, heavy residue formation, and its characterization (1986-90). Important critical reviews of the properties of heavy and superheavy elements were published in 1979, 1985, and 1990.

Other Department of Chemistry faculty associated with the laboratory's Nuclear Chemistry (Nuclear Science) Division included Professors Joseph Cerny, Samuel S. Markowitz (who joined the Applied Science Division), Luciano G. Moretto, John O. Rasmussen, David A. Shirley (who became director of the Materials and Molecular Research Division and then director of the Lawrence Berkeley Laboratory), and David H. Templeton (who joined the Materials and Molecular Research Division). I was succeeded as Director of the Nuclear Chemistry (Nuclear Science) Division by Bernard Harvey, who was followed by Joseph Cerny and then James Symons.

I also pursued my interest in the chemical properties of the actinide elements by involving myself in a research program with Norman Edelstein (some of my graduate students performed their research with him). In this connection I was associated with other Department of Chemistry faculty members--Kenneth N. Raymond, Richard Andersen, Neil Bartlett, Andrew Streitweiser--and their periodic "Actinide Chemistry Seminar."

In 1984 Darleane Hoffman joined the Department of Chemistry on campus as a Professor and the Nuclear Science Division of the Lawrence Berkeley Laboratory. She assumed the responsibility for much of my research program (to some extent, this became a shared responsibility) and for the incoming graduate students in this general area of research. The graduate students who have worked with or are working with Professor Hoffman include Robert Chasteler, Kenneth Czerwinski, Nancy Hannink, Roger Henderson, Dianne Bennett, Carolyn Gannett, Howard Hall, Robert Chadwick, Peter Johannson, John Leyba, Bobby Kadkhodayan, and Steven Kreek. The undergraduate students who worked with Professor Hoffman included Raj Agarwal, Atlee B. Benally, Elizabeth Brady, Aaron Charlop, Y. Y. Chu, David Dorsett, George Haynes, Chris Kacher, Lithium Lin, Teresita Padron, and Yasmin Williams. Visiting scientists (including some graduate students from other institutions) included Urs Baltensperger, Helmut Barth, Reinhard Brandt, Willie Brüchle, Shanyu Cai, Kuen-Bey Chen, Hans Gäggeler, Yuichi Hatsukawa, Mathias Heck, Gunter Herrmann, Dieter Jost, Jens Kratz, Christoph Lienert, Walter Loveland, Ann Mueller, Ya Nai-Qi, Hiromichi Nakahara, H. A. O'Brien, Mathias Schädel, Ulrich Scherer, K. Sümmerer, Andreas Türler, Hans von Gunten, C. M. Wai, A. Yokoyama, and Yu-wen Yu.

Biweekly luncheon meetings of our research group were held in my office. This group assumed the colloquial appellation "Superheavy Element Interlaboratory Khemists" or SHEIKS, a name that lost its descriptive character with the passage of time, but which has nevertheless been retained up to the present time and will continue to be used.

I taught both the Freshman Chemistry laboratory sections 1972-1982 and the Nuclear Chemistry course (Chemistry 123) with John Rasmussen in the winter quarter of 1978. I met once a week for lunch with a group of undergraduate chemistry majors, called the "Freshman Cluster Group." I also have given numerous lectures to undergraduate classes such as freshman chemistry, nuclear chemistry and political science classes.

During this period my office staff was under the leadership of three outstanding administrative assistants, first, from 1971-76 Sheila Saxby; from 1977-83 Pat Johnson; and, finally, and especially, from 1983 on Sherrill Whyte. Supporting staff included Sharon Date, Margie Hollander, June Jackson, Carol James, Sylvia Kihara, Jane Kingston, Lin Lorenz, Janice Ludwig, Delores Mason, Marta Munoz, Grace Nubla, Debbie Olson, Joy Perkins, Zoe Randolph, Pamela Taylor, Kathy Vanderhagen, Peggy Yamada, and an army of temporary help.

During 1972 I served as President of the American Association for the Advancement of Science and during 1973 as Chairman of the Board of Directors of the AAAS. While serving in these offices I was instrumental in establishing the office of International Science. It was largely in this connection that the Interciencia Association was established.

From May 24 to June 10, 1973, my wife Helen and I visited the People's Republic of China. We were members of a team including physical and biological scientists and representatives of the social sciences and the humanities (and a few of their wives) sponsored by the U.S. Committee for Scholarly Communication with the People's Republic of China. Ours was the first group to visit the People's Republic of China on a semi-official basis for the purpose of negotiating agreements for exchange of people and visitors between our two countries. While in Peking we had the pleasure of attending a meeting in the Great Hall of the People (National People's Congress Building) in T'ien An Men Square in Peking. Attending, in addition to our group, were members of the Chinese Academy of Sciences, the Chinese Science and Technology Association and many leaders of Chinese scientific institutes and laboratories. Of special interest was the attendance at this meeting of Chinese Premier Chou En-lai, whom we all met and who played an active role in negotiating the exchange agreement with the members of our delegation. During this visit to the People's Republic of China, we visited, besides Peking, Shumchun, Canton, Nanking, Wu-hsi, Soo-chow, Shanghai and Ch'ang Sha. I kept a complete journal during this visit, which was published in a document entitled "China Journal."

I visited the People's Republic of China again from May 17-June 11, 1978, as chairman of a delegation for "Pure and Applied Chemistry." During this trip we visited Peking, Talien, Ch'ang Chun, Chenyang, Fushun, Shenyang, Shanghai, Hangchou, Sian and Lanchow. Again I kept a complete journal which was published in a document entitled, "China Revisited." (A book, Chemistry and Chemical Engineering in the People's Republic of China, was also published by the American Chemical Society.)

My journal recounts a number of visits of delegations from the People's Republic of China to the United States, when I helped play host to them both in Berkeley and in Washington, D.C.

I served as President-elect of the American Chemical Society in 1975. I then served as President of the ACS in 1976 (the year of its centennial) and as Past-President in 1977. I served as a member of the ACS Board of Directors during each of these three years. At the centennial banquet held in New York in April 1976 I had the pleasure of introducing Senator Ted Kennedy as our keynote speaker. Also at the time of the New York centennial meeting I played host to a gathering of heads of chemical societies throughout the world, and at that time I proposed the creation of an International Chemical Society. Although such a society never came to fruition, one consequence of my proposal was the creation of the affiliate scheme of the International Union of Pure and Applied Chemistry which came into effect in February, 1985.

I served as founding president of the International Organization for Chemical Sciences in Development (IOCD) beginning in 1981 and have continued in that post. The aim of this organization is to help to provide the benefits of chemistry to people in developing countries of the world. IOCD's working groups draw scientists from Third World countries into collaboration with scientists from industrial countries into research focused on areas of vital developmental concern: unchecked population growth, persisting parasitic diseases, and declining agricultural productivity. The scientists in IOCD's working groups represent the broad geographic regions of Africa, Asia, Latin America, and the Middle East. IOCD's Working Group on Tropical Diseases, for example, involves 16 laboratories around the world in its work. By 1989

the group had tested over 100 chemical compounds, several of which show promise in treating devastating ailments found in developing countries. Another important way IOCD is assisting Third World scientists is to offer them certain technical services at no charge. IOCD's scheme of Analytical Service Centers will submit a scientist's compound to analysis by magnetic resonance spectroscopy or mass spectroscopy, for example; methods that require sophisticated and costly apparatus not often available in Third World countries. Similarly, the IOCD Biological Screening Service will test chemical compounds for their biological activity.

In the area of international cooperation in science I am particularly proud that I suggested and helped to initiate the Interciencia Association of the American Association for the Advancement in Science (which encourages collaboration with our neighbors in Latin America) and the Affiliate Scheme of the International Union of Pure and Applied Chemistry (which serves as a sort of international chemical society).

Having been involved with the Lawrence Hall of Science on the Berkeley campus since its inception in the fall of 1958, I immediately resumed an active role on its Faculty Advisory Committee upon my return from Washington, later serving as the chairman of this committee. I then served as director of the Lawrence Hall of Science from 1982-1984 and have served as chairman since 1984. The Lawrence Hall of Science has and is playing a leadership role in solving the national crisis in pre-college science and math education. It carries on in three areas: 1) to improve the quality of mathematics and science instruction for the benefit of pre-collegiate students through the development of innovative math and science courses and accompanying curriculum materials and teaching training services; 2) to augment pre-college mathematics and science instruction provided by schools by offering special mathematics and science courses at the Hall; and 3) to enhance the knowledge, appreciation, and enjoyment of mathematics and science for the general public by providing the community with a math and science center.

The Hall's curriculum materials have a widespread use on a national scale and substanial use on an international scale. The overall success of the Hall's program has led to an extreme shortage of space needed to accommodate the expanding efforts--preliminary plans have been prepared for an addition to the building and fundrasising for this is in progress (in 1990).

I served as a member of the National Commission on Excellence in Education (NCEE), which worked under the chairmanship of David P. Gardner from the fall of 1981 until April 1983 to produce its report, "A Nation At Risk." We presented this report to President Ronald Reagan on April 26, 1983. This report has had a substantial impact on the national reform movement toward improving the status of pre-college education, especially science and math education, in the United States.

More recently I served as co-chairman with Secretary of Energy James D. Watkins at a summit conference on pre-college science and math education held at the Lawrence Hall of Science October 9-10, 1989. This conference was attended by representatives of the National Science Foundation, the National Academy of Sciences, the National Aeronautics and Space Administration, the U.S. Department of Education, the U.S. Department of Energy, the President's Science Advisor, representatives of many of the DOE laboratories and representatives of many organizations

concerned with education, such as the National Science Teachers Association, the American Federation of Teachers, the American Association for the Advancement of Science, the National Education Association, and the Triangle Coalition for Science and Technology Education. The report covering this conference was issued on May 22, 1990. It makes a call for the following reforms by the year 2000: a core curriculum in science and mathematics for preschool through high school; high quality teacher training in hands-on scinece for 10% of the nation's teachers each year; a significant increase in female, minority, disabled, and disadvantaged students completing high school and advancing to graduate education, careers in mathematics and science, and science teacher training; the establishment within the next 24 months and expansion of community alliances involving government, education, and business to improve mathematics and science education; and the development in the U.S. of a workforce equipped to meet the technological demands of the 21st century.

My wife Helen and I attended the Nobel ceremonies in Stockholm in 1975 on the occasion of the 75th anniversary of the Nobel Ceremony and have attended the Nobel ceremonies in the years 1978, 1979, 1980, and 1985. We visited many of my relatives in Sweden on these trips as well as on a number of other trips to Sweden.

I have continued to serve as president of Science Service (a post that I have held since 1966). Science Service is the national organization that is devoted to an increase in the public understanding of science; it conducts the annual Science Talent Search in Washington, D.C., and the annual International Science and Engineering Fair, and publishes the very effective weekly Science News magazine. I have continued during this period to interview the 40 Science Talent Search finalists in my role as a judge; since 1965 I have conducted this interview 26 times, for a total of 1,040 finalists. In March 1989 I had the pleasure of serving as co-host when President George Bush visited the Science Talent Search exhibits and addressed the Science Talent Search finalists and other spectators in the auditorium of the National Academy of Sciences building. (I had the responsibility of briefing President Bush on so-called "cold fusion" on a visit with him in the Oval Office of the White House in April 1989.)

I have served as a member of the Board of Directors of the World Future Society since 1969 and have attended the annual meetings of the Board, each year during this period. In 1974 I had the pleasure of introducing Vice President Gerald Ford at a symposium on "Energy: Today's Choices, Tomorrow's Opportunities" sponsored by the World Future Society in Washington, D.C.

During much of this period I have been active with the American Academy of Achievement in connection with their annual "Salute to Excellence" symposia and banquet where the achievements of hundreds of students and American leaders in all walks of life are recognized. In 1984 I met President Jimmy Carter, one of the honorees at the banquet that year. Others that Helen and I have met at the annual banquets include Mortimer Adler, Tom Brokaw, Frank Capra, Olivia DeHaviliand, Clint Eastwood, Phil Esposito, Bob Feller, Betty Ford, Gordon Getty, Helen Hayes, Hal Holbrook, Bill Honig, Kareem Abdul Jabbar, Robert Jarvik, Michael Jordan, Jim Lehrer, George Lucas, Henry Mancini, Ralph Nader, Sandra Day O'Connor, Walter Payton, Claude Pepper, Ronald Reagan, Burt Reynolds, Brooks Robinson, Pete Rozelle, Rosalyn Russell, Diane

Sawyer, Tom Selleck, Dinah Shore, Beverly Sills, John Sununu, Joe Theisman, Lowell Thomas, Ted Turner, Faye Wattleton, Herschel Walker, Bill Walsh, Oprah Winfrey and Andrew Young.

During much of 1972 and 1973 I served on the 80-member Citizens Task Force of the East Bay Regional Park District (EBRPD) that had the responsibility of advising the EBRPD on a master plan for the future expansion and operations of the District. I served as chairman of the Trails Committee. Joe Bort served as chairman of the Citizens Task Force. I participated during this period in a number of hikes and exploratory trips with members of the Citizens Task Force which were conducted for the purpose of accumulating data that would be helpful in preparing our report to the District. Our Citizens Task Force submitted a master plan which was accepted and put into force.

Following this experience with the Citizens Task Force, in the succeeding years Helen and I on weekends took multitudinous hikes, often with members of the Mt. Diablo Regional Group of the Sierra Club (I sometimes served as leader) in the various parks of the East Bay Regional Park District and their interconnecting trails.

In 1978 I became a charter member of the newly formed American Hiking Society. When Helen and I attended one of the Board meetings of the American Hiking Society in Vienna, Virginia (a suburb of Washington, D.C.), at which the idea for a cross-country hike was discussed, I made the suggestion that the decision should be made to go ahead with it; and it was accepted. I said that I would be willing to be responsible for scouting and laying out the trail across California for the cross-country hike, which became known as "HikaNation." During weekends Helen and I together with our friends, Joe and Betty Goldstein, explored the route and laid out the path for the hike across California. Jeannie Harmon acted as pathfinder for the state of California portion. The HikaNation started in San Francisco on Saturday, April 12, 1980. A group of some 6,000 people walked across the Bay Bridge early Sunday morning April 13th (for which I had helped obtain permission from Sacramento). Helen and I accompanied the group across much of California. The participating group consisted of 100-200 people. The route that we had laid out was about 265 miles long and was traversed in 21 hiking days, with an average of about 13 miles per day. Helen and I left the group at the Nevada border; it continued with a core group of about 40 people across the United States. Helen and I joined the HikaNation group at Harper's Ferry on May 9, 1981, and hiked with them along the C&O Canal tow path to Washington, D.C., where we arrived on May 13, 1981.

Starting in June 1990, our son Eric and his friend Ellen Dudley are scouting, under the auspices of the American Hiking Society and Backpacker magazine, the route of a west-east trail, "The American Discovery Trail," across the United States (from San Francisco at the Pacific Ocean to Delaware at the Atlantic Ocean).

As a result of our contacts with the HikaNation group and in connection with laying out the trail across California, Helen and I bought a vacation home in Strawberry on Highway 50 in 1980, which we used as a weekend and summer vacation spot and origin of our hikes in the Sierra throughout the 1980s.

I later served on the Board of Directors (1980 - 1984) and for a period as vice president (1981-1982) of the American Hiking Society and continue to serve on the Advisory Board. My son Eric served on the Board of Directors and also served three years as president of the American Hiking Society. He also serves as an editor in their publications.

During this period Helen and I made a number of trips to Ishpeming, Michigan (my birthplace). On one of these trips, in the summer of 1980, we purchased the Seaborg house at 639 East Division Street from Oscar Kurin, who owned it at that time. This house was purchased by my grandfather, Jon Eric Seaborg, in about 1882, when my father was about two years old, and is the house in which my father and his sisters and brothers were raised. It was sold to the Kurin family in about 1914 and remained in their possession until Oscar Kurin sold it back to me in 1980 for a purchase price of $6,700. It is now the oldest house in Ishpeming. On this same visit to Ishpeming (1980) I attended the 50th anniversary reunion of the high school graduation class of 1930, the class of my schoolmates in Ishpeming until I left in October 1922. I served as the speaker at the reunion banquet on this occasion (Summer of 1980).

In 1978 I was asked to join, in the role of president, the Swedish Council of America (an umbrella organization of Swedish-American societies). I served as president for four years and then continued to serve on the Board of Directors. On October 27, 1984, the Swedish Council of America awarded jointly to me and Ann-Margret their annual Great Swedish Heritage Award at their meeting in Seattle. I also served during this period, and continue to serve, as a member of the Royal Round Table, a joint organization of the Swedish Council of America and Swedish leaders and industrialists. I attended meetings of this group, which are held in alternate years in the United States and Sweden.

I served 1970-1982 as vice president and 1982-1986 as president of the International Platform Association (IPA), an organization of platform performers, that is, public speakers. Before, during and after my presidency Helen and I usually attended the annual convention of the IPA in Washington, D.C., during the summer, where we met many outstanding personalities, such as Senator Robert C. Byrd, Harry Blackstone, Dick Cavett, Mario Cuomo, Douglas Fairbanks, Jr., Malcolm Forbes, George Gallup, Peter Grace, Jesse Jackson, James Kilpatrick, G. Gordon Liddy, Ed Meese, Claude Pepper, George Plimpton, Mark Russell, Carl Sagan, Lowell Thomas, and Governor George Wallace.

A number of annual awards, lectureships and so forth were established in my name: the Glenn T. Seaborg Actinide Award (starting date, 1984); the Glenn T. Seaborg, American Nuclear Society (1984); the Glenn T. Seaborg Medal, UCLA (1987); the Glenn T. Seaborg Research Award, Alpha Chi Sigma, UCLA (1979); the Glenn T. Seaborg Award, International Platform Association (1979); the Glenn T. Seaborg Nobel Travel Awards (two from the International Science and Engineering Fair in 1976 and one from the Swedish Council of America in 1978); also the Glenn T. Seaborg Laboratory, Kevex Corporation (established in 1985); and the Glenn T. Seaborg Center for Science and Math Teaching Excellence, Northern Michigan University (1985).

I was the author or co-author of about 100 papers published in scientific journals or books and the following books: Nuclear Milestones (1972), Transuranium Elements - Products of Modern Alchemy (1978),

Kennedy, Khrushchev and the Test Ban (1981), Nuclear Chemistry (1982), The Chemistry of the Actinide Elements, 2nd Edition (1986), Stemming the Tide: Arms Control in the Johnson Years (1987), Elements Beyond Uranium (1990).

My public speaking schedule included about 700 speeches on a wide variety of topics. Included were talks each year (1972-1990) at the Science Talent Search in Washington, talks at seven of the annual International Science and Engineering Fairs, eight commencement addresses, four science building dedicatory addresses, and talks each year since 1984 to the Nuclear Science Summer School (for high school students chosen at a national level) at San Jose State University. Celebrations observing the 25th anniversary of the discovery of elements 97 and 98 were held in January 1975, of elements 99 and 100 in January 1978, and of element 101 in March 1980.

Honors during this period included the Founder's Medal of Hebrew University (1981), Rudder Lectures at Texas A&M (3/26-28/73), French Legion of Honor (4/13/73), the Gold Medal of the American Institute of Chemists (5/18/73), Austin M. Patterson Award of the Dayton Section of the American Chemical Society (6/7/75), Bicentennial Science Lectureship of Stephen F. Austin State University in Nacodoches, Texas (9/2/75), Goosh-Stephens Lectureship of Baylor University (11/3-4/77, Francis G. Slack Lectureship of Vanderbilt University (11/30 and 12/1/77), Priestley Award of the American Chemical Society (4/2/79), J. T. Baker Nobel Laureate Lectureship of Caltech (10/24/79), Distinguished Lectureship in Materials and Society of the American Society of Metals (11/13/79), Henry DeWolf Smyth Award of the American Nuclear Society (11/17/82), Glenn T. Seaborg Medal of the American Nuclear Society (11/12/85), the Berkeley Academic Senate's Clark Kerr Award (1986), UCLA Glenn T. Seaborg Medal (10/23/87), and the Vannevar Bush Award of the National Science Board (5/11/88).

I was also elected to foreign membership in five academies of science: Royal Academy of Sciences, Sweden (1972), Deutsche Akademie der Naturforscher Leopoldina, East Germany (1973), Polish Academy of Sciences (1975), Academy of Arts and Sciences of Puerto Rico (1982), Chemical Society of Japan (1985), and Serbian Academy of Sciences and Arts (1985). This brings the total number to eleven.

I continued my membership in the Scientific Advisory Board of the Welch Foundation, attending the semiannual meetings each of the years 1972-1990. I served as Chairman of the Board of Directors of Kevex Corporation until it changed ownership in 1988.

The journal covers the activities of our children for this period. Dianne and Eric returned with us to our home in Lafayette when we moved back there from Washington in 1971. Pete moved to our home in Washington (at 3825 Harrison Street). Lynne and her husband, William B. Cobb, Dave and Steve were already in California (Steve and Dave attending the University of California at Davis).

Dianne attended Stanley Intermediate School in Lafayette and finished the ninth grade in 1973, was graduated from Acalanes High School in Lafayette in 1977, and received a B.S. in Human Development from the University of California at Davis in 1982. After living in Los Angeles for a while she has returned and is now living at home in Lafayette.

Eric was graduated from Acalanes High School in 1972 and graduated from the University of California at Davis in 1976 with a B.A. degree in Human Ecology. He moved back to Washington, D.C., in 1978.

Steve finished his undergraduate work at the University of California at Davis in 1973 with a B.A. in Psychology and then went on to obtain an M.S.W. in Social Welfare at San Diego State University. He remained in San Diego, where he married Pat Calvert in August 1986, and they are still living in La Mesa near San Diego.

Dave finished his undergraduate work at the University of California at Davis with a B.S. in Zoology in 1972 and went on to obtain an M.A. in Zoology at the University of California at Berkeley in 1974. He has been living in the Bay Area since that time.

Lynne and Bill moved back to the Midwest and East, where Lynne obtained a Ph.D. in Clinical Psychology at Purdue University in May 1979 and Bill an M.D. at Howard University (Washington, D.C.) in 1978. They moved to Iowa City in 1978, where Bill did his medical internship at the University of Iowa. Their daughter Lela Bates Cobb was born on February 15, 1981, in Iowa City. In 1983 they moved to Grand Junction, Colorado, where their second daughter Molly Seaborg Cobb was born on October 6, 1984. They are still living in Grand Junction.

Pete is still living in our Washington home. He began the operation of a used bookstore (featuring books of the Civil War era) on Connecticut Avenue, and he later moved the bookstore to Georgetown, where he is presently in business.

This brings us up to date as the volumes of Period VIII begin to be issued in 1990.

ACKNOWLEDGEMENTS

I wish to express my appreciation to my daughter Dianne, who helped to assemble, typed and prepared the name index for the initial volumes for this period of my journal, and to members of my office staff, Sherrill Whyte, June Jackson, Grace Nubla, Marta Munoz, Janice Ludwig, and others, who have done the same thing for those volumes after 1979.

Tuesday, January 1, 1974 - Lafayette

The New Year.

I again spent some time recording old music (Charlotte Harvey, popular music, big bands) to 8-track tape.

Peter and Jody Biermann, Ben Orlove, Suki, and I took a hike around the rim trail of the Lafayette Reservoir--we had sunny weather, the first in some days.

Dave's friend Harvey Chinn arrived about noon and watched--with Dave, Steve and me--the Rose Bowl game on TV; Ohio State beat USC, 42-21. Some of the group also watched other Bowl games.

Eric arrived at 6:00 p.m. with Ruthie Olson, having driven up from Sanger (her home) following their visit to Yosemite and neighboring spots.

At 10:00 p.m., we received a phone call from Pete and Jane. They told us that Jane has decided to quit work and start school this month at American University.

Wednesday, January 2, 1974 - Berkeley

I returned to my LBL office today and spent the morning catching up on various matters.

Robert Dean (a technical advisor for the Advanced Waste Treatment Group, Environmental Protection Agency, working with Reiderbach in Cincinnati) called at 8:45 a.m. to ask about the environmental chemist opening. In response to his inquiries, I indicated that this would not be a transfer for anyone now in a federal agency and that we will probably try to get a younger man. I said that we want to get someone right away. He told me that he graduated from Berkeley in 1935.

Mike Moravcsik phoned me from Oregon at 9:10 a.m. to ask about the status of the international science proposal with the AAAS Board of Directors. I told him that the proposal was received positively but that there is no money. The AAAS will try to squeeze out some $5-10,000 to start something in the way of an office. I suggested that perhaps the first priority would be to get foundation support. He asked me how the foundations will be approached, but I indicated that I did not know of a detailed plan but expect that it is in Bevan's area. Mike is concerned that someone write a proposal; I indicated that I thought Bevan has someone to do this who has been connected with the AID program. I suggested that he or someone else try to talk with Bevan about this during the San Francisco meeting. Moravcsik also noted that the study group recommended that an advisory committee be set up; to my knowledge, this has not yet been done.

I went to see Kratz to go over with him the draft of our article on chemical identification of superheavy elements which I worked on over the Christmas vacation. I also went by to see Edelstein to discuss our postdoctoral requirements.

Joe Bort called me at 11:10 a.m. in his capacity as Chairman of the Association of Bay Area Governments (ABAG). He invited me to be the keynote speaker at an ABAG General Assembly to be held in San Francisco on February 21. I consulted Bernie Harvey about the schedule of the Outside Review Committee that day, then called Joe back to accept the invitation.

I had lunch in the cafeteria at the lower level with Gradl, Ritter, Nugent, Poskanzer, Nitschke, Kratz, Bucher, and others. Poskanzer has heard from Claude Stephan, who responded to our offer to collaborate with them on their mass spectrographic identification of superheavy elements by saying we might chemically separate the original samples into fractions including one that would contain the superheavy elements. I said that we do not have the uranium, thorium and transuranium-free laboratories, nor the manpower to do this, so Poskanzer will write Stephan declining the offer.

Jane Freeman called me at 2:20 p.m to invite me to speak at a wives' luncheon during the Business International Roundtable in Puerto Rico on January 10; I said I would be happy to do so.

I sent Andrew Sessler a request for a change of visa status for Adnan Shihab-Eldin, who has been working on our Table of Isotopes project since 1971.

Watanabe phoned to say he has decided to accept my offer to come to work in the Nuclear Chemistry Division of LBL as a prelude to his deciding whether he wants to undertake graduate work with me. He will work in the HILAC Building and Ghiorso will help supervise him.

We heard from John Burnett, Washington AEC, that they would welcome a midyear request for funds to support a postdoctoral man to work with me (in Edelstein's group) on the transuranium elements; we arranged to send in the required information.

Tsang came by and we discussed some ideas for my introductory remarks at the Symposium on the Superheavy Elements at the AAAS Annual Meeting next month; we also designed a couple of slides that I might use.

I picked up Dave and Harvey Chinn at the Lawrence Hall of Science and they rode home with me. Eric and Ruthie arrived home at 6:30 p.m. after a visit to Mount Diablo. Suki and I took a hike to the water tank. Steve drove to Oakland to see Lois after dinner.

Thursday, January 3, 1974 - Berkeley

I conferred with Nugent about our book and helped gather more material. I also conferred with Kratz about our paper and with Tsang about the production of super heavy elements in secondary reactions.

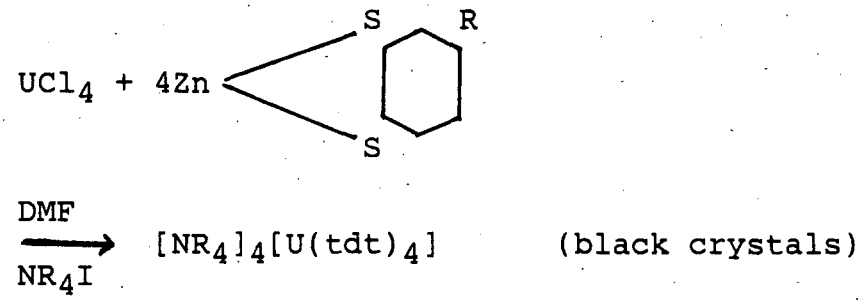
I met with Peter Degroot, Associate Editor of the National Cyclopedia of American Biography, from 10:00-10:45 a.m. They are doing a biography of Burris Cunningham and I went over the draft, made some suggestions, and gave him some more material. If a photograph is to be included, this will cost $425 and I referred this question to

Thursday, January 3, 1974 (con't)

Eileen Eiland for resolution; we left it that, if the Lab could legitimately pay for it, this would be done. I will next see a draft of the write-up, which I will be free to correct, and finally a galley proof.

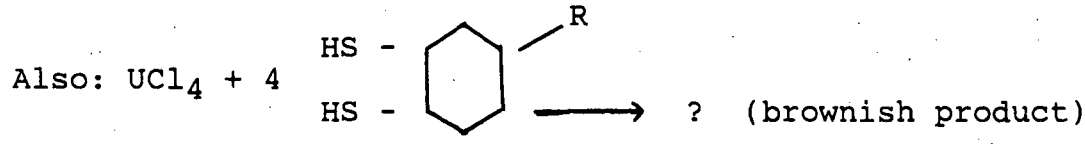
I attended the regular luncheon meeting of the actinide chemistry group in room 1147A, Building 70A. Present were Edelstein, Raymond, Streitwieser, Nugent, Parsons, Ritter, McLaughlin, Starks, Gradl, Halstead, and Baker.

Gradl reported on his further work with uranium organometallics. He may have observed a reaction like:



(DMF = Dimethylformamide

tdt = toluyldithiolate)



Ken Raymond told me that he has decided to accept his Associate Professorship at Berkeley; he has written to decline his other offer. After lunch, we looked out the window and saw that it was snowing! It snowed for about an hour, but not enough to leave a white coat on the ground.

While I was at the Actinide Chemistry Group meeting, Paul Lochak called the office to report on the most recent developments. He told Sheila that, on about Christmas Day, the USAEC sent a Telex (to Wyart?) saying that individual utilities could make individual requests for postponement. The OPEN Group responded that it was practically impossible to get in touch with anyone between Christmas and New Year's and that, early in January, they would be back in touch with the AEC to see how to follow up. The OPEN Group will meet on January 14 and hopes then to decide on the next step towards bringing about cooperation, deadlines notwithstanding.

Leonard Rieser called me at 1:40 p.m. to inquire about the ARCS Foundation and the banquet to which he has been invited on March 1. I described their program to him and suggested that he should do this if possible. He told me that Roger Revelle had asked for a meeting of the Committee on Council Affairs in Washington on January 2. The

Committee gathered, but Revelle was found to be still in Cambridge without having notified anyone that he couldn't come. (Len indicated that he is feeling somewhat lonely now that he is no longer working with Mina Rees and me.)

I called AAAS and talked to Catherine Borras about the election results. Margaret Mead won--she received 24,128 votes and Melvin Calvin received 20,437 votes. The two members elected to the Board of Directors were Ruth Davis with about 24,000 votes and Chauncey Starr with about 18,000 votes. Catherine indicated that Bevan had phoned these results to Melvin Calvin yesterday.

We received word in mid-afternoon that Grizzly Peak Boulevard, Fish Ranch Road, etc., are closed due to the snow! Dianne felt ill today and stayed home from school. Ruthie left during the afternoon to drive back to her home in Sanger. Harvey also left during the afternoon.

Friday, January 4, 1974 - Berkeley

At 9:30 a.m., I met in the HILAC Building conference room with our SuperHILAC Planning Group. Present were Al Ghiorso, Mike Nitschke, Jose Alonso, Carol Alonso, and Matti Nurmia.

We discussed an experiment that Watanabe might work on--study of the efficiency of recoil collection from Cf-252 spontaneous fission in helium jets containing aerosols. We also discussed Kim Williams's possible starting work. We will ask her to measure gold monitors (irradiated with krypton ions) for gamma rays and, later, to work on the target heating problem using the electron gun we have ordered.

We then discussed the problem of making metal out of Ca^{48} for use as a source. We will have about 5 gm of Ca^{48} and will use about 0.3 gm on each source. Each 0.3 gm source will last about a week. Jack Gavin and Nurmia are working on this. I agreed to ask Leo Brewer for one of his IMRD people to consult with Nurmia on this.

Jose and Carol Alonso then presented a schedule for debugging and then using SASSY for superheavy element experiments; they worked out this schedule over the Christmas vacation. The Alonsos hope to start on the first steps of the debugging next week.

Then we discussed plans for the element 106 experiment. The reaction will be $Cf^{249}(O^{18},4n) \rightarrow 106^{263}$. Ghiorso predicts for 106^{263} a half-life of 10 seconds and Nurmia predicts 20 seconds for alpha decay: $106^{263} \rightarrow 104^{259} \xrightarrow{3\ sec.} No^{255} \xrightarrow{3\ min.}$ With 700 micrograms per sq. cm. of Cf^{249} and 6 microamperes of O^{18} the yield is 5 atoms per hour of 106^{263}. The 106^{263} will be transported by a helium jet and caught on a nearby collector (one foot away) where the daughter 104^{259} can be detected. This assumes the half-life for spontaneous fission is longer. Nurmia believes the spontaneous fission half-life of 106^{236} is longer than that for alpha decay and the spontaneous fission half-life of 106^{261} is even longer than that for 106^{263}.

Jose Alonso then reported on his consideration on the production of superheavy elements by secondary reactions. The use of Ca^{50},

Friday, January 4, 1974 (con't)

produced from Ca^{48}, may be feasible for the detection of a superheavy element in a thick target. This led to the conception of the following experiment, which Kim could work on:

$$Cu^{65} + Ar^{40} \rightarrow Ar^{42} \rightarrow Cu^{65} + Ar^{42} \rightarrow Ag^{105}+2n \text{ (40-day E.C.)}$$

I returned to my office in Building 70A for the bag-lunch meeting of the Nuclear Chemistry Division Program Committee, which met from 12:00-1:30 p.m. Present were Richard Diamond, Norman Edelstein, Albert Ghiorso, Norman Glendenning, Hermann Grunder, Bernard Harvey, David Hendrie, Jack Hollander, Arthur Poskanzer, John Rasmussen, David Shirley, Frank Stephens, Ken Street, David Templeton, and Luciano Moretto (substituting for Stan Thompson).

Harvey indicated that the Nuclear Chemistry Division budget for the current year appears to be in balance. I urged that we think in terms of being prepared to participate in the $300 million set for Basic Research in Dixy Lee Ray's proposed budget for FY75-FY79. The committee discussed some of the implications of this; we agreed that the nature of the program will depend very much on the person who heads ERDA. Hollander was asked to report on these developments at the next meeting. Harvey said that we could expect a report on the LBL Mid-Year Budget Review within about a week.

Harvey announced our decision to close down the cave room. Livermore has indicated their willingness to take over any business that we have. Jim Harris will probably go back to Ghiorso's group. Harvey also reported that Joe Cerny will replace Richard Diamond as Chairman of the Equipment Committee and that Art Poskanzer has been appointed as a new member. Diamond will stay on the committee for an interim, transitional period.

Harvey raised the question--brought to his attention by George Pappas upon receipt of a recent memorandum by Bob Thorne--about our participation in the equipment pool. Diamond noted that surplusing old equipment is a different problem from that of pooling still usable equipment. It is anticipated that the pools will be set up on a building-by-building basis. Harvey asked that Cerny call a meeting of the Equipment Committee soon to develop a proposal, after which the senior staff and group leaders will be called for a general meeting to establish our procedures. Harvey also extended Sessler's concern about some general housekeeping needs in the Lab; Michel will coordinate the Nuclear Chemistry Division as soon as the equipment pool matter is settled. Poskanzer observed that such clean-up would raise the threat of losing space; Hollander indicated, however, that space on a Laboratory-wide basis is an imminent item on Sessler's agenda. I asked that equipment having any historical value be preserved.

I described our search for an environmental chemist. I expressed our agreement with Street's suggestion that we also need some strength in geochemistry. Shirley inquired about the criteria we are setting for the environmental chemist; I indicated that it could be a local person (such as Harold Johnston) if he or she were sufficiently interested--there was general agreement that Harold Johnston is

Friday, January 4, 1974 (con't)

perhaps the best in the field, but the question was raised as to how interested he would be in the time commitment required in this position. It was agreed that Johnston should be among those to be approached for the position, it being made clear the nature of the commitment we have in mind. (Templeton reminded the committee that Johnston is already a member of IMRD, as is Pitzer.)

Harvey then raised the question of whether the environmental chemist should be based in the Nuclear Chemistry Division or in Hollander's Division. Hollander expressed the view that the person's Divisional base would not make a great deal of difference in his actual functioning (although it would, Harvey noted, make a difference in the respective Division's budget). The Committee discussed the question at some length in relation to the Lab's total program and its effect on all individual Division programs. Poskanzer suggested that the Divisional base of the person be determined when the candidate is named, although Harvey concluded the consensus of the committee was that it should be Nuclear Chemistry. Hollander agreed that, although he is anxious to build up his own group, the environmental chemist's Divisional base will depend very much on the individual under consideration. Harvey will review the quite structured procedures that will be followed in the search and appointment of the position at a future Program Committee meeting.

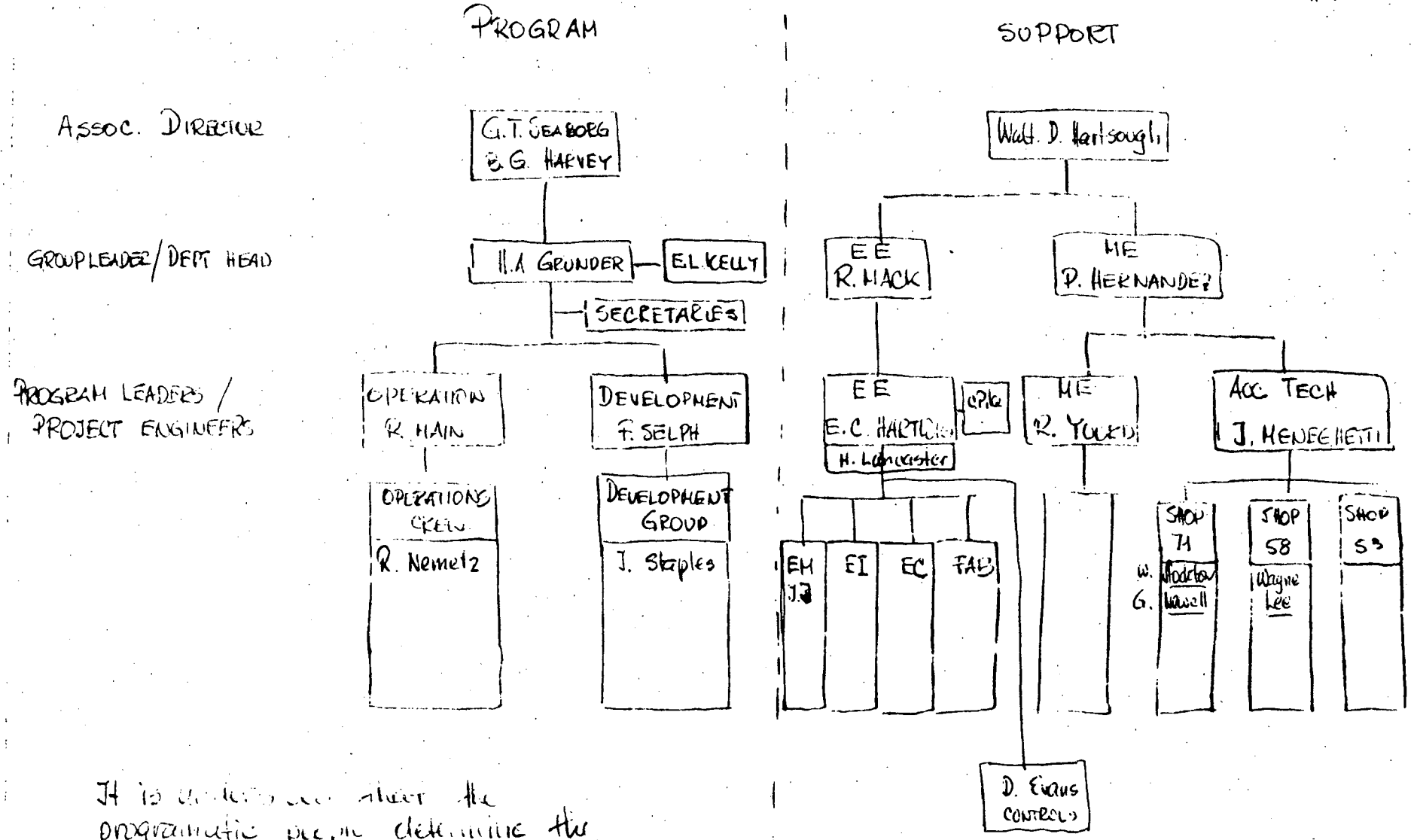
Harvey described the work conducted thus far by the internal review committees and thanked the participants. He announced that the Outside Review Committee will be coming in on February 21-22. He reminded the Committee that the sacred deadline for submissions to the Annual Report is 4:30 p.m. on Friday, January 11. He also extended Yvonne Hall's request for three or four topics that might appear in the 1973 "Research Highlights." I urged that pictures of the SuperHILAC be included and there was general agreement that Dick Marrus's work should be written up.

Harvey announced that George Rogosa will be here on January 17-19; he will participate in the Bevatron Program Committee on the 18th and speak to the Bevatron Users Association on the morning of the 19th, so it appears that we will see him on the 17th. Harvey also announced that Elliot Pierce will be here on January 30.

Ghiorso reported on work to date at the SuperHILAC, including a description of the reorganization there. He said that they plan to run krypton until the March shutdown, though they may be able to get a couple of xenon beams in the meantime. Hermann Grunder diagramed on the blackboard (per the attached) the new organization at the SuperHILAC, dividing the effort into development and operations. He described the roles to be played by key personnel (including those being drawn in from the Electron Ring Accelerator and the Bevatron)--pretty much along the lines of his memorandum attached. He anticipates that Henry Lancaster will work under Ed Hartwig so as to be able to eventually replace him at an appropriate time. (In response to an inquiry, Grunder reviewed the options available to Birt Kortegaard, who will not be involved in our new organizational structure.)

SUPER HILAC ORGANIZATION

DEC 20, 1973
HG



It is [illegible] that the programmatic people determine the course of action for the Super-Hilac

LAWRENCE BERKELEY LABORATORY
Room: 149 Bldg.: 50 Ext.: 5501

December 21, 1973

MEMORANDUM

Sub 1/4/74

TO: SuperHILAC Personnel

FROM: H. A. Grunder

SUBJECT: SuperHILAC Staffing

I am happy to inform you that a number of talented people have been recruited for the SuperHILAC, and some shift of emphasis of existing personnel has taken place.

R. Main has agreed to carry the heavy load of operations chief for the SuperHILAC.

F. Selph is in the process of forming a Beam Development group. John Staples will be his right-hand man and will retain some responsibilities at the Bevatron as well. Duane Spence has agreed to also give his experience and talents to the development effort.

E. L. Kelly will be responsible for the budget and general coordination at the SuperHILAC.

E. C. Hartwig has accepted the job of project engineer for the Electronics Department; he has appointed H. Lancaster as his deputy. Don Evans will be responsible for the digital control work at the SuperHILAC. Jim Johnston will continue as the head of the EM group; his right-hand man, Bill Reinecke, will carry the load on a day-to-day basis.

John Meneghetti has been appointed to supervise the accelerator technicians' effort in buildings 71, 58 and 53. The supervisors in Bldg. 71, Walter Stockton and George Newell, will remain in their present positions. Wayne Lee will become assistant supervisor in Bldg. 58.

R. Yourd, an old hand at the SuperHILAC, will become the project engineer for the Mechanical Engineering department.

Let me take this opportunity to express my thanks for the warm welcome I have received. I am convinced that with the talent and dedication I have observed at the SuperHILAC, the big task of getting the accelerator's potential fully developed will not only be successfully accomplished, but should even be an enjoyable one. The very successful period of krypton running before Christmas is a great tribute to the group.

H. Grunder

H. A. Grunder

HAG:as

I called Leo Brewer during the afternoon to ask if he had anyone at IMRD who could assist us in our experiment of bombarding such elements as curium with calcium-48. I indicated that our problem is to reduce this to the metal and put it into the ion source, probably plating it to a metal. He suggested that Rolf Muller could be a good man to help.

I mailed to John Howe an editorial for publication in Annals of Nuclear Science and Engineering.

At 4:00 p.m., I went by to see Kratz and Norris to discuss the writing of our contribution to the LBL Annual Report. At 4:30 p.m., Sheila, Jane and I went over to the Director's Office in Building 50 so that Jane and I could meet Anna Fleming, Sessler's new Administrative Assistant. She was the Administrative Assistant at the Center for Latin American Studies on the campus before coming to LBL on January 2.

Suki and I took a hike to the water tank in the bitter cold.

Saturday, January 5, 1974 - Lafayette

In the morning, Ghiorso called me to discuss plans for our element 106 experiment. We agreed to invite Ken Hulet to collaborate with us--his contribution would include the preparation of the Cf-249 targets. We will also ask him to collaborate on the superheavy element experiment, where his contribution would include making Cm-248 targets for bombardment with Ca-48. I told Al about the recent reprint I received from Ivo Zvara (JINR E12-7547, Studies of the Heaviest Elements at Dubna) in which he emphasizes their planned attempt to produce and identify element 106 by its production by the bombardment of Cm-246 with O-18; they also have plans for an immediate attempt to produce and identify element 107.

In the late morning, Suki and I took a hike around the rim trail at the Lafayette Reservoir in a cold rain. In the afternoon, we had a hail storm in Lafayette and much cold rain. I spent some time reading reprints of work on superheavy elements and Chem 1B material.

Helen, Dave, Steve, Eric, Dianne and I had dinner together in the kitchen, the last time we will all be together this vacation break.

Sunday, January 6, 1974 - Lafayette

In the late morning, Suki and I hiked around the rim trail at the Reservoir; it was cold, but rained only near the end of our hike.

Joan Duffield spent the day at our house with Steve. Dave moved his things to his room at International House just before dinner. After dinner, Steve drove Eric with his things to Davis so he could move into his new room at Hammarskjold House; Joan went along and then Steve brought her home to Berkeley.

Monday, January 7, 1974 - Berkeley

Helen drove me to the University so she could pick up the Bonneville left parked on the campus last night by Dave. I attended in PSL the first Chemistry 1B lecture for the winter quarter, given by George Pimentel. The hall was overflowing, so Pimentel announced that he will try to arrange for a TV room to take care of those sitting in the aisles.

I walked back up the hill in the rain, went over my correspondence with Sheila, and made a number of phone calls.

I called Kenneth Thimann at Santa Cruz at 10:30 a.m. to discuss the content of my opening remarks at the open meeting of the AAAS Committee on the Public Understanding of Science, to be held at the Exploratorium in San Francisco on February 26. He would like my remarks to be centered on the importance now and in the future of the public understanding of science and of the AAAS Committee.

Walter Costa called me at 11:00 a.m. to tell me that the City Council has on its agenda for this Wednesday's meeting a verbal presentation to be made on the sale of the Panorama and Buckeye Ranch properties to the City of Lafayette. The lands are owned by the Tucks and Adrian Kragen, but the presentation is to made by a realtor. He indicated that Ernie Marriner feels that the realtor is only interested in making a deal with the city.

The land is contiguous to the University of California property and the McKee property (the latter just recently donated to the city). The realtor is talking about a cost of $500,000--that is, about $1,000 per acre, which we agreed seems high. Wally indicated that a price of $600 an acre might be more reasonable. He said that, if they got down to a reasonable price, he would recommend to the Council that the city buy the land with a ten-year note (at the 8.5% interest rate, this would cost the city about $600,000). They would think in terms of the city's continuing to honor the lease with Buckeye Ranch. The land is in two pieces--one on the ridge, the other in the hills, with the Girl Scouts having a piece between them. Wally asked me to find out what I could about the Kragen-Tuck intentions.

I then called Adrian Kragen, who said that he knows nothing about this but that it is feasible. He explained to me that Bob, Jim and Doug Tuck--as Tuck Investments Incorporated--own the ridge around the Kragen group's property. The Kragen group land, which includes Buckeye Ranch, is mostly not in Lafayette. Besides their own property, the Tucks have 30-40% interest in the Kragen [Buckeye Ranch] property; seven others hold the balance, and Kragen said that those seven would probably go along with whatever the Tucks wanted to do with it. Kragen thinks that the $500,000 price suggested is probably for the Tuck land alone. He told me that they have a $350,000 offer for the 137 acres comprising the land of which he is co-owner. He suggested that I call Bob, Doug or Jim Tuck (in that order) at Atlas Heating in San Francisco.

I then talked with Jim Tuck in the absence of his brothers in the capacity of an interested citizen of Lafayette. Jim told me that he

and Doug don't know anything about the proposed presentation at the City Council meeting, but he thinks that Bob might be handling it. Bob will return to the area tomorrow.

I then called Wally Costa back and reported as follows: Kragen's property is probably not involved and the land to be discussed is probably the Tuck brothers' property. From the report of my conversation with Jim Tuck, Wally deduced that the item is probably not high on their priority list.

I held my office hour in 446 Latimer Hall. I had lunch with the Chemistry Department faculty in the Howard Room of the Faculty Club, then taught my first Chem 1B lab section in Room M with C. K. "Cindy" Denley as my Teaching Assistant. At 2:45 p.m., I walked back up the hill to my office.

Roger Batzel called at 3:15 p.m. to tell me that Congressman Orval Hansen will visit the West Coast, including LLL and LBL. He asked if I would be available to see him this Wednesday afternoon. I exclaimed that this is about the only time I will be gone during the next two months and asked that he extend my greetings and regrets to the Congressman. Batzel is in touch with Sessler about the program for Hansen.

Richard Holton, Dean of the School of Business Administration at Berkeley, called at 3:20 p.m. to invite me to address their Alumni Association's annual spring conference in San Francisco on March 22. The date and details have yet to be confirmed; I indicated that if I could do this early in the morning I would probably be able to accept.

I had a cup of tea with Bob Silva. We agreed to continue our plans to collaborate on the chemistry of element 105 using the FAKE apparatus; the collaboration will consist of Norbert Trautman, Silva and someone from my group. Silva also wants to have a close relationship with LBL after he returns from his sabbatical at the University of Mainz; he wants to spend a good deal of time at LBL or even join the LBL staff to work with my group. I said I will bear this in mind.

I wrote a letter to the Admissions Committee of the Cosmos Club, supporting the proposal of Ted Sherburne for membership (copy attached). Since Waldo Smith and I are co-sponsoring Sherburne, I also wrote Milton Harris, O. W. Riegel and Paul McDaniel, asking them to submit letters of endorsement, as well as to Richard Kenyon and Chauncey Leake.

I sent to Rodney Hader a copy of my statement on issues facing the American Chemical Society and a corrected copy of my biography for his use in connection with my candidacy for President (copy attached). I sent to the Nobel Committee for Physics my renomination of Aage Bohr, Ben Mottelson and John Wheeler for the 1974 Prize (copy attached).

In response to his letter requesting an evaluation, I wrote Professor David Lykken at the University of Minnesota about Bill Bevan's qualifications for their presidency (copy attached). I sent to Joe Katz, Bob Penneman and Jack Ryan the general plan for our

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

January 7, 1974

Admissions Committee
The Cosmos Club
2121 Massachusetts Avenue, N.W.
Washington, D.C. 20008

Gentlemen:

I am pleased to write in support of the proposal, submitted by Waldo E. Smith and me, of Edward Gill Sherburne, Jr. for membership in the Cosmos Club. I believe that Ted Sherburne is very well qualified for membership in the Club and I wish to endorse very strongly the proposal for his membership.

I have known Ted Sherburne quite intimately since 1958 and have been in a position to watch at first hand his many contributions to society. I served on the faculty committee at the University of California which recommended his appointment as Statewide Coordinator of Educational Television for the University of California. He served in this position during the period from 1958 to 1961, during which time I was Chancellor of the Berkeley Campus. This gave me an opportunity to work with him and observe closely his outstanding contributions to the installation of educational television at the Berkeley Campus and the University of California as a whole.

From 1961 to 1966 he served as Director of the Public Understanding of Science Program of the American Association for the Advancement of Science. Upon the death of Watson Davis, Director of Science Service, it fell upon me as Chairman of the Board of Trustees of Science Service to play an important role in the selection of Davis' successor. Remembering his outstanding performance at the University of California, I immediately thought of Ted Sherburne and, with

the backing of the Board of Trustees, offered him the position as Director of Science Service. We were delighted that he accepted, and his performance since 1966 in this role has amply justified our confidence in him.

As Director of Science Service, Ted Sherburne has performed brilliantly. This organization has a number of programs in the public understanding of science and in science youth activities. He has not only carried on and expanded these programs, but has placed Science Service in the strongest financial position that it has enjoyed in years. He has been continuously imaginative and innovative in this program and has simultaneously carried on important collateral activities in the fields of public understanding of science and science youth activities.

I am confident that he will be a valued member of the Cosmos Club. His wife Mary Lela is also a delightful person, with a career background in television and other areas complementing the work of her husband.

In summary, I urge very strongly that Ted Sherburne be accepted for membership in the Cosmos Club.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

LAWRENCE BERKELEY LABORATORY
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BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

January 7, 1974

AIR MAIL

Mr. Rodney N. Hader
Office of the Executive Director
American Chemical Society
1155 Sixteenth Street, N.W.
Washington, D.C. 20036

Dear Rod:

In response to your letter of December 21, 1973, I am enclosing a copy of my statement on issues facing the Society and a corrected copy of my biography (following the format of the draft which you sent).

Cordially yours,

Glenn T. Seaborg

GTS/sms

Enclosures

1/4/74

STATEMENT ON AMERICAN CHEMICAL SOCIETY ISSUES

Glenn T. Seaborg
University of California, Berkeley

Circumstances in 1976, difficult to foresee now, will in large part determine what should or can be accomplished by the President of the American Chemical Society. I shall make some suggestions in terms of today's picture.

I would strive for a larger role for the ACS in helping to determine national science policy. This would include policy for science (a better blueprint for the development of science and technology) and science for policy (the role of science and technology in the determination of national policy in general). Chemistry, as a crucial part of science, plays a central role in determining the future health of our country--the ACS Study Report Chemistry in the Economy represents a dramatic illustration of this.

Circumstances in 1976 will determine the best method for liaisons with the White House and the Congress in this area. Although such a program might be supported by the ACS Department of Chemistry and Public Affairs, a high-level committee, with appropriate relationship to the Board of Directors and Council, would be needed to represent the ACS in such a liaison.

Another related objective should be an expanded program in the public understanding of science as represented by chemistry and chemical engineering. Chemistry and chemical engineering provide most of the materials we live, work, and play with every day of our lives, including our food, clothing, housing and

life-saving drugs--creating the colors we see, the textures we feel, and the tastes as well as the nutritional values of the foods we eat. But, for all the great strides science has made, we still display a woeful ignorance compared with what we need to know. The energy shortage, the new recycle revolution, the problems of our water system and air pollution, and the apparent conflicts between industrial chemistry and our new "environmental economics" indicate that a vast undertaking lies ahead for chemists and chemical engineers in reconciling the activities of man's modern society with his natural habitat, in re-establishing man's viability in the web of life. The American public as a whole and the leaders who make the decisions (political, business, educational, social) must better understand and appreciate the role of science. Broad public support is needed to accomplish what needs to be done, and this can only be attained through a better understanding by the general public and decision-making leaders of what chemistry and chemical engineering have accomplished in the past, are accomplishing now, and can and must accomplish in the future.

This objective of better public understanding can be furthered through the expansion and modification of present ACS programs, such as the programs of ACS Short Courses, audio courses, film courses, and correspondence courses, and by the institution of new programs.

Another related goal in this general program to help direct chemistry and chemical engineering into humane channels is the modest expansion of ACS activities on an international

scale. Scientists and engineers in the last few years have shown an increasing concern about the social impact of their work, accompanied by a redirection of their efforts into areas more directly applicable to practical contemporary problems and the promotion of human welfare. Such activities on the domestic scene must be further expanded into the international arena in order to accomplish their objective. Perhaps it is time for the ACS to undertake a larger program in this direction. This could be started by initiating greater liaison with our sister Chemical Societies in other countries.

The various innovations I have suggested should not be allowed to detract from, but rather should advance, the position of ACS as one of the world's leading scientific organizations. The publications program and the national and regional meetings are the backbone of the scientific programs. The publications program has moved forward with the times, as evidenced by the excellent new journals Accounts of Chemical Research and Environmental Science and Technology. The role of Chemical and Engineering News needs re-evaluation--its financial difficulty seems to be characteristic of nearly all publications of this type that rely on advertising as a source of revenue. A study of the format of national meetings should be undertaken to attempt to increase the interest of university scientists, especially younger scientists often in new fields; more should be done to exploit the potential of regional meetings.

The program of professionalism, expanded by recent Presidents of the ACS to meet current needs, should be continued,

and ACS should continue to exert leadership in this area. The ACS has shown the way in this field with its programs, including employment aids, manpower studies, and assistance to members with professional problems. Efforts should continue to achieve for chemists and chemical engineers the ultimate goal of vested pension rights which insure reasonable and proper retirement benefits independent of job changes throughout a career.

The year 1976 will see the celebration of the 200th anniversary of the birth of our country and the 100th anniversary of the start of the ACS. The President-Elect in 1975 should play in important role in planning for appropriate observance of these anniversaries.

GTS

SEABORG, GLENN T. California Section. Lawrence Berkeley Laboratory, University of California, Berkeley, California.

Date of Birth: April 19, 1912.

Academic Record: University of California at Los Angeles, A.B., 1934; University of California, Berkeley, Ph.D., 1937.

Honors: Honorary D.Sc., Denver, 1951, Gustavus Adolphus College, 1954, Northwestern, 1954, Notre Dame, 1961, Ohio State, 1961, Florida State University, 1961, Maryland, 1961, Temple University, 1962, Tulane University, 1962, Drexel Institute of Technology, 1962, Georgetown University, 1962, University of the State of New York, Albany, 1962, Mundelein College, 1963, Trinity College, 1963, University of Detroit, 1965, McGill University, 1966, University of Miami, Florida, 1967, Widener College, 1967, College of Wooster, 1967, University of Delaware, 1967, Tri-State College, 1967, Lambuth College, 1967, John Carroll University, 1968, Duquesne University, 1968, Indiana State University, 1969, University of Utah, 1970. Honorary Sc.D., University of Bucharest, Romania, 1971. Honorary LL.D., Michigan, 1958, Massachusetts, 1963, San Diego State College, 1966, Michigan State University, 1966, Miami University, Ohio, 1969, Rutgers, 1970. Honorary D.P.S., George Washington University, 1962. Honorary D.P.A., University of Puget Sound, 1963. Honorary D.Eng., Michigan Technological University, 1970. Honorary Lit.D., Lafayette College, 1966. Honorary L.H.D., Northern Michigan College, 1962, Nebraska Wesleyan University, 1964, Carroll College, Wisconsin, 1970. Morgan Memorial Lecturer, UCLA, 1946; Howe Memorial Lecturer, Rochester, 1946; Faraday Lecturer, Pasadena, 1947; Nieuwland Lecturer, Notre Dame, 1947; Lecturer, Royal Swedish Academy of Sciences, Stockholm, 1949; Foster Lecturer,

Buffalo, 1951; Philips Lecturer, Haverford, 1953; Franklin Memorial Lecturer, University of Kansas, 1956; Centenary Lecturer, The Chemical Society, England, 1956; Lewis Memorial Lecturer, Berkeley, 1956; Silliman Lecturer, Yale, 1957; Kennedy Memorial Lecturer, Washington University, St. Louis, 1958; Harkins Memorial Lecturer, Chicago, 1958; Faculty Research Lecturer, Berkeley, 1959; Edgar Fahs Smith Memorial Lecturer, Philadelphia, 1960; Powell Lecturer, AAAS, Denver, 1961; Schwab Memorial Lecturer, American Iron and Steel Institute, New York, 1962; Brien McMahon Memorial Lecturer, Connecticut, 1962; Edison Memorial Lecturer, Naval Research Laboratory, Washington, 1963; Quillian Lecturer, Emory, 1964; Harrelson Lecturer, Raleigh, 1964; Evans Memorial Lecturer, Ohio State University, Columbus, 1965; Lecturer, British Nuclear Energy Society, London, 1966; Rosenfeld Lecturer, Grinnell College, 1969; Aebersold Memorial Lecturer, American Nuclear Society, San Francisco, 1969; Gardner Lecturer, Carroll College, 1970; Studsvik Lecturer, Nyköping, Sweden, 1972; Rudder Lecturer, Texas A & M, 1973; Bateman Distinguished Lecturer, Central Arizona Section, A.C.S., Tempe, 1973; Chalmers Lecturer, Gothenburg, Sweden, 1973. ACS Award in Pure Chemistry, 1947; Nichols Medal, New York Section, ACS, 1948; Parsons Ward, 1964; Gibbs Medal, Chicago Section, ACS, 1966; Marshall Award, North Alabama Section, ACS, 1972. John Ericsson Gold Medal, American Society of Swedish Engineers, 1948; Nobel Prize for Chemistry (with E.M. McMillan), 1951; Perkin Medal, American Section, British Society of Chemical Industry, 1957; Enrico Fermi Award, USAEC, 1959; Priestley Memorial Award, Dickinson College, 1960; Science and Engineering Award, Drexel Institute of Technology, 1962; Franklin

Medal, Franklin Institute, 1963; First Spirit of St. Louis Award, 1964; Leif Erikson Award, 1964; Washington Award, Western Society of Engineers, 1965; Chemical Pioneer Award, American Institute of Chemists, 1968; Prometheus Award, National Electrical Manufacturers Assn., 1969; Nuclear Pioneer Award, Society of Nuclear Medicine, 1971; Oliver Townsend Award, Atomic Industrial Forum, 1971; Gold Medal Award, American Institute of Chemists, 1973.

Professional Positions (for past 10 years): University Professor of Chemistry, University of California, 1971--; Associate Director (Director, Nuclear Chemistry Division), Lawrence Berkeley Laboratory, 1971--; Chairman, U.S. Atomic Energy Commission, 1961-71.

Service in ACS Offices: Member ACS since 1938. California Section: Councilor, 1953-55. Division of Physical and Inorganic Chemistry: Chairman, 1951-52, Councilor, 1951-52, Chairman-Elect, 1950-51.

Service in ACS National Offices: Foreign Compendia, 1946-54; Councilor-at-Large, 1947; Committee Advisory to the Chemical Corps, 1947-55; Associate Editor, JACS, 1950-54; Editorial Board, JACS, 1950-59; Council Committee on Publications, 1951-56; Council Policy Committee, 1955-56; Chairman, CPC Subcommittee on Nominations for Perkin Medal, 1955-56; CPC Subcommittee on Non-ACS Awards, 1956; Advisory Board, C&EN, 1957-59; Joint Board-Council Committee on Chemistry and Public Affairs, 1965-70; CCPA Subcommittee on Chemistry and the U.S. Economy, 1971--; Screening Panel for the Priestley Medal, 1970-72; Screening Committee for the Parsons Award, 1973--.

Related Activities: Member, Joint Commission on Radioactivity, International Council of Scientific Unions, 1946-56; Chairman of the Board, American Association for the Advancement of Science, 1973, President, 1972,

President-Elect, 1971; Trustee, Science Service, Inc., 1965--, President, 1966; Trustee, Pacific Science Center Foundation, 1962--; Member, Scientific Advisory Board, Robert A. Welch Foundation, 1957--. Member, First General Advisory Committee, U.S. Atomic Energy Commission, 1946-50; President's Science Advisory Committee, 1959-61; National Science Board, National Science Foundation, 1960-61; NSF Advisory Council on College Chemistry, 1962-67; Federal Radiation Council, 1961-69; Federal Council for Science and Technology, 1961-70; National Aeronautics and Space Council, 1961-71; National Council on Marine Resources and Engineering Development, 1966-71; Secretary of State Rusk's delegation to Moscow for signing of Limited Test Ban Treaty, 1963; Chairman, U.S. delegation to U.S.S.R. for signing of "Memorandum on Cooperation in the Field of Utilization of Atomic Energy for Peaceful Purposes," 1963; U.S. Representative, annual General Conferences, International Atomic Energy Agency, 1961-71; Chairman, U.S. delegation, and President, Fourth United Nations International Conference on the Peaceful Uses of Atomic Energy, Geneva, 1971; Chairman, U.S. delegation, Third International Conference, 1964; Commission on the Humanities, American Council of Learned Societies, Council of Graduate Schools and United Chapters of Phi Beta Kappa, 1962-65; Chairman, Steering Committee, Chemical Education Material (CHEM) Study, 1959--; Advisory Committee, Lawrence Hall of Science, 1963--.

Member: National Academy of Sciences, National Academy of Public Administration. Fellow: American Academy of Arts and Sciences, American Association for the Advancement of Science, American Institute of Chemists, American Nuclear Society, American Physical

Society, British Chemical Society, British Royal Society of Arts, California, New York, and Washington Academies of Sciences. Honorary Member: American Philosophical Society, American Society of Swedish Engineers, Society of Nuclear Medicine. Foreign Member: Argentine National Academy of Sciences (hon.), Bavarian Academy of Sciences (corr. mem.), Swedish Royal Academy of Engineering Sciences, Spanish Royal Academy of Exact, Physical and Natural Sciences, Swedish Royal Academy of Sciences, Royal Society of Edinburgh (hon. fellow), Deutsche Akademie der Naturforscher Leopoldina (East Germany), U.S.S.R. Academy of Sciences. Alpha Chi Sigma, Phi Beta Kappa, Phi Lambda Upsilon, Pi Mu Epsilon, Sigma Xi.

LAWRENCE BERKELEY LABORATORY
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January 7, 1974

Nobel Committee for Physics
Swedish Royal Academy of Sciences
Sturegatan 14
S-114 36 Stockholm, Sweden

Gentlemen:

It is my pleasure to renominate Aage Bohr, Ben Mottelson, and John A. Wheeler for the Nobel Prize for Physics. In earlier nominating letters I have developed in detail the case for this award to them. Subsequent developments up to the current thrusts of nuclear physics have amply borne out the enormous and lasting impact of their visionary insights of the early 1950's. Particularly has the Copenhagen school under Bohr's and Mottelson's leadership been the wellspring of ideas for the elucidation of nuclear structure. John Wheeler meanwhile has moved more into leadership in the astrophysical areas of gravitational collapse and general relativity.

The comprehensive and unifying viewpoint of Bohr and Mottelson on nuclear phenomena was well brought out in Professor Bohr's address to the IUPAP General Assembly in Washington in 1972. A copy of that paper is enclosed.

The Bohr-Mottelson volumes on Nuclear Structure, of which the first is published and the second has circulated to us in final draft form, stand as really monumental works in the field.

Bohr, Mottelson and Wheeler are richly deserving of the 1974 Nobel Prize for Physics for their unification of collective and single particle aspects of nuclear structure and for numerous other contributions.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

Enclosure

NOMINATION FOR THE AWARD OF THE 1974 NOBEL PRIZE FOR PHYSICS

Candidate(s):

Name: Dr. Aage Bohr
Position or title: Professor
Address (Institution): Niels Bohr Institute, University of Copenhagen, Blegdamsvej 17, 2100 Copenhagen Ø, Denmark

Name: Dr. Ben R. Mottelson
Position or title: Professor
Address (Institution): Nordic Institute for Theoretical Atomic Physics (NORDITA), Blegdamsvej 17, 2100 Copenhagen Ø, Denmark

Name: Dr. John A. Wheeler
Position or title: Professor
Address (Institution): Joseph Henry Laboratories, Department of Physics, Princeton University, Princeton, New Jersey 08540, U.S.A.

The nomination is made in respect of

their brilliant elucidation of the interrelationships of collective modes and individual particle motion in atomic nuclei.

Brief motivation. (Detailed motivation, bibliography and curriculum vitae, if available, and other documents which the nominator wishes to cite should be appended.)

The detailed support of this nomination is contained in my original nominating letter of January 15, 1965, and in my renomination of January 10, 1968.

A supplementary letter is appended herewith.

I renominated them for the 1969, 1970, 1971, 1972 and 1973 Awards.

Because of their great contributions in opening up and developing significant areas of nuclear physics, I recommend them again for consideration for the 1974 Nobel Prize for Physics.

Nominator: Glenn T. Seaborg
Position or title: University Professor of Chemistry
Address (Institution): Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720, U.S.A.

Signature of nominator

Date: January 7, 1974

January 7, 1974

Professor David T. Lykken
Faculty Consultative Committee
Box 392, Mayo Memorial Building
University of Minnesota
Minneapolis, Minnesota 55455

Dear Professor Lykken:

This is in reply to your letter of December 20, 1973, requesting my evaluation of Dr. William Bevan in connection with your search for a new president for the University of Minnesota.

Dr. Bevan is in his fourth year as Executive Officer of the American Association for the Advancement of Science and, as you may now know, has announced his resignation to be effective at the end of this academic year. Before assuming this position in 1970, he was the Vice President and Provost of Johns Hopkins University (1966-70). He served as Vice President for Academic Affairs at Kansas State University from 1963 to 1966.

I have become very well acquainted with Bill Bevan during the last three years (1971-73) in which I served as President-Elect, President, and Chairman of the Board of the AAAS. He possesses a rare combination of scholarly background, executive ability and administrative experience which would suit him admirably for the position at Minnesota--particularly as you have described your concerns in your letter. He is a very dynamic person, is decisive, and relates well to people both above and below him in the administrative ladder. He is energetic, gets things done on schedule, and is very articulate. He has a good reputation in his academic specialty, experimental psychology.

I believe that you should give him your most serious consideration for the Presidency at Minnesota.

Cordially yours,

Glenn T. Seaborg

GTS/sms

revision of Chemistry of the Actinide Elements, as prepared by Len Nugent (copy attached).

At 4:00 p.m., I attended the graduate student session of the Nuclear Chemistry Division Seminar. The speakers were Norman Jacob (who works with Professor Markowitz), who spoke on "Free-Particle Collisions in Pion and Proton-Induced 'Knock-Out' Reactions," and Gary Schwartz (who works with Professor Shirley), who spoke on "Perturbed Angular Correlation Measurements in Rare Earth Alloys."

I called Bill Bevan at 5:15 p.m. (at his home in Baltimore) to discuss the final count of the AAAS election. He said that he will not be able to come out to the Bay Area in January and suggests that we arrange a meeting for him when he is here at the end of February. I suggested that we may also arrange for him to meet someone in University Hall when he is here. I told him that I had sent off a strong letter for him to Minnesota; he indicated that he had heard about this by rumor but has not been approached directly.

When I arrived home, Helen gave me the bad news that cousin Edith Ericson died at about noon yesterday; Helen received a phone call this afternoon from Edith's attorney, Leslie Fisher (of Iron River, Michigan), who informed her of Edith's death and the fact that Jeanette and I are beneficiaries in her will. Edith would have been 96 years old in March.

Steve, Suki and I took a hike to the water tank. Helen and I called Jeanette after dinner to inform her of Edith's death.

Tuesday, January 8, 1974 - Lafayette - Dorado Beach, Puerto Rico

Steve drove Helen and me to San Francisco International Airport. Helen called home at 7:10 a.m. to awaken Dianne for her departure for school. We flew to San Juan, Puerto Rico, via New Orleans, arriving at 7:40 p.m.

We took a taxi to the Cerromar Beach Hotel at Dorado, a ride of about 30 miles, which we shared with a couple from Marian, Illinois. We arrived at the hotel at 9:15 p.m. and checked in. We then went down to the Garden Terrace to look in on the Rendezvous Dinner of the Business International Roundtable where Orville Freeman was just finishing his after-dinner talk. We met Orville and Jane Freeman, Sol and Toni Linowitz, Eldridge and Elliott Haynes, and many others. We joined the Freemans and Hayneses for some dessert and tea and coffee.

Wednesday, January 9, 1974 - Dorado Beach, Puerto Rico

Helen and I had breakfast in our room. I then went down to the Salon Cerromar where I attended the opening session of the Business International Roundtable chaired by James E. Lee, President of Gulf Oil Corporation (schedule attached). The Session 1 Roundtable discussion on today's topic "The Energy Crisis and International Business" had His Royal Highness Amir Sa'ud al-Faysal as discussion leader. He made some opening remarks ("The Saudi Arabian View") on the oil supply problem. He made a case for the need of the Arab countries to increase the price of oil in concert with the inflationary trend

p. 1

General Plan January 1974

Title: THE CHEMISTRY OF THE ACTINIDE ELEMENTS

Subtitle: A Physicochemical Exposition of the Elements beyond Radium

Authors and Affiliations

Preface, August 1957 (to be written last by Katz and Seaborg)

Preface, January 1975 (to be written last by Katz and Seaborg)

CONTENTS

I. INTRODUCTION (4 pages to be written last by Katz and Seaborg)

Part 1

Physicochemical Properties of Each Element beyond Radium

(General outline for each chapter of Part 1)

1. Introduction (includes history)
2. Nuclear properties
3. Occurrence in nature
4. Preparation and purification
5. Atomic properties
   a) Emission spectra, X-ray spectra, Electronic structure, etc.
6. The Metallic State
   a) Structures, mechanical properties, thermodynamic properties, electronic properties
   b) Chemical properties of the metallic state. Reactions with non-metallic elements; reactions with non-metallic compounds, reactions with acids; etc.
   c) Intermetallic systems
7. ~~Binary~~ Simple and complex compounds
   a) Metal-hydrogen systems
   b) Borides, carbides, silicides
   c) Oxides, nitrides, sulfides, phosphides
   d) Halides
8. ~~Other compounds (including metallo organics)~~
8, ~~9~~. Solution chemistry

(Application will be mentioned in passing at the point in each chapter where appropriate.)

II. ACTINIUM (11 pages to be written by Nugent/Ryan).

III. THORIUM (51 pages to be written by Nugent/Ryan).

IV. PROTACTINIUM (27 pages to be written by Nugent/Ryan).

V. URANIUM (110 pages to be written by Ryan/Nugent). (Be sure to include the description of the Gabon natural reactor of French equatorial Africa in this chapter. Seaborg has a file on this which we will send to Ryan).

VI. NEPTUNIUM (35 pages to be written by Ryan/Nugent).

VII. PLUTONIUM (92 pages to be written by Ryan/Nugent).

VIII. AMERICIUM (42 pages to be written by Ryan/Nugent).

IX. CURIUM (13 pages to be written by Nugent/Ryan).

X. BERKELIUM (14 pages to be written by Nugent/Ryan).

XI. CALIFORNIUM (14 pages to be written by Nugent/Ryan).

XII. EINSTEINIUM (6 pages to be written by Nugent/Ryan).

XIII. TRANSEINSTEINIUM ELEMENTS (20 pages to be written by Nugent/Ryan).

1. Fermium
2. Mendelevium
3. Nobelium
4. Lawrencium
5. Element 104
6. Element 105

Part 2

Summary and Correlation of Physicochemical Properties

XIV. GENERAL CONSIDERATIONS (10 pages including position in the periodic table to be written by Ryan/Nugent).

XV. ELECTRONIC STRUCTURES (20 pages to be written by Nugent/Ryan).

XVI. SPECTROSCOPIC PROPERTIES (30 pages to be written by Nugent/Ryan).

XVII. THERMODYNAMIC PROPERTIES (50 pages including ionization potentials - to be written by Nugent/Ryan).

XVIII. MAGNETIC PROPERTIES (20 pages to be written by Nugent/Edelstein).

XIX. SOLID STATE CHEMISTRY (30 pages including crystal structures, the tetrad effect, and ionic radii - to be written by Nugent/Penneman).

XX. SOLUTION CHEMISTRY (30 pages including hydrolysis and complex ion formation, absorption-elution behavior, and the tetrad effect - to be written by Ryan/Nugent).

XXI. FUTURE ELEMENTS (10 pages to be written by Penneman/Nugent).

APPENDIX I. Nuclear Spins of the Actinide Elements (1 page to be compiled by Ken Vander Sluis).

APPENDIX II. Specific Activity of Actinide Nuclides (3 pages to be compiled by Don Ferguson, et al.).

APPENDIX III. This appendix will consist of a list of references which direct the reader to where more tabulated data on the lanthanides and actinides can be found. It will also list the subject matter not covered in the present revision but emphasized in other recent actinide monographs and reviews (5 pages to be compiled by Nugent/Ryan).

NAME INDEX (8 pages to be compiled by Nugent/Ryan).

SUBJECT INDEX (20 pages to be compiled by Ryan/Nugent).

Total of pages for INTRODUCTION	=	4
Total pages for Part 1	=	435
Total pages for Part 2	=	200
Total pages for APPENDICES	=	9
Total pages for INDICES	=	28
Total of above pages for monograph	=	676

Consideration of Length

Titles and lengths of similar publications

1) "The Chemistry of the Transuranium Elements" by Cornelius Keller, Verlag Chemie GmbH (1971), 675 pp.

2) "The Actinide Elements" by K. W. Bagnall, Elsevier Publishing Company, Amsterdam/London/New York (1972), 272 pp.

3) "The Chemistry of the Actinide Elements" by J. J. Katz and G. T. Seaborg, Methuen and Co. Ltd./London, and John Wiley and Sons/New York (1957), 508 pp.

The length of the (1975) revision of "The Chemistry of the Actinide Elements" should certainly not be shorter than the 500 pp. length of the first edition, and, in order to try and keep the purchase price below that of 1) above, it should not be longer than 700 pp.

Target number of pages = 650 ± 50 pp.

Overall Style

Chapter II. ACTINIUM will soon be finished. This chapter will serve as an illustrative guide for the style of the entire book.

Style for References

Rather than list references at the bottom of each page as in the original Katz and Seaborg, we shall list them consecutively from 1 to N at the end of each chapter. The references shall be indicated in the text whereever appropriate as superscripts, for example, Katz and Seaborg[1], etc.

Definition of the number of words in what we call 1 page

We mean by one page approximately 550 words. If a table takes up a whole page then it is the equivalent of 550 words, and similarly with figures and equations.

L. J. Nugent

BUSINESS INTERNATIONAL CHIEF EXECUTIVE OFFICERS' ROUNDTABLE

Puerto Rico - January 8-11, 1974

Schedule of Sessions

Tuesday, January 8

	1:00 PM - 7:00 PM (Salon 9)	Registration
	7:30 PM (Garden Terrace)	Rendezvous Reception and Buffet Dinner (L)

Wednesday, January 9: The Energy Crisis and International Business

	7:30 AM - 8:30 AM (Salon 5)	Breakfast - Teams for Sessions 1, 2, 3, 4
(1)	8:45 AM - 9:45 AM (Salon Cerromar)	The Saudi Arabian View H.R.H. Amir Sa'ud al-Faysal
(2)	9:45 AM - 10:45 AM (Salon Cerromar)	The European View Georges Brondel
	10:45 AM - 11:00 AM	Coffee break
(3)	11:00 AM - 12:00 PM (Salon Cerromar)	The Japanese View Hon. Kiichi Miyazawa
(4)	12:00 PM - 1:00 PM (Salon Cerromar)	The United States View George M Bennsky Dr. William A. Johnson
	1:00 PM - 5:00 PM	Free time
(5)	5:00 PM - 6:30 PM	Discussion groups: 5A - Salon 1 5B - Salon 2 5C - Salon 3 5D - Salon 4 5E - Salon 7 5F - Salon 8 5G - Salon Cerromar 5H - Salon Cerromar 5I - Hotel's "Executive Conference Room"
	Evening	Free

cont'd

Schedule of Sessions (cont'd)

Thursday, January 10

	7:30 AM - 8:30 AM (Salon 5)	Breakfast - Teams for Sessions 7 and 8
(6)	8:45 AM - 9:45 AM (Salon Cerromar)	Plenary Conclusions Session on the Short and Medium-Term Energy Outlook
(7)	9:45 AM - 10:45 AM (Salon Cerromar)	The Long-Term Energy Outlook Dr. Glenn T. Seaborg Professor Keeve M. Siegel
	10:45 AM - 11:00 AM	Coffee break
(8)	11:00 AM - 1:00 PM (Salon Cerromar)	Industrial Democracy and the Enterprise System Dr. Pieter A. Blaisse Charles Levinson
	1:00 PM - 5:00 PM	Free time
(9)	5:00 PM - 6:30 PM	Discussion groups: 9A - Salon 1 9B - Salon 2 9C - Salon 3 9D - Salon 4 9E - Salon 7 9F - Salon 8 9G - Salon Cerromar 9H - Salon Cerromar 9I - Hotel's "Executive Conference Room"
	7:30 PM - 8:30 PM (Garden Terrace)	Reception (L)
	8:30 PM (Club Cerromar)	Banquet (L)

cont'd

	Friday, January 11:	New Patterns of Business in the Socialist World
	7:30 AM - 8:30 AM	Breakfast - Teams for Sessions 10, 11, 12
(10)	8:45 AM - 9:45 AM (Salon Cerromar)	The USSR George S. Schukin Yuriy Tikhonov
(11)	9:45 AM - 1:45 AM (Salon Cerromar)	Eastern Europe Dr. Janez Stanovnik
	10:45 AM - 11:00 AM	Coffee break
(12)	11:00 AM - 12:00 PM (Salon Cerromar)	The People's Republic of China Gerald Tannebaum Georg Hansen
(13)	12:15 PM - 2:15 PM (Salons 6 & 7)	Luncheon Discussion Groups: 13A - Salons 6 & 7 13B - Salons 6 & 7 13C - Salons 6 & 7 13D - Salons 6 & 7 13E - Salons 6 & 7 13F - Salons 6 & 7 13G - Salons 6 & 7 13H - Salons 6 & 7 13I - Salons 6 & 7
(14)	2:30 PM - 4:45 PM (Salon Cerromar)	Business International Presentation: World Monetary and Trade Situation; Findings of Research on International Corporate Investment; Action Programs for the Future
	4:45 PM - 5:00 PM	Coffee break
(15)	5:00 PM - 6:30 PM (Salon Cerromar)	Final Plenary Conclusions Session
	6:30 PM (Foyer Grande)	Farewell Cocktails (L)

(L) - Ladies invited.
In addition to the functions shown, the ladies are also welcome to audit plenary sessions 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 14 and 15.

Wednesday, January 9, 1974 (con't)

throughout the world. He said the unrealistically low prices of oil in the 1950's and 1960's enabled the industrial countries to expand in a manner that exploited the oil producing countries and increased the gap between the two classes of countries. Saudi Arabia has increased its foreign aid at a rate greater than its increase in income in recent years. The international oil companies will always have a role to play as the intermediaries between the Arabian owners of the oil sources and the ultimate consumers of the oil.

The attendees (clients) sat at five long tables set at right angles to the front table where the Roundtable participants sat. Along the wall sat the spectators, including wives of the attendees.

At the conclusion of Sa'ud's opening remarks, Lee called for questions from the floor (attendees), after which Sa'ud was allowed to ask questions of his hosts. Then there were additional questions from the floor. Freeman asked if investors in Saudi Arabia would be "expropriated" and Sa'ud replied that the record to date, the best indicator, shows that this is not likely.

The meeting then went to Session 2 with Hans Rausing (President, Tetra Pak International AB, Sweden) as chairman, who introduced Georges Brondel (Director for Hydrocarbons, Directorate General for Energy and Euratom Safeguards, Commission of the European Communities) as discussion leader for "The European View." Brondel made his opening statement, followed by questions from the floor and then his questions. He asked if industry can react rapidly to changes in the price for energy; the answer was that industries can react faster than governments.

After this session, we took the scheduled coffee break where I was joined by Helen. We talked to Simon Ramo who recalled my talk to the ARCS in Los Angeles which he and Mrs. Ramo attended. We talked to Sol and Toni Linowitz; Sol told us he still thinks Nixon will resign soon due to health reasons.

We went in to Session 3 where the chairman, John L. Hanigan (Chairman of the Board & Chief Executive Officer, Brunswick Corporation) introduced Kiichi Miyazawa (Member of Japan's House of Representatives) who served as discussion leader. He made his opening statement. He described the relative uses of various fossil fuels and their application in Japan, the United States, and other countries. In nuclear power, Japan will have six million kilowatts by 1977 but have no plans now for nuclear capacity beyond that. Japan now realizes they are an economic giant with feet of clay, but cannot identify how they reached their present precarious status. They now import 12% less oil than last year while they had planned on a 13% increase. So they must remodel their economic policy and life style. After Miyazawa's presentation, Hanigan asked for a show of hands as to which companies would suffer badly from an increase in cost of energy or raw materials; very few hands were shown. This was followed by questions from the floor, then Miyazawa's questions. He asked whether consuming countries plan to band together as Secretary Kissinger suggested, and Dr. William A. Johnson (Special Assistant to the Deputy

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Secretary for Energy and Natural Resources, U.S. Department of the Treasury) said there is still hope that constructive steps can be taken.

Session 4 started with Simon Ramo (Vice Chairman of the Board and Chairman of the Executive Committee, TRW, Inc.) as chairman. He introduced Dr. William A. Johnson as the first discussion leader giving "The United States View." Johnson then made his presentation. He said he was speaking in the place of Simon. We are in the present crisis because of two decades of neglect of our domestic energy program and a century of neglect of our natural resources. We can increase oil supply by resuming Elk Hills and Santa Barbara channel drilling and lifting the ceiling on Texas fields drilling. However, the only short-range solution to the shortage is through conservation. The entire short fall could be thus met (through conservation) without curtailing our industry. The best solution to effect this would be to let prices rise, but our political leaders are afraid to do this. Prices of natural gas will soon rise to $1 per cu. ft. and gasoline to 80-90¢ per gallon. Among the things we must do are: reverse the EPA lead standards, curtail overzealous environmental legislation, go on with strip mining, accelerate off-shore drilling, accelerate commercial development of oil shale, remove constraints on construction of refineries, speed up of nuclear power, and allow prices to increase. We should aim for self-sufficiency by 1980 with a Manhattan Project-type effort; he mentioned an expenditure of $800 billion over the next 15 years in this connection and said, confidentially, such a program will be announced soon.

Ramo called on George M. Bennsky (Director, Office of Fuels and Energy, U.S. Department of State) as the next discussion leader. He began his presentation by expressing the regrets of Under-Secretary Donaldson for his inability to attend. He said that international companies have a key role to play.

Then Ramo called for questions from the floor. Johnson told the representatives of oil companies to watch their public relations and, in particular, to be sure the independent marketers will get their just share of the oil supply. Linowitz suggested (1) we should stop talking about our energy self-sufficiency; (2) the line between domestic and foreign supply doesn't make sense; (3) clarity, like charity, should begin at home; (4) we must be made to believe that the situation is serious; (5) unless the government calls on industry, the job won't be done. Johnson, in response, agreed on point (1), except we need reasonable self-sufficiency and with this still can have the well-being of the rest of the world in mind; he attempted to justify self-consistency of governmental statements on oil supply; conservation is having a large impact. Bennsky, also in response to Linowitz, said the best response is that the United States make the best use of its resources; on misunderstanding, he said this is because people use complex data in the way they want; and finally, he said companies can move now and don't need a signal from the government. In response to a question, Johnson said his paper will probably be adopted by many in government. Johnson said Congress is coming back mad from the holiday vacation and many impractical bills will be introduced. Johnson was

asked about the announcement of Atlantic Richfield suggesting the dropping of the oil depletion allowance and he, and apparently other oil companies, regard it favorably; independent producers are against it, however. Ramo said that the $10 billion government plan over the next 5 years, to develop synthetic fuels from coal, explosives for gas recovery, etc., could keep the price of energy low enough to make unnecessary some of the reduced economy outlooks for the future.

After the morning sessions, Helen and I had lunch in the Garden Terrace. We joined Charlie and Louise Weaver for a while after lunch. He told me that he and Louise visited the People's Republic of China for a couple of weeks in November as members of an industrial group. He wasn't able to find out anything about their plans for nuclear power or whether the information (which he sent to Sze at my suggestion) had been put to any use. Helen and I went down to the beach for a bit, then went back to our room where I worked on my talk for tomorrow.

At 5:00 p.m., James McDenna and Miss C. Arena, accompanied by photographer Jose Garcia, all of the San Juan Star, interviewed me about the energy crisis. (McDenna reminded me that he had interviewed me on previous visits to San Juan.) They were particularly concerned about the future of San Juan because of its dependence on oil and therefore about the role of synthetic liquid fuels and nuclear power.

Helen and I went to dinner as the guests of Orville and Jane Freeman. After cocktails in the Freeman's suite, along with the others in the dinner party, we boarded a bus and rode to the Su Casa restaurant on the grounds of the Dorado Beach Hotel. Present at the dinner party were: at our table, the Freemans, Mr. and Mrs. William F. May (Chairman, American Can Company) and Mr. and Mrs. James K. Morris (Vice President, International, American Can Company); and at another table, Mr. and Mrs. Eldridge Haynes (Chairman of the Board, Business International), Mr. and Mrs. Frank X. White (Vice President, Business International, Chicago), Mr. and Mrs. W. H. Conzen (President, Schering-Plough Corporation), Mr. and Mrs. William C. Norris (Chairman of the Board, Control Data Corporation, Minneapolis), and Lord Harry Pilkington (Honorary President, Pilkington Brothers Ltd., St. Helens, England).

I learned that Bill May has a bachelor's degree (1937) in physical chemistry from the University of Rochester and did some work with Lee DuBridge's cyclotron group in the Physics Department. This may explain his enlightened humanitarian attitude which makes him stand out so much among corporate executives.

Thursday, January 10, 1974 - Dorado Beach, Puerto Rico

Helen and I had breakfast in our room. I then went down to Salon Cerromar to attend the Plenary Conclusions Session on the Short and Medium-Term Energy Outlook.

Following this, I went up to the head table, along with Walter S. Bencher (Vice President, International Relations, Combustion Engineering, Inc.), Professor Keeve M. Siegel (Chairman, KMS Industries, Inc.,), and Orville Freeman. Bencher, acting as chairman of

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this Session 7 on "The Long-Term Energy Outlook," introduced me and I gave my talk "Energy Sources of the Future," illustrated with about 20 slides. Following this, Siegel gave his talk on the laser fusion program at KMS Industries. He said they have been successful but are not yet ready to announce that they have achieved proof of principle. They do not plan to produce electricity but apparently will use the 20% of the fusion reactions that produce He^3 to produce hydrogen by bond breaking processes. He thinks they will have a hydrogen-producing pilot plant by 1979 and a profitable production plant in the 1980's.

After the presentations by Siegel and me, there were a few questions, mostly directed at me. They had to do with supply of uranium ores, relative cost of nuclear power, speed-up of construction of nuclear power plants, and my estimate of the time scale for practical application of the KMS fusion process (I said I estimated some 20-25 years in the future). Siegel later expressed his appreciation for my role in making it possible for KMS to work on laser fusion.

We then had a coffee break. I introduced Helen to Mr. and Mrs. Edward R. Kane (President, E.I. du Pont de Nemours & Company). He told us he knows Bill Jenkins quite well. We also reminisced about our many other mutual friends at du Pont. He said he shares the Chief Executive Office function with Irving Shapiro, the new Chairman of the Board at du Pont. Charles McCoy is now Chairman of the Executive Committee.

I then went up to my room to put together my slides for my scheduled luncheon talk. I went down to the Surf Room, along with Helen, who had attended a number of the talks this morning. Here, along with Jane Freeman, Kathleen Haynes, and, at times, Louise Wright (whose husband is Vice President and General Manager, Western Hemisphere, Business International), we stood in the reception line prior to the Ladies Luncheon. About 50 women attended the reception and luncheon, which was held in the Orchid Room. Helen and I sat at a table with Jane Freeman, Toni Linowitz, Kathleen Haynes, Mrs. Feliks Gorski (whose husband is Vice President, Energoinvest, Sarajevo, Yugoslavia), Mrs. Atherton Bean (whose husband is Chairman, Executive Committee, International Multifoods, Minneapolis, Minnesota), and Mrs. Janez Stanovnik (whose husband is Executive Secretary, United Nations Economic Commission for Europe, Geneva, Switzerland--they are Yugoslav nationals). I learned that Kathleen Haynes was raised in Berkeley and spent a good part of her life there (they live at St. Croix a good part of the time now since his retirement). After lunch, I gave a combination talk on the energy problem and our visit to China, which was well received.

Helen and I took a walk around the Hotel grounds, then went back to our room until dinner time. We attended the reception in the area in front of the Salon Cerromar. Among the people we talked to were Mr. and Mrs. Sven Agrup (President, AGA Aktiebolag, Lidingo, Sweden), Mr. and Mrs. William F. May, Mr. and Mrs. Forrest E. Behm (President, Corning International Corp., Corning, New York), Mr. and Mrs. Byron

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Smith, Jr. (President, Illinois Tool Works Inc., Chicago, Illinois), Mr. and Mrs. Antonie T. Knoppers (President, Merck & Company, Inc., Rahway, New Jersey, and a friend of Vannevar Bush), Mr. and Mrs. Arne Westerberg (President, Sandvik AB, Sanviken, Sweden), Mr. and Mrs. Hans Rausing, Mr. and Mrs. Simon Ramo, Mr. and Mrs. William D. Sneath (President, Union Carbide Corporation; he told me John Swartout has retired from Union Carbide), Mr. and Mrs. Charles H. Weaver (President, World Regions, Westinghouse Electric Corporation), Mr. and Mrs. Redvers Opie (Economic Counsellor, American Chamber of Commerce, Mexico; as Charlie Hitch's professor at Oxford University, he asked me to extend his regards to Charlie).

After the reception, we all went to dinner in the Club Cerromar. The evening included a show (a young singing group of three girls and two fellows) and dancing to a small orchestra. Helen and I sat near Sol and Toni Linowitz, Mr. and Mrs. Harvey J. Taufen (Vice President and Director, Hercules Incorporated, Wilmington, Delaware), Orville and Jane Freeman, and Mr. and Mrs. Walter S. Bencher.

Bencher and several others expressed great skepticism to me about Siegel's presentation this morning. I explained that my role was not as a backer of the KMS laser fusion project but to make it possible for KMS to carry on the work. Harvey Taufen told Helen and me that he was a student at Illinois Institute of Technology when Saul Winstein was there (1940-41) and was much helped by him.

Sol Linowitz and I brought each other up-to-date on our conversations with Paul Lochak. Paul told him that Dr. Ray was not able to postpone the deadline date as she promised because the State Department opposed it. I told Sol that there was also opposition among the AEC Commissioners. Paul will meet with the OPEN group on January 14 and will then try to formalize his relationship with them. Sol has also discussed the general problem with DeBono and Peter Flanigan; he has learned that Craig Hosmer hopes to be the head of the U.S. Comsat-type uranium enrichment organization that he is espousing.

Sol told me he has again met with Nelson Rockefeller, who is afraid that he may get into income tax trouble in connection with his organization for looking at future alternatives. Sol advised him to ask Mike Mansfield to serve as co-chairman to create an international advisory committee and to make public all the conclusions from the deliberations of the whole committee as soon as they are available; Rockefeller apparently agreed to do this.

I described to Sol the background for the KMS laser fusion program and my skepticism as to the chances in Orville Freeman's judgement (he is a member of the KMS Board and believes in Siegel's optimistic schedule) on the KMS laser fusion and other matters.

Since Toni has a role in choosing speakers for the National Democratic Woman's Club and was so impressed by my talk today, Sol suggested she arrange for me to talk to the Club on the Energy Problem at the time of my trip to Washington to attend the meeting of the DATRAN Board on April 25.

As we were leaving, I met with Norman M. Wellin (Vice President and Treasurer, Business International) to discuss my expenses, etc., for attending the meeting. Helen and I then went back to our room and retired at about midnight.

Friday, January 11, 1974 - Dorado Beach, Puerto Rico - Lafayette

Helen and I arose at 6:15 a.m. We tried to pay our hotel bill but the staff at the desk didn't want to be bothered with it so early. We rode in the Airport Limousine to the San Juan Airport. I boarded a Delta flight and flew to San Francisco via New Orleans, arriving at 4:00 p.m. Helen was due to leave on a later flight for Washington, D.C. Steve met me and drove me through heavy traffic and rain to my office where I picked up my mail, signed checks, etc.

While at the office, I returned a call to Phil Abelson, reaching him at his home at 5:15 p.m. He wanted information on the Co-Chairmen's Symposium at the 1974 Annual Meeting of the AAAS in San Francisco. I read the official program to him, including the names and affiliations of speakers, their talk titles, and the program summary. Jane sent a copy of this to his home air mail, special delivery. I emphasized that we sought for the best people in each field and had succeeded in almost every case. Abelson was impressed by the stature of the event and especially noted our success in stimulating community involvement. He is planning to use this material in an editorial in Science.

Steve, Dianne and I had Colonel Sander's chicken for dinner. Dianne babysat at the Baxters; Steve went in to see Joan. I called Helen and she told me she had arrived in D.C. okay, but her luggage had not.

Saturday, January 12, 1974 - Lafayette

I spent most of the day reading the material that accumulated during my trip to Puerto Rico. In the afternoon, Suki and I took a hike around the rim trail at the Reservoir. Steve cooked a steak dinner for the three of us, then went to visit Joan after dinner.

Sunday, January 13, 1974 - Lafayette

I worked on the write-ups of the work of our nuclear chemistry group for the Nuclear Chemistry Division's Annual Report for 1973. Dianne, Steve and I watched the Super Bowl from Houston on Dianne's black-and-white portable TV since our color set is in for repairs. The Miami Dolphins beat the Minnesota Vikings, 24-7.

Suki and I took our hike at the Reservoir in the late afternoon. We had Colonel Sanders chicken for dinner again. Steve drove to San Francisco Airport to meet Helen, who arrived from Washington at 8:20 p.m.

Dianne went babysitting at the Shermans. Steve went to see Joan in the late evening.

Monday, January 14, 1974 - Berkeley

I drove to work with an unusually beautiful sunrise in view. I attended Pimentel's Chem 1B lecture, then walked back up the hill and met Colin Watanabe in my office. He had finished all the preliminaries preparatory to starting work. I walked with him to the HILAC Building and took him to Mike Nitschke, who will start him to work on the helium jet transport aerosol problem that we have planned for him.

I then went to Ghiorso's office conference room to attend a meeting in progress--with Ghiorso, Nurmia, Rolf Muller, Harry Heckman, and Frank Selph--to discuss methods of putting Ca^{48} into metallic form for use in the ion source of the SuperHILAC. Reduction to metal by an active metal, followed by volatilization onto the ion source electrode may be the best method.

I dropped in to see Kratz and Norris to discuss the inputs to the annual report, upon which I had worked over the weekend. They told me that Roland Otto, out house-hunting this morning, reported for work while I was away last week; he was delayed about two weeks in driving across the country because of the bad weather. Kratz and Norris told me about the bad treatment they received on Friday night when a scheduled bombardment of uranium with krypton ions (a large beam was available) was cancelled without consulting them.

I walked back down to the campus to hold my office hour in 446 Latimer Hall from 11:10 a.m. to noon. Catherine Mouton, a freshman Chemistry major in my Chem 1B lab section, dropped in for help in obtaining an enrollment card.

I attended the regular weekly luncheon of the Chemistry Department faculty in the Howard Room of the Faculty Club. From 1:10-2:45 p.m., I taught my Chem 1B lab section in Room M Latimer.

When I walked back up the hill, I met Roland Otto in my office; he has filled out the necessary papers, taken his physical examination, and started to work after his arrival last week. He will work with Kratz and Norris and have his office in 203 Building 70.

Bernie Harvey told me he has decided to hire Olivia Austria as his administrative assistant; she is now the Administrative Assistant in the History Department on the campus.

Len Nugent called to tell me that the AEC has declined to support Jack Ryan in his collaboration on the revision of The Chemistry of the Actinide Elements; this is a blow to our plans.

At 4:00 p.m., I attended the Nuclear Chemistry Seminar in the conference room of Building 70A. Frank Stephens spoke on "Coriolis Effects in Nuclei."

Helen, Dianne and I had dinner together; Steve had gone in to Berkeley to see Joan. I drove in to Berkeley and attended the annual meeting of the membership of the Alta Bates Hospital (of which I am a new Advisory Trustee) at the hospital on Webster and Regent Streets, beginning in the dining room and foyer at 7:30 p.m. Among the people

I met and talked with at the reception were Stephen L. Davenport, Dr. William Picard, William Corlett, Adrian Kragen, Winifred Heard, Dr. Gilbert Barron, Mrs. Gerald H. Hagar, Dr. Robert Z. Perkins, Philip H. Angell, Dr. William G. Donald, Jr., M.D., William B. Rumford, Jr., Julius Krevans, and Norvel Smith. Picard and I reminisced about the days in the 1950's when he and his son Andy and I and my son Peter attended Boy Scout meetings. Dr. Krevans suggested that I visit the San Francisco campus in my role as a University Professor, and I suggested that I might talk about discovery of iodine-151, iron-59, cobalt-60, and so forth. I also talked with Dr. Morton Meyer, who told me that he is going to visit China in March in a group arranged by Joyce Kallgren of the Center for Chinese Studies at Berkeley. I told him that I will send him a copy of my China Journal.

At 8:15 p.m., we then went into the cafeteria for the annual meeting, which was presided over by Stephen L. Davenport, President of the Board of Trustees. He first called for a report from the President of the Alta Bates Voluntary Association. He then introduced Dr. Gilbert Barron, President of the Alta Bates medical staff, who introduced a number of staff members for short presentations describing recent advances in the medical field at Alta Bates. Dr. William Picard talked on xerography, Dr. Brinkerhoff on anesthesiology, Dr. Larry Gould on dialysis, and Dr. Peter Patch on the recently instituted 24-hour medical service.

President Davenport then called on Mr. Lou H. Penney, Vice Chairman of the Foundation Board, who gave a report. This was followed by President Davenport's own presidential report. He then introduced a number of new attendees to the meeting. He called on Mr. Robert Montgomery for the report of the Executive Vice President, who reported that the hospital is operating in the black but will have financial problems in the coming year. Montgomery showed a 12-minute movie which is shown to new employees at Alta Bates. Davenport then adjourned the meeting.

Tuesday, January 15, 1974 - Berkeley

I drove in to work again with a lovely sunrise in view. It was somewhat rainy last night, but the temperature has gone up to moderate levels.

I called Rodney Hader (Executive Assistant to the President, American Chemical Society, Washington) in response to a call he made yesterday, in which he suggested that the second sentence in the third paragraph of my Statement on ACS Issues (sent to him on January 7) be revised. I told him that I agreed to his suggestion and it will be revised to read as follows: "Such a liaison program, supported by the ACS Department of Chemistry and Public Affairs, will call for high-level involvement by the Committee on Chemistry and Public Affairs with its appropriate relationship to the ACS Board of Directors and Council."

We then went on to talk about the subsequent steps as he sees them. He said the Council will make its choice at the time of its meeting in Los Angeles on April 3. He thinks it is important that I

Tuesday, January 15, 1974 (con't)

attend the Los Angeles ACS meeting; I would probably go down after class on Monday, April 1, and stay through Wednesday. Hader thinks the decision, which is by ballot, will be the first item on the agenda. This year the ballots will go out to the membership earlier than last year--namely, by October 10. Thus, the question-and-answer material for Chemical and Engineering News will probably be due by around September 1.

Hader told me that Bailey has expressed a strong interest in my success as a candidate. Hader said that he had just finished talking with George Watt, who has been out of town and therefore was not able to prepare a statement for distribution to the Council at this time. George apparently expressed to Hader a hope that I would be elected. I told Hader that I would rather not run against George. Hader hazarded the guess that the candidates would be Henry Hill and me. He said he didn't know whether there would be additional candidates by petition and said this will be determined by such potential candidates on the basis of their evaluation of their potential competition.

Loy Sammet called me at 9:35 a.m. in his capacity as Acting Dean of Agricultural Sciences. He asked if I would send my evaluation of Daniel Arnon's work and recognition in the field, in connection with the campus's review of him and I said I would (copy attached).

I called Ed Cornish at 10:55 a.m., indicating that I was sending him a draft of my talk, "1994?" to be given at the World Future Society Symposium at the AAAS Meeting in San Francisco. Ed told me that Anton Schmalz is organizing a high-level WFS conference on energy to be held in Washington late in April. As speakers, he is trying to line up such people as Simon, Jackson, Nader, and Ray. They hope to focus on policy matters and want to get a general overview rather than specific technological data or partisan issues. I said that I didn't know whether I would be able to be there, but he will keep me informed.

I called Jack Ryan at Battelle at 11:20 a.m. He confirmed that the Division of Research, Joe Gratton in the Division of Informational Services, and Frank Pittman in the Division of Waste Management and Transportation had turned down our request. He told me that they had asked Gratton for $25,000 for a half-year. He said that he would have Van Tuyl call me immediately if he can, and I indicated that I will see George Rogosa tomorrow and will talk with him about it.

Harold Van Tuyl then phoned me. He described the routes they have tried to get support for Ryan to work on our Chemistry of the Actinide Elements revision. At the Division of Research, John Burnett indicated that, while their FY74 money is allocated, they would be receptive to proposal for support from FY75 funding. They then tried to see if they could get funding from the Division of Waste Management and Transportation (of which Frank Pittman is the Director); they went through Joe Gratton at the Office of Informational Services, who checked with DWMT and got negative results--their argument is that other books have come out on actinide chemistry and they therefore question whether this revision is necessary. Van Tuyl said that they

January 15, 1974

Dr. Loy Sammet
Acting Dean of Agricultural Sciences
101 Giannini Hall
Berkeley Campus

Dear Loy:

At your request, I am writing to give an assessment of Professor Daniel I. Arnon's scientific contributions and his standing as a scientist.

Professor Arnon's major contributions have been in the field of photosynthesis. The process of photosynthesis includes a light phase in which radiant energy is converted into chemical energy and a dark phase in which the chemical energy is used for the conversion of carbon dioxide into carbohydrates and other cell constituents. Arnon's discoveries concern the light phase of photosynthesis. He and his associates discovered photosynthetic phosphorylation (photophosphorylation), a previously unknown fundamental phosphorylating process present in all photosynthetic cells. In photophosphorylation, the chlorophyll-containing particles (chloroplasts) use the energy of absorbed photons to form adenosine triphosphate (ATP), the universal energy carrier in living cells. Previously, ATP was known to be formed only in fermentation or respiration. Later, Arnon discovered that the process of photophosphorylation includes two light reactions: cyclic photophosphorylation, which yields only ATP, and noncyclic photophosphorylation, which yields not only ATP but also reducing power (reduced ferredoxin) and molecular oxygen. Reduced ferredoxin is an iron-sulfur electron carrier protein (first crystallized in Arnon's laboratory) which in turn reduces NADP, a hydrogen carrier in cellular biosynthesis. ATP and reduced NADP jointly constitute the assimilatory power required for the conversion of carbon dioxide into carbohydrate.

Arnon's discovery of photophosphorylation was accompanied by the first demonstration of complete photosynthesis outside the living cell. His other contributions include concepts of light-induced cyclic and noncyclic electron flow in photosynthesis and their relation to the photochemical system in intact cells.

With respect to Professor Arnon's standing, I might say that I have such a high regard for his accomplishments that I have repeatedly nominated him for the Nobel Prize for Chemistry during the last seven years. I believe that his work is of the high calibre to qualify for this highest accolade that a scientist can receive, and I believe that he is widely held in this high regard.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

Tuesday, January 15, 1974 (con't)

are trying to get $50,000 for one year, which would include the overheads that Battelle has to pay.

Van Tuyl and I then reviewed the alternatives that we have: (1) Van Tuyl will talk with Frank Pittman to see if he can interest him in it; (2) I might be able to get Rogosa's concurrence to pay Ryan's salary out of my budget for the rest of FY74 if Van Tuyl could take care of the overhead--he indicated that $20,000 is all that he could spend on this; (3) a third option is to have Ryan be on a leave of absence from Battelle and come to work at LBL. Van Tuyl will check out whether he could get the overheads waived under such an arrangement. He indicated that Ryan's salary would be in the range of $8-9,000 for the remaining five months. I said that I would like Ryan to be able to start by February 1 to give us as much overlap as possible.

Bernie Harvey heard from AEC that we may get in the midyear review $20,000 for me to cover Otto and an actinide chemist, $50,000 for LASSY, and $50,000 for heavy ion source development at the 88" Cyclotron.

I had lunch at the lower level of the cafeteria with Nugent, Stephens, Bucher, Edelstein, Ritter, Kratz, Norris, Proetel, and others. I told Edelstein about the probable money from midyear review to hire an actinide chemist. I discussed with Kratz and Norris, and with Ken Hulet as we left the cafeteria, plans for target preparation and chemical procedures for looking for superheavy elements from bombardments of Pu-244 and Cu-248 with Ca-48 ions.

After lunch I met with Earl Hyde, who described to me his recent visit to Israel to attend a scientific conference at the Sea of Galilee. He told me about LBL budgetary problems, especially the overrun by about $770,000 for the BEVALAC; Bob Thorne is so irate that he wants to close down the project. I told him that we prefer to have the work on environmental and energy chemistry (and the man to head it up) in the Nuclear Chemistry Division, and he agreed. I also told him about our plans to expand the actinide chemistry work.

Edelstein came by to tell me that Dennis Fujita has accepted his invitation to come and work on the magnetic susceptibility of Bk and Cf metals; he would be paid from the money we will get in the midyear review.

Ghiorso called to tell me that Hulet, with Lougheed, has accepted his invitation to collaborate on the element 106 problem (Cf-249 + O-18) and the superheavy element problem (Pu-244 and Cm-248 plus Ca-48). He has decided to call the equipment for the 106 experiment (in which the decay chain 106 $\xrightarrow{\alpha}$ 104 $\xrightarrow{\alpha}$ 102 $\xrightarrow{\alpha}$ will be identified) the Family System, or FAMSY.

I went up to the HILAC Building to watch the experiment in progress testing the proposed use of FAKE prior to its use to study the chemistry of element 104; the group was testing the transport of Fr isotopes, formed from Au-197 plus O-18, in helium jet streams to

which various aerosol material (alcohol, benzene, ethylene, acetylene) had been added. The group consisted of Ghiorso, Nitschke, the Alonsos, Hulet, and Watanabe. They were getting ready to test FAMSY.

I had dinner with Dave at International House cafeteria. I saw his friend from Davis, Dave Wemmer, who is now a chemistry graduate student at Berkeley. We sat at a table that included Doug Sherman.

When I got home, Helen told me that Emery Stone of Doten Pontiac came by with a car that we could buy for Steve.

Wednesday, January 16, 1974 - Berkeley

Helen told me that the car which we will buy for Steve is a 1970 Pontiac Catalina, a 2-door, 6-passenger coupe, costing $1,700 and that she has made a deposit toward purchasing it.

Jim Waber called me at 8:55 a.m. to ask if he could name me as a reference in connection with his having been named a candidate for the Englehart Chair, an endowed research chair in the Chemistry Department at Northwestern University. I indicted that I would be glad to do this, provided he would send me a curriculum vitae and a few paragraphs about what he has done--the latter in such a way that I could use it in my statement. He reported that they have been making some interesting progress on molecular calculations, and he will send me information on this in the near future. He has a Swedish postdoctoral named Arne Rosen working with them on relativistic things, whom he would like to send to Berkeley to give a talk. I asked Jim to find out what Rosen's plans are for touring the U.S.; I indicated that we could probably give him a small honorarium that would help.

I attended Pimentel's lecture, driving down due to the heavy rain. Hyde came by at 10:30 a.m. to discuss further the funding problems with the BEVALAC and Bevatron and to enlist my help with the AEC people who are coming to discuss this today and tomorrow.

Shiing-shen Chern called me in his capacity as a member of the search committee for a successor to Harrison Brown as Foreign Secretary of the National Academy of Sciences. Donald Osterbrook (Santa Cruz) is chairman of the search committee. They anticipate that the job is about a half-time one. He asked if I could call Paul Doty at Harvard to discern his willingness to be considered for the post.

I then called Paul Doty. He indicated that he must decline the offer at this time because he has just entered into a seven-year Ford Foundation project on science and international relations (mostly on arms control). We discussed our mutual interest in the international area; I will send him a copy of my Mexico City speech. He will be here on March 10 and suggested that we might be able to discuss these matters further. I then called Shiing-shen Chern and reported that Paul Doty could not take this position at this time.

I had lunch at the lower level of the cafeteria with Nugent, Hyde, Edelstein, Ritter, Gradl, and others. Nugent told me that Ryan had called to report great interest among PNL administrators in my offer to pay Ryan's salary (about $10,000) for the remainder of this

fiscal year so he can start to work on the revision our book; presumably the Division of Research would foot the bill after July 1.

I taught my lab section in Room M from 1:10-2:45 p.m., then walked back up the hill.

I sent copies of China Journal to Jane Freeman and Toni Linowitz. I renominated Iz Perlman, Frank Asaro and Harry Bowman for the 1975 ACS Award in Analytical Chemistry (letter attached). I renominated Daniel I. Arnon for the 1974 Nobel Prize for Chemistry (copy attached).

I met with George Rogosa (Assistant Director for Nuclear Sciences, AEC Division of Research) from 4:00-4:50 p.m. in my office. He confirmed to me that, in the Midyear Review, the Division of Research has recommended $50,000 for the ion source work at the 88" cyclotron, $50,000 for the SuperHILAC heavy element program, and $20,000 for the actinide chemistry and SHEIKS program--all subject to approval by Abbadessa. He reviewed for me the problems with the BEVALAC overrun and indicated that the extra money needed for the Bevatron possibly would have to come from or be funneled through his Nuclear Sciences Branch, putting additional strain on that budget.

I described to him the circumstances that have made it necessary for the LBL Nuclear Chemistry Division to pay Jack Ryan's salary (approximately $10,000) for the remainder of FY74 on the assumption that Battelle Northwest Laboratory will cover the overhead. Rogosa saw no problem with this and indicated that my budget might be large enough in FY75 to carry this on. He said that an additional $40,000 already has been added to my budget for FY75 (and presumably $100,000 for the heavy elements program at the SuperHILAC).

I outlined for him my thoughts on building up the actinide chemistry program and also augmenting the SHEIKS program, mentioning a sum of a couple of hundred thousand dollars for FY75, if this is still possible, and he seemed to react favorably. He indicated that the way to proceed was to justify this in the FY75 column of the FY76 189 forms which are due in a couple of months.

Steve's car was acquired during the day and after dinner he drove it to Berkeley to see Joan.

Thursday, January 17, 1974 - Berkeley

Earl Hyde dropped by at 8:30 a.m. to tell me that a careful re-evaluation by Hermann Grunder and associates of the magnitude of the SuperHILAC line item budget for FY75, which went in at $2.4 million, indicates that it should be $2.9 million. Part of this is due to an increase of the contingency from 15% to 25%. This will be presented to the present Visiting Review Committee from the AEC and SAN leaders today. Earl also said that he and Sessler held an in-depth review of the Bevatron budget situation for FY75 last night with Lofgren, et al. from 8:00 p.m. till midnight and were convinced that this program needs an additional $1 million from some source for FY75. They hope to get it from Wallenmeyer through Teem, but it may have to come from Rogosa's Nuclear Sciences Branch.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

January 16, 1974

Dr. Justin W. Collat
Awards Program
American Chemical Society
1155 Sixteenth Street, N.W.
Washington, D.C. 20036

Dear Dr. Collat:

I wish to renew my nomination of Drs. Isadore Perlman, Frank Asaro and Harry R. Bowman for the 1975 Award in Analytical Chemistry.

The material which I submitted in nominating them for the 1974 Award may serve as the main statement of my reasons for my supporting their receipt of the Award.

A particularly noteworthy addition to their accomplishments is their work with collaborators in throwing new light on the "Colossi of Memnon" in Egypt, which is described in their joint paper in the December 21, 1973 issue of Science (copies enclosed).

For their work in the application of highly sensitive and precise nuclear spectroscopic techniques in the field of archaeology, and the development of equipment particularly suited for this purpose, Drs. Perlman, Asaro and Bowman are highly deserving of the 1975 Award in Analytical Chemistry.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

Enclosures

NOMINATION FOR THE AWARD OF THE 1974 NOBEL PRIZE FOR CHEMISTRY

Candidate(s):

Name Daniel I. Arnon

Position or title Professor of Cell Physiology

Address (Institution) Department of Cell Physiology, University of California, Berkeley, California 94720, U.S.A.

Name

Position or title

Address (Institution)

Name

Position or title

Address (Institution)

The nomination is made in respect of

his major contributions in the field of photosynthesis.

Brief motivation. (Detailed motivation, bibliography, curriculum vitae and other documents which the nominator wishes to cite should be appended.)

Arnon's discovery of photophosphorylation was accompanied by the first demonstration of complete photosynthesis outside the living cell. His other contributions include concepts of light-induced cyclic and noncyclic electron flow in photosynthesis and their relation to the photochemical system in intact cells.

This nomination is documented in my letter for the 1966 Award and supplemented in my renomination for the 1972 Award. I renominated him for the Award in 1967, 1968, 1969, 1971, 1972, and 1973.

Nominator Glenn T. Seaborg

Position or title University Professor of Chemistry

Address (Institution) Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720, U.S.A.

Signature of nominator

Date January 16, 1974

Thursday, January 17, 1974 (con't)

I took Roland Otto up to the HILAC Building where Ghiorso and I introduced him to our research group and showed him the SuperHILAC as well as SASSY, FAKE, FAMSY, etc. Watanabe is working on the aerosol problem. A long bombardment (actually a series of bombardments) is starting for the SHEIKS (Kratz, Norris, Otto, Binder).

Phil Dauber came in to see me in my office at 11:35 a.m. I had read his prospectus for a movie on antimatter and discussed with him possible sources of the $100,000 that he needs for support. He is trying such industries as TRW and AT&T. I suggested that he might consider Hewlett-Packard, Texas Instruments and DuPont. He is hoping to get Leonard Nimoy to be the narrator; I suggested Evans G. (Red) Valens as a possibility for co-director.

I attended the regular luncheon meeting of the Actinide Chemistry Group in the library next to Edelstein's office. Present were Starks, Edelstein, Streitwieser, Raymond, Ritter, Gradl, Parsons, Ted Baker, Gordon Halstead, and Kenji Hagawara.

Gradl reported on Koch's apparatus for making analysis of organic and organometallic compounds in the Chemistry Department on campus. Baker reported on his synthesis and characterization of lanthanide cyclopentadienyl chloride compounds. Halstead reported his work on $U(IV)Cp_3C_4H_7$

(methylallyl)

I went down to the campus and, from 1:30-2:30 p.m., presided over a meeting of the Planning Subcommittee of the Lawrence Hall of Science Advisory Committee (minutes attached) in Latimer Hall. Present were Frank Oppenheimer, George Pimentel, Frederick Reif, Wilbur Somerton, David Wake, and Pimentel's secretary, Sammi Evans.

The main agenda item was to discuss a response to Dean Sanford S. Elberg's letter of November 26, 1973, requesting comment on the Annual Report of the Lawrence Hall of Science. We agreed that Pimentel would draft a letter for us to be checked by the individual members of the Subcommittee, saying that we feel that the Hall is in very good shape and that the Annual Report is a good one. We will also suggest that more consideration be given to the administration of the computer operations and their relations with the campus. We also will suggest that the level of financial support for LHS should be raised by trying to negotiate with the campus Budget Office a higher rate of return on the Ernest O. Lawrence Endowment or by trying to get an increase of the endowment through further allocation of overhead funds from the AEC contract for operating the three large AEC laboratories by the University of California.

At 2:30 p.m., I stopped by to see David Shirley in his office in Latimer Hall. We discussed the suggestion that C. Bradley Moore might join the Nuclear Chemistry Division to carry on his work on lasers. I suggested that it shouldn't be too difficult to find space for him in the Nuclear Chemistry Division buildings. We agreed that he should try to build up his own financial support at the beginning and that we

Lawrence Hall of Science Planning Sub-Committee Meeting

The meeting was called to order at 1:30 p.m. by Chairman Seaborg. The Director's Report was reviewed in the context of a request from Dean S. S. Elberg for an Advisory Committee appraisal of the Hall's progress under LHS Director Laetsch. There was unanimous agreement that the Hall of Science is beginning to realize its potential in scientific educational innovation and in public service. Indeed, there was only one area in which there was lack of consensus, that of the use and the future of computers in the Hall.

The computer question was the subject of detailed study two years ago by an ad hoc committee chaired by Professor Henkin. This committee concluded that the program lacked cohesiveness and that serious consideration should be given to a staff addition of an individual highly qualified in computer-education. This recommendation has not been implemented.

Reif observed that Mr. O'Brien, who directs computer operations, is a systems engineer, more concerned with technical functioning than with developing new programs or computer uses. The graduate students furnish a potentially effective resource, but there is presently little coherence in the variety of programs they run. The present emphasis is on getting students and teachers to feel comfortable with computers and simple programming, and this emphasis is successfully pursued. However, there is a dearth of educational projects connected with learning problem solving skills or projects that involve computers in research and investigation.

Wake noted the recent LHS computer use in the Biology Department. Its success will undoubtedly lead to terminals placed in LSB. Somerton asked whether computer programming skill is an important staff need. Reif contended that more important dimensions would be creative development of educational and social strategies for using computers, for course progressions and educational concerns. Oppenheimer argued for a role more like a library operated by an effective manager whose forte is effective response to needs proposed by a variety of users. Wake argued for LHS involvement in research and development.

Oppenheimer recommended that the Director investigate current activity and progress at other leading centers, such as Dartmouth and MIT.

Seaborg suggested that a brief account of this discussion should be included in the minutes of this meeting, but that it need not be emphasized in the Advisory Committee report to Dean Elberg.

Pimentel changed the subject to the question of funding. LHS needs more operating funds from the endowment to enhance the public programs for which Federal support is not available. The current endowment return, corresponding to about 4 3/4% interest rate, seems rather low. It was agreed that the Advisory Committee should seek to aid the Director with the University Administration to try to gain increased funding.

The Sub-Committee agreed that it would not be necessary for them to schedule another meeting during the Spring Quarter, since there would be an Advisory Committee meeting. The meeting was adjourned at 2:30 p.m.

Glenn T. Seaborg
Chairman, LHS Planning
Sub-Committee

Thursday, January 17, 1974

could submit 189 forms for his program for FY76. I suggested that Shirley have Moore come up and talk to Harvey and me about his possible affiliation, and Shirley said he would do this.

Shirley also mentioned that he is becoming interested in offering a high-level faculty position to Yuan T. Lee of the University of Chicago. Shirley feels that Lee is probably the best young man in the country on molecular beams (better than Herschbach). I suggested that he might try to have him take over Ken Street's high-level faculty slot, and this struck Shirley as an interesting possibility. It isn't clear whether Lee would join the Nuclear Chemistry Division or IMRD. He is being supported to the extent of about $100,000 a year by the AEC, and the hope would be that he could have this transferred to cover his work at LBL through the process of providing 189 forms.

I wrote Peter Laubereau, suggesting that he give a Nuclear Chemistry Seminar when he is here on February 11 (copy attached).

At 3:30 p.m., I conferred with Jane, Eileen and Sheila about the steps we need to take to qualify Jane for the position as my assistant to work on Travels in the New World.

I dropped by the SuperHILAC on my way home and found they were just starting a series of bombardments, which we hope will extend over 24 hours or more, for the SHEIKS.

Suki and I took a hike to the water tank. Helen drove in to Berkeley to attend a lecture with Dave at the Lawrence Hall of Science by Marian Diamond on Ants and People.

Friday, January 18, 1974 - Berkeley

I went up to the HILAC Building. The SHEIKS got a high intensity bombardment with Kr^{84} ions last night--so high that the first uranium targets were burned out and had to be replaced. The final load was about 200 nanoamperes. Then, this morning, a special water-cooled uranium target was put in for a long bombardment and the Kr^{84} beam is as high as 2 microamperes. The SHEIKS worked up chemically the earlier targets during the night.

I talked to Ghiorso and Main about Main's plans--the new arrangement under Grunder isn't working out so well for him. He wants to go back to research, and Ghiorso and I agreed that his working on a new heavy ion source for the SuperHILAC would be a good project.

After I returned to my office, Charles Weaver (Westinghouse Corporation, Pittsburgh) returned my call. I urged him to support the continuance of Westinghouse support for the Science Talent Search when the matter comes up at the meeting of the Westinghouse Educational Foundation Trustees. He seemed to be favorably inclined, but did indicate that he might want to investigate the possibility of some innovations, in which case he would get in touch with me.

Roger Batzel returned my call at 11:50 a.m. I told him that Ken Hulet's collaboration with us at LBL is expanding to include the experiments on the identifications of elements 106 and 107 and the

LAWRENCE BERKELEY LABORATORY
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January 7, 19[illegible]

Dr. Peter G. Laubereau
Hessische Landesanstalt für Umwelt
Kranzplatz 5/6
62 Wiesbaden, Germany

Dear Dr. Laubereau:

We have arranged for you to give two seminars during your visit to Berkeley during the week of February 11-15. The first seminar will be on Monday afternoon at 4:00 p.m. at the Nuclear Chemistry Division seminar. The second seminar will be a special seminar to be held on Thursday morning in the Chemistry Department on the University of California campus. Since it is rather late to receive titles from you I have suggested the following general titles: Organometallic Chemistry of the Actinides, Part I, and Organometallic Chemistry of the Actinides, Part II. If you wish to change these titles, please let me know immediately.

We are looking forward to seeing you next month.

With warm regards,

Cordially,

Glenn T. Seaborg

GTS/eee

possible production of superheavy elements by bombardments of plutonium-244 and curium-248 with calcium-48. I said that I am personally involved in these interesting experiments. I said that Hulet feels he is short of manpower, having only two others besides himself on his program, and would like to have one additional manpower allocation. Roger seemed to think this would be possible and will look into it.

I had lunch in my office, then walked down to the campus in the rain for the regular weekly meeting of the Chem 1B instructional staff in Latimer Hall.

I walked back up the hill, met George Rogosa in Stan Thompson's lab, took him by to meet Roland Otto and Irwin Binder, then up to the HILAC Building. Here Ghiorso and I took him to the control room--a record beam of 2 microamperes on the SHEIKS target was in progress-and then explained to him the element 106 experiment and FAMSY. I left Rogosa with Ghiorso and walked back down to Building 70A where I met with the Nuclear Chemistry Division's review committee--Diamond, Shirley, Harvey, Cerny--in Harvey's office. Edelstein joined us for a time. I described our actinide chemistry program and plans for expansion (I mentioned expanding from the present $140,000 budget to twice this or more), the SHEIKS program (I mentioned plans to expand this by about $100,000 in annual budget), and my program at the SuperHILAC with Ghiorso (the plans for elements 106 and 107 and superheavy elements via Ca-48 bombardments). They were concerned about the latter program if superheavy elements are not found and I tried to assure them that the many possibilities with heavy ions will assure a fruitful program for many years. They also expressed the hope that Ghiorso and Nurmia will attend the Monday afternoon Nuclear Chemistry Division seminars, and I said they probably will.

Kim Williams came up and I took her over to Room 230 in Building 70 so that she could join the SHEIKS in their work on the counting of samples from last night's bombardments; she plans to participate in their handling of the strongly bombarded uranium (20 hours of 2 microamperes Kr^{84}) when the bombardment ends at 8:00 a.m. tomorrow--this will be as a training step for her later research work.

I then stopped by the HILAC Building on my way home. The uranium bombardment with Kr^{84} is going well and the plan is still to run until 8:00 a.m. tomorrow morning at which time the SHEIKS will begin the chemical separations. I talked to Ghiorso about progress on the element 106 experiment.

I drove home in the rain and decided not to take my usual hike with Suki due to the weather. Helen, Dianne and I had dinner together in the kitchen. Steve is visiting Davis for several days to see his friends and to look for a job through the campus Placement Service.

<u>Saturday, January 19, 1974</u> - Berkeley

I drove in to the Lab and found that the bombardment of uranium with Kr^{84} ions proceeded very well throughout the night (1-2 microamperes) and ended at 8:00 a.m. as scheduled. Kratz, Norris and Binder dissolved the target and performed chemical separations (flow sheet attached). Separations were made into four fractions: (1) a

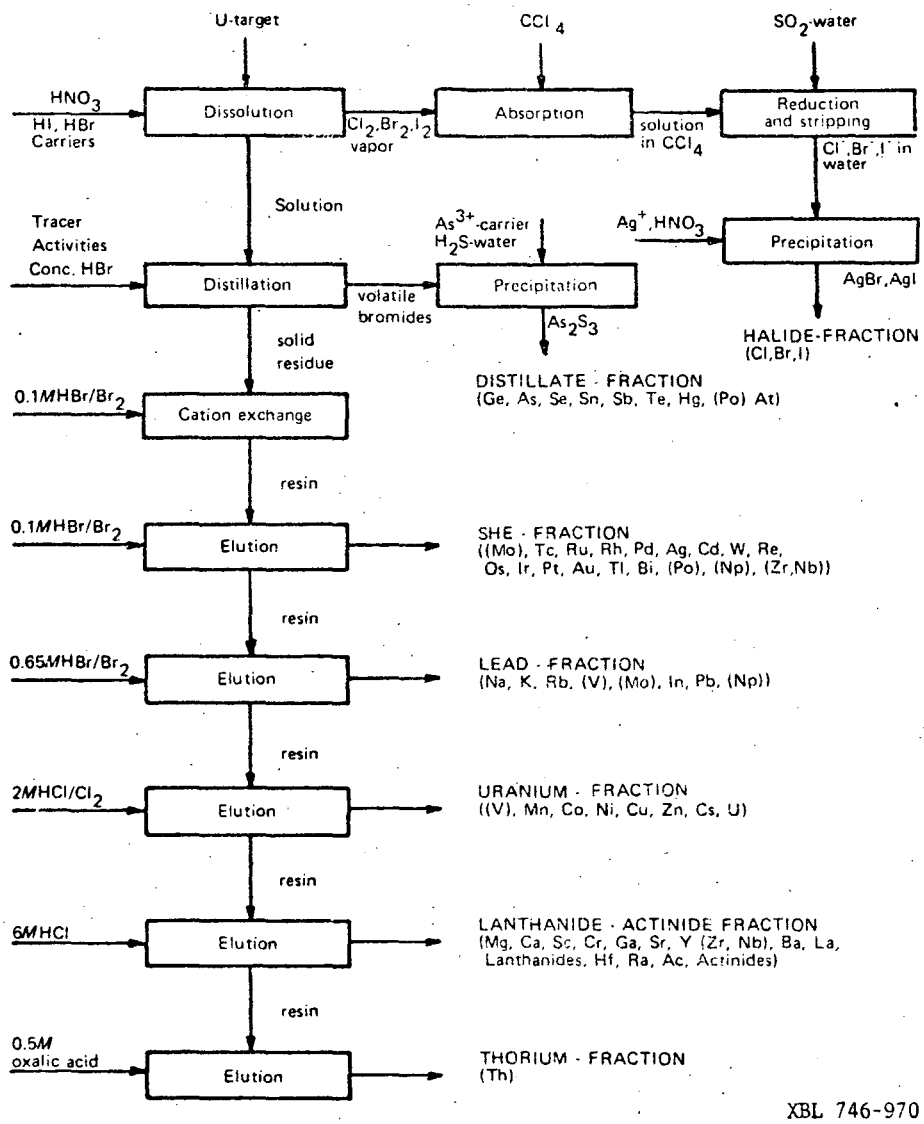

Figure 5. Chemical Processing of Heavy-Ion Bombarded Uranium Targets

Saturday, January 19, 1974 (con't)

distillate containing Hg and Po (representing elements 112 and 116), (2) the SHE eluant from cation exchange resin containing the Pt and Pt groups, W, Re, Au, Tl, Bi (representing elements 106 to 115), (3) the lead fraction (representing element 114), the second eluant, and (4) the elements remaining on the resin (U, the actinides and lanthanides, the alkaline earths, etc.). Fraction no. 4 was sent to LASL (by commercial airlines, early afternoon flight) where a group of radiochemists will separate and identify the actinides and the other constituents present. Kim Williams was also present, largely as an observer.

As the counting of the samples commenced, I went over to the Building 50 Auditorium where the Annual Bevatron Users Meeting was in progress (agenda attached). This included prospective BEVALAC Users and the audience numbered about 150, the largest to date, indicative of the greatest interest in the BEVALAC. I heard the talk by George Rogosa, "The Nuclear Science View of the Bevatron/BEVALAC." He said that, in response to mailed inquiries, a surprising 365 responses were obtained indicating interest in using the BEVALAC; about 150 of these were medical-biological investigators. I also heard the talk by Hermann Grunder, "A Review of Bevatron Facilities," in which he also described the BEVALAC and its expected capabilities.

I went with Grunder to his office to discuss the SuperHILAC. I emphasized again my concern to be sure that the SuperHILAC will have the capability to deliver uranium ions; this suggests that the capabilities of Adam should be compared with those of a low energy injector-Wideroe linac combination. Grunder said this comparison will be made and he will let me know. He said he will make general progress reports to me on the SuperHILAC every two or three weeks. He also gave me some slides of the BEVALAC construction.

I went back to Building 70 to view the progress of the SHEIKS. Things seem to be going well, so all left to go home to rest, except Norris who stayed on to do the counting until relieved later tonight by Kratz and others.

I had lunch with the attendees at the Bevatron Users Meeting, sitting at a table with Cornelius Tobias and Max Borne (a medical investigator in the radiation field). I also sat at a table with Earl Hyde, who said the overrun on the BEVALAC will probably be accommodated, reluctantly, by AEC; the amount is now fixed at $600,000; he said Rogosa has refused to consider raising the SuperHILAC line item to $2.9 million from $2.4 million.

I also talked to Dr. Budinger, who said he is chairman of a new outside committee to advise on the medical program at the BEVALAC; this takes the place of the old, ineffective committee appointed by Jim Born, and a clash is imminent. The problem of changing leadership in Donner Laboratory must be solved.

After lunch, I went back to the Bevatron Users Meeting and heard the talk by T. D. Lee on "Some Considerations on Physics with High Energy Heavy Ions." He made the exciting suggestion that a new type

ANNUAL BEVATRON USERS MEETING

Saturday, January 19, 1974
Building 50 Auditorium
Lawrence Berkeley Laboratory

PROGRAM

9:00 A.M. - Registration

Morning Session - Chairman: T. Bowen, Univ. of Arizona

9:20 A.M. - Welcoming Remarks - T. Bowen

9:30 A.M. - "The Nuclear Science View of the Bevatron/Bevalac" - G. L. Rogosa, AEC

10:00 A.M. - "A Review of Bevatron Facilities" - H. Grunder, LBL

10:30 A.M. - "Heavy-Ion Research at The Bevatron" - H. Steiner, LBL/UCB

11:00 A.M. - "Biomedical Uses of Heavy Ions" - C. Tobias, Donner Lab, LBL

11:35 A.M. - "Particle Physics at The Bevatron--Present Program" - R. L. Lander, U.C. Davis

12:00 Noon - LUNCH RECESS

Afternoon Session - Chairman: R. L. Lander, U.C. Davis

1:15 P.M. - "Some Considerations on Physics with High-Energy Heavy Ions" - T. D. Lee, Columbia Univ.

2:00 P.M. - "Panel Discussion: "Relevance of Research in The Few BeV Region in The Next Decade"

Moderator: S. Drell, SLAC

Panel Members: D. Cline, Univ. of Wisconsin; S. Treiman, Princeton Univ.; R. Sachs, ANL; O. Piccioni, UC San Diego.

Audience participation in the discussion will be encouraged

3:30 P.M. - "Bevatron Improvements" - Open Discussion
Discussion Leader: R. Birge, LBL

4:00 P.M. - Remarks by A. Sessler, Director, LBL

4:30 P.M. - Parallel Sessions:

Panel Discussion - "LBL Resources and Off-Site Experiments"
Moderator: W. Hartsough, LBL
Panel Members: L. Stevenson, LBL; R. Kenney, LBL; H. Lubatti, Univ. of Washington; V. Peterson, Univ. of Hawaii

Business Meeting of Bevalac Users Association
(To be held in the Bldg. 70A Conference Room - Room 3377)

6:00 P.M. - Social Hour, LBL Cafeteria

of superheavy nucleus (representing a difference in kind), of bubble configuration, might be made by the bombardment of an element like lead with high energy (1 Bev per nucleon) projectiles like lead ions.

I then went back to Building 70 and learned from Norris that we have a spontaneous fission count in the lead (i.e., element 114) fraction; this occurred at about 1:30 p.m.--the chemistry had been completed at about 9:30 a.m. following the end of bombardment at 8:00 a.m. This is exciting if it signifies the presence of a superheavy element, but it could be due to an actinide impurity.

I drove home and found Helen and Dianne gone. Suki and I took a hike around the rim trail at Lafayette Reservoir. I then picked up some Kentucky fried chicken and had dinner alone at home.

Helen and Dianne arrived home at 7:00 p.m. They had visited Point Reyes with Peter and Jody Biermann and Ben Orlove and had enjoyed it very much. Helen and Dianne then went to Acalanes High School to attend a school play, "The Odd Couple," presented by the Drama Department.

Sunday, January 20, 1974 - Lafayette

I spent several hours preparing a new form 189 for the AEC for support of the heavy ion radiochemistry (including the SHEIKS) program, with emphasis on an attempt to get about $100,000 additional funding in FY75. Suki and I hiked around the Reservoir. In the evening, I read material in preparation for my Chem 1B lab section lectures. Steve returned from his visit to Davis tonight.

Monday, January 21, 1974 - Berkeley

I drove in to LBL with an extraordinary view of the bay and surroundings, due to the unusually clear day.

I called Darleane Hoffman at LASL to discuss their plans for chemical separations on the fraction we sent them over the weekend; their portion contains the actinides, lanthanides, alkaline earths, Cs, and the Co, Zn, Cu, etc., region of elements.

I attended Pimentel's lecture, then walked back up the hill to talk to Kratz, Norris and Otto in their lab. They are still seeing some high energy counts in the lead fraction and will look at these data more carefully.

Dick Marrus called at 10:55 a.m. to tell me that he is applying for a Miller Professorship and asked if he could use me as a reference. I said fine.

I went over my mail, then walked down to Latimer to hold my office hour. Catharine Mouton dropped in for some help with oxidation-reduction reactions. I then went to the regular lunch in the Howard Room and taught my lab section from 1:10-3:00 p.m.

I walked back up the hill and visited the SHEIKS. Unfortunately, the high energy alpha particles are due to known isotopes of Po, etc.

While in their office, Otto received a call from Jim Cobble, which gave me a chance to talk to him.

When I returned to my office, Len Nugent called with the welcome news that Jack Ryan called to say it seems certain that he will be allowed to work on the revision of our book under the arrangement where LBL pays his salary.

Earl Hyde dropped by for a cup of tea; he has heard about Bob Main's plan to go back to research and agreed that this will work out fine.

I wrote Ted Sherburne to report on my conversation with Charlie Weaver. I then attended the Nuclear Chemistry Seminar where Dr. David Scott spoke on "Old and New Aspects of Heavy Ion Reactions at High Energies."

Suki and I took our water tank hike. As I was listening to the Walter Cronkite news program during dinner, I learned that Lewis Strauss died today at the age of 77. I feel I have lost an old friend, having known him since 1946.

Tuesday, January 22, 1974 - Berkeley

I talked to Margie Hollander about her progress in duplicating my Chancellor's files; I asked her to start assembling historic lab equipment involved in the discovery of elements, etc.

I called Nello Pace at 9:45 a.m. for his evaluation of Peter Sybert in connection with my evaluating him for the California Heart Association Student Research Associates program. Pace told me that he had just written a glowing recommendation. He says that Sybert is quick, good, very bright, and also uses his hands well in the lab. He said Sybert's work with him in the environmental physiology lab could serve as an example of his having done independent research. On this basis, I completed the recommendation form and sent it in.

At 10:00 a.m., I walked with Rollie Otto up to the HILAC Building to discuss with Ghiorso his involvement in the practice experiments to identify tungsten isotopes by gas chromatography as a prelude to element 106 chemical experiments using gas chromatography.

I met with Robert Hollingsworth (now retired as General Manager of the AEC) from 11:30-12:15 in my office. He told me that he has been out on the west coast serving as a consultant to the Lawrence Livermore Lab on their proposed energy and environment research program and that he was at Los Alamos earlier this month for the same purpose.

He told me about where he stands with respect to the job situation. The contact with Glenn Penisten at DATRAN has led to a definite possibility of his working there in the position that Dan Young had before his promotion to second-in-command. My suggestion of the UC-Statewide administration is also being explored and he has five or six other possibilities. He also told me a little bit about the dissension among the Commissioners.

Tuesday, January 22, 1974 (con't)

Earl Hyde met us at 12:15 p.m. and the three of us went up to the cafeteria for lunch. Here Hollingsworth told me that both he and Giller have been called up to testify before the staff of the Senate Watergate Committee for questioning in connection with the pressure that Howard Hughes tried to put on us through his man Meier to stop underground weapons testing in Nevada. In the course of this, Hollingsworth showed to the committee staff members a copy of the letter which I had written to Hughes definitely turning down his request and its implied intimidation. It is fortunate that we were so clear in our rejection of the Hughes ultimatum and had the courage to state our position so clearly or I personally would surely have become embroiled in the Senate Committee's investigation.

After lunch, we proceeded to the Associate Directors' meeting in Building 50A. Present were Earl Hyde (acting as chairman), Andrew Sessler, Bernard Harvey, Robert Birge, Leo Brewer, James Born, Harold Fidler, Edward Lofgren, Jack Hollander, and George Pappas.

Hyde said that John Teem will be here next Monday and Tuesday; Nuclear Chemistry people might see him on Tuesday. Sessler said that the LBL Scientific Program Council will meet on January 29 instead of the 24th, so that Teem can attend.

Hyde then called on Hollingsworth, who made a few remarks. He said he was optimistic about the prospects for ERDA and emphasized that each AEC lab must work out for itself a mission in the energy and environment field; they should carve out significant chunks of research program, because otherwise the Washington AEC would be directing diverse segments.

Hyde then called on Hollander, who distributed an outline (two items attached) on his proposed LBL Energy and Environment Division administration and programs. He described these in some detail.

Hyde then asked Hollingsworth his thoughts as to which subjects each of the AEC labs would specialize in as lead laboratories. He said this isn't too well determined at this point, but he thought that LLL might be the lead lab for oil and gas research, ORNL for coal research, LASL for geothermal research, BNL for research on the transmission of energy, ANL possibly for automotive research, and suggested that LBL might be wise to make a bid to be the lead lab for solar research. The only competition for the latter might be Sandia Lab, and this wouldn't be too serious.

I left the meeting while it was still in progress. Ken Street came in at 2:35 p.m. to tell me rather emphatically that he disagreed with the impending recommendation of the Diamond Intralaboratory Review Committee that his Research Assistant Alvin J. Hebert be terminated because he doesn't qualify as a Senior Scientist. Street feels that there is a place for men like Hebert in the Nuclear Chemistry Division, especially in view of its impending expansion into practical work in the energy and environment area, and this might suggest the creation of an additional category besides Senior Scientists. I said that I tended to agree with him and, following our

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ENERGY & ENVIRONMENT DIVISION

ADMINISTRATION AND PROGRAMS

January 1974

I. *Administration*

A. *Division Director: Jack M. Hollander*

1. *Technical Assistants: Melvin K. Simmons*
Sydney A. Cameron

2. *Administration: Dick A. Mack*
L. Ruth Lewis, Administrative Assistant
Elizabeth C. Garrett, Secretary

II. *Programs*

A. *Energy Technology Research and Development*

1. *Geothermal energy: Paul A. Witherspoon*
Kenneth F. Mirk

a. *Geophysical methodology and analysis:*
Frank H. Morrison

b. *Geothermal power extraction processes:*
Allan K. Laird

c. *Kinetics of silicon precipitation and dissolution:*
Alan K. Laird

d. *Corrosion research:*
Israel I. Cornet

e. *Geothermal reservoir fluid circulation studies:*
Paul A. Witherspoon

f. *Properties and behavior of rock-fluid systems at high pressure and temperatures:*
Wilbur H. Somerton

g. *Brine management in relation to power generation methods:*
Theodore Vermeulen

h. *10 MW field experiment facility:*
Kenneth F. Mirk

i. *Environmental impact study:*
John Harte

j. *Geothermal resources information and data center:*
Sidney A. Phillips

2. *Solar Energy: Michael A. Wahlig*

a. *Photovoltaic conversion using thin polycrystalline layers:*
Gabor A. Somorjai

b. *Photochemical decomposition of water to produce hydrogen:*
Melvin Calvin

c. *Photosensitization of photovoltaic converters:*
Melvin Calvin

d. *Cellulose conversion to fuels:*
Charles R. Wilke

e. *Solar heating and cooling of buildings:*
Michael A. Wahlig

f. *Low-ΔT energy conversion (Nitinol engine):*
H. Paul Hernandez/Ridgeway Banks

g. *Measurements of the solar radiation:*
Donald F. Grether/Michael A. Wahlig

h. *Solar thermal, central-tower focusing system:*
Michael A. Wahlig

i. *Environmental impact of solar energy:*
Robert J. Budnitz/Melvin K. Simmons

j. *Materials studies for solar-thermal systems:*
Jack Washburn

3. *Controlled thermonuclear reactions: Wulf B. Kunkel*

   a. *Neutral-beam development: Robert V. Pyle*
   b. *Basic plasma research, plasma heating, plasma diagnostics: Wulf B. Kunkel*
   c. *Theoretical plasma studies: Allan N. Kaufman*
   d. *Atomic physics: Robert V. Pyle*

4. *Coal utilization research: Edward A. Grens/Theodore Vermeulen*

B. *Analysis and Assessment Studies: John Harte*

1. *Energy conservation in commercial and residential buildings: Arthur H. Rosenfeld, John Harte*

2. *Economic studies of energy problems: Everard M. Lofting/Peter H. Benenson*

   a. *national and interregional models of energy demand.*
   b. *potential manpower constraints on energy-related construction activity.*
   c. *quantitative economic modeling for energy conservation strategies.*

3. *Study of ecosystem stability: John Harte/Donald Levy*

4. *Impact of supply limitations on employment and income: Carl M. Quong/Everard M. Lofting*

5. *Study of inland waterways: Everard M. Lofting/ Mark W. Horovitz*

6. *Influence of property taxes on land use: William B. Michael/John Harte*

7. *Optimization of nuclear reactor safety test procedures: Mark W. Horovitz*

C. *Environmental Trace-Substance Problems: Robert J. Budnitz*

1. *Study of the chemistry of atmospheric aerosols: Tihomir Novakov*

2. *Epidemiological study of trace substances in urban air: Warren Winkelstein*

3. *Effects of pollutants on mammalian cells: Lester Packer*

4. *Effects of pollutants on metal-dependent enzyme systems: Arthur Furst*

5. *Study of toxic-metal pollutants in estuarine ecosystems: Robert W. Risebrough Donald C. Girvin*

6. *The impact of dredging in the S. F. Bay; heavy metals in benthic species: Amos S. Newton/Victor C. Anderlini*

7. *The environmental chemistry of ozone: Warren M. Garrison*

D. *Instrumentation R&D: Dick A. Mack*

1. *Developments in x-ray fluorescence analysis: Fred S. Goulding/ Joseph M. Jaklevic*

2. *Development of Isotope/Zeeman atomic absorption method for trace-substance analysis: Tetsuo Hadeishi*

3. *IZAA prototype development: Fred Kirsten*

4. *Development of photoelectron spectroscopic technique for application to environmental problems: Tihomir Novakov*

5. *Investigation of use of resonance raman effect for pollutant monitoring: Owen Chamberlain*

6. *Microwave spectroscopy for monitoring gaseous pollutants: Branko Leskovar*

7. *Mass spectroscopy of organic compounds in air-like mixtures: Maynard C. Michel*

8. *The analysis of waters by electrochemical methods: Ray G. Clem*

9. *Survey of instrumentation for environmental monitoring, air, water, noise, radiation: Dick A. Mack*

E. *Seismic and Transportation: D. Theodore Scalise*

1. *Dynamic testing of structures for earthquake safety: D. Theodore Scalise*

2. *Studies in earthquake prediction: Frank H. Morrison*

3. *Mathematical modeling of earthquake phenomena: B. A. Bolt, J. V. Lepore and R. J. Riddell*

4. *Computerized seismic data acquisition and analysis system: B. A. Bolt and J. V. Franck*

5. *Studies of Bay Area Rapid Transit System: D. Theodore Scalise*

ENERGY AND ENVIRONMENT DIVISION

PROGRAM DEVELOPMENT REQUESTS FOR JAN-JUNE 1974

ENERGY TECHNOLOGY		
SOLAR		
Heating/Cooling of Buildings		$72 K
Banks Engine		$42 K
"Central Tower" Focusing System		$30 K
Measurement of Solar Radiation		$36 K
	Solar	$180 K
CTR		
100 keV Neutral Beam		$14 K
COAL		
Selective Hydrogenation		$20 K
CELLULOSE		
Cellulose Conversion		$27 K
	Energy Technology	$241 K
ANALYSIS AND ASSESSMENT		
Support for Personnel		$29 K
Demonstrate Conservation in Buildings		$8 K
Geothermal Data Center		$33 K
	Analysis and Assessment	$70 K
TRACE-SUBSTANCE PROBLEMS		
Chemistry of Atmospheric Aerosols		$16 K
Metal-Dependent Enzyme Systems		$16 K
Membrane Structure and Function		$16 K
	Trace-Substance Problems	$48 K
INSTRUMENTATION		
Coherent Forward Scattering		$40 K
Microwave Spectroscopy		$25 K
Low-Level Tritium and Krypton-85		$20 K
	Instrumentation	$ 85 K
SEISMIC		
Seismic Strain - Hollister, Calif.		$23 K
Seismic Strain - San Bernardino, Calif.		$12 K
	Seismic	$35 K
	Total	$479 K

Tuesday, January 22, 1974 (con't)

meeting, went in to see Harvey to tell him about Street's feelings; he recognized that Street has a point.

Bradley Moore called me at 2:45 p.m. and indicated his interest in joining the Nuclear Chemistry Division to work on isotope separations, including the field of uranium isotopes. I suggested that he come up at 2:00 p.m. on Friday to meet with me.

I met with George Milly (President of GEOMET, Inc.) in my office from 3:00-4:00 p.m. He brought me up-to-date on a number of interesting developments in GEOMET:

(1) The negotiations with the New Court Securities Corporation: they are proceeding to negotiate an agreement with GEOMET in which they would finance uranium exploration by GEOMET Mining, providing an agreement for follow-up drilling is made with a uranium company such as Kerr-McKee (?), Exxon, or Gulf Mineral; an amount of $3 million for exploration using GEOMET methods has been suggested. The negotiations have been with New Court Securities Vice President Aley Allen and his staff assistant Phil Young. Milly told me that New Court Securities, the uranium mining company, and GEOMET would share in the mining operations that would come out of this. Before proceeding, New Court Securities want to make a detailed evaluation of the GEOMET exploration method (the radon detection procedure) and, after finishing this near the end of February, check it out with me. If this checks out all right, it will bring in the uranium mining company within another month, conclude the three-corner arrangement, and start exploration as early as summer.

(2) They are also making progress in interesting Texas Gulf in their Wyoming property. Milly will meet representatives in Denver tomorrow. He is trying to arrange with Texas Gulf to drill on the Wyoming property at a total expenditure of some $300,000 and to the extent of 50,000 feet for the first year, for which Texas Gulf would acquire from GEOMET 1/2-3/4 interest in the subsequent operation. Milly is also going to talk to Gulf Minerals in Denver tomorrow to get acquainted with them.

(3) The Sitelines operation is becoming very successful, to the extent that they have $3 million worth of business, the limit of their capability already, and could easily go to $10 million. Milly is trying to find some partnership with a glass company to take advantage of this potential.

(4) Interest is being shown in their medical services operation by Damon Corporation, which could result in a joint participation.

(5) The research program at GEOMET hasn't been going so well. Milly said that he has had to move David Hill, who was in charge, to computer operations and is directing the research himself.

(6) In view of the interesting uranium developments, Milly is thinking of asking Dr. Philip Merritt of Salt Lake City to Join GEOMET in some capacity, perhaps as a member of the Board of GEOMET Mining.

(7) In accordance with my arrangement with GEOMET, Milly presented me with a certificate for the remaining 3,000 shares of GEOMET stock, bringing my total to 4,000 shares. He indicated that the fair market value at this time is $0.75 per share and this is the value that should be declared at income tax time.

At the conclusion of our meeting, Milly introduced me to Janet Connaughton, who had driven him here. She graduated in psychology from Berkeley in 1964, but spent her freshman year at Montana.

I wrote Craig Hosmer upon hearing the news that he has decided not to seek re-election to the House of Representatives (announcement attached), saying he will be sorely missed and hoping he will change his mind. I mailed to Ed Cornish the draft of my remarks for the World Future Society Symposium.

At 4:15 p.m., I took Roland Otto up to the HILAC Building to meet Matti Nurmia. The three of us discussed Otto's proposed participation in the experiment to identify tungsten isotopes.

I then went down to observe the progress on the bombardments of gold plus oxygen to form francium isotopes in preparation for the detection of 106 and its daughters by alpha particle decay. The experiments with benzene as an aerosol in the helium jet seemed to be going quite well.

Wednesday, January 23, 1974 - Berkeley

I received a call from Van Tuyl at Battelle who asked me to call Frank Pittman to ask for support from his Division for the salary (and overhead) of Jack Ryan to work on our book revision.

At 8:45 a.m., I received a call from Norbert Beyrard in Paris. He asked that I prepare a short memorandum summarizing the feasibility and cost of placing small nuclear power reactors (125-225 MW) for operation in the 1982-1985 time frame in African countries. He mentioned as an example Abidjan, Ivory Coast. He said there is plenty of cooling water. He wants estimates on a turnkey job and answers to the questions: (1) It is feasible? (2) Cost of the reactor system installed? (3) Cost of the operation, including amortization of the reactor over various time periods? I said that I would see what I could do, that it would be necessary to get in touch with vendors to get this information.

I attended Pimentel's lecture. Returning to my office, I received a call from Paul Gilmore, Lewis Branscomb's assistant at IBM. He asked if I would be able to attend a dinner in New York City on the evening of March 8 sponsored by Mr. Carey of IBM honoring the three Nobel Prize winners for Physics this year. I said I had another engagement that evening.

I called Frank Pittman (Director, AEC Division of Waste Management Transportation) at 11:10 a.m. to ask if his division could support Ryan, emphasizing that our project cannot go ahead without him. Pittman will look into it with Van Tuyl and get back to me.

REP. CRAIG HOSMER (R-Calif.)
2217 HOB - D.C. 20515
(202) 225-2415

For Release: Tuesday
January 22, 1974

HOSMER WILL NOT SEEK RE-ELECTION

Rep. Craig Hosmer (R-Long Beach) has announced his intention not to seek re-election to a 12th term in the House of Representatives.

First elected in 1952, Hosmer expressed his deep gratitude to the people of California's 32nd Congressional District for the privilege given him "to serve long and continously in the Congress during an era of key decisions on nuclear, environmental and many other vital issues of historic concern."

The 22-year veteran of Congressional battles under five presidents holds unique influence as the senior ranking Republican member of both the Joint Committee on Atomic Energy and the House Interior and Insular Affairs Committee.

In announcing his decision to retire from the House, Congressman Hosmer said "long seniority helps a Congressman serve his constituency well, but from time to time it is also healthy for fresh talent to move up to governmental responsibility.

"Last month's decision on redistricting by the California Supreme Court created new Congressional districts likely to remain stable for the rest of this decade. It has been a tough decision, but now seems to be the logical time for me to make way for a new representative in the new 34th Congressional District," he said.

Hosmer, 58, an attorney and a retired Naval Reserve rear-admiral, said he has absolutely no intention of retiring from work.

"I will eventually go into business or return to law or other government service, but I have no definite plans at this time," he stated.

-0-

(Biog. enclosed)

Louis Lazaroff (Asia Foundation) called to give me a status report on arrangements for the luncheon of representatives of science in Asia at the AAAS meeting on February 28. All of the invitations have been issued; some cannot accept, so we discussed alternates.

After lunch in my office, I taught my Chem 1B lab section from 1:10-2:45 p.m. We gave them the first quiz (copy attached).

During the afternoon I made telephone calls to several vendors to collect information for Norbert Beyrard. I talked to: Charles Weaver at Westinghouse in Pittsburgh about the Pressurized Water Reactor; Karl Cohen at General Electric in San Jose about the Boiling Water Reactor; John Landis at General Atomic in San Diego about the High Temperature Gas-cooled Reactor; Walter Bencher, Vice President for International Relations, Combustion Engineering, Stamford; and Walter M. Vannoy, head of the Power Generation Group of Babcock and Wilcox.

I mailed to August Schou at the Norwegian Nobel Institute the corrected proof of my paper, "New Directions in Development," for publication in the Proceedings of Nobel Symposium 26. I sent invitations for the February 28 luncheon to Leonard Rieser, Roger Revelle, Bill Bevan, and Phil Abelson.

Edelstein dropped by at 4:15 p.m. to discuss the recent work of Richard Lagow (of MIT) on the synthesis of $W(CF_3)_6$ from WCl_6 and CF_3CF_3 under electrical discharge conditions. This method may be applicable to the synthesis of $U(CF_3)_6$, which might have application to the separation of uranium isotopes. We also discussed the application of actinides, in glasses and crystals, to modern laser spectroscopy. We decided to ask for AEC funds to start research in both these areas in our form 189 description.

Leonard Ho, Cerny's graduate student, came in by appointment at 4:30 p.m. to discuss with me his Graduate Research Conference topic and his prelim topics. I am on his qualifying exam committee which will meet on March 11. He will discuss his research on the determination of the mass of B^{15} by heavy ion transfer techniques and also Report LBL-1997, by Gross, Stephens and Diamond on "Back Bending in Odd-A Ho Isotopes."

I picked up Helen on the campus and rode home with her. She had spent the day on a Sierra Club hike in Marin County with Cathy Sherman. She left the Bonneville on campus for David to use.

Suki and I took a hike to the water tank. (Sheila has suggested that I should explain what "the water tank" is: it sits atop a hill of several hundred feet, approached from the end of Monticello Road near our house. It is a nice climb, and one gets a beautiful panoramic view of Lafayette Ridge and the town of Lafayette.)

<u>Thursday, January 24, 1974</u> - Berkeley

I went up to the HILAC Building to talk to Ghiorso and the Alonsos about their work and to Main about the new operational organization (he is not too happy about it and said a number of engineers from the old organization are also unhappy and leaving).

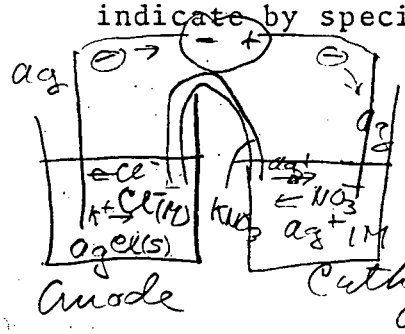
Chem 1B Section 2
1st Quiz Jan. 23, 1974
35 points OPEN BOOK
35 minutes Show all work
Pimental and Spratley

Name _____
Locker No. _____
T.A. _____

1. (15 points) The following cell can be used to determine the solubility product of $AgCl$.

$$Ag,\ AgNO_{3(1M)}\ //\ KNO_3\ //\ KCl_{(1M)},\ Ag, AgCl.$$

Sketch the cell, labeling all parts. Indicate the direction of flow of all electrical species. Write the cell reaction, and indicate by specific equations how you would obtain K_{sp} for $AgCl$.



$\Delta\mathcal{E} = \Delta\mathcal{E}^\circ - \frac{0.059}{n}\log Q$ $\quad \Delta\mathcal{E} = -\frac{0.059}{n}\log_{10} Q$

$= -0.059 \log_{10} \frac{Ag^+}{1}$

$\log_{10} Ag^+ = -\frac{\Delta\mathcal{E}}{0.059}$ $\quad Ag^+ = 10^{-\frac{\Delta\mathcal{E}}{0.059}}$

$K_{sp} = (Ag^+)(Cl^-) = 10^{-\frac{\Delta\mathcal{E}}{0.059}}(1)$

$Ag^+ + e^- \rightarrow Ag$

$Ag + Cl^- \rightarrow AgCl + e^-$

$Ag^+ + Cl^- \rightarrow AgCl$

2. (10 points) Complete and balance the following equations:

$$Ag + NO_3^- = Ag^+ + NO \qquad \text{Acidic sol.}$$

$$MnO_4^- + C_2O_4^{--} = Mn(OH)_3 + CO_3^{--} \qquad \text{Basic sol.}$$

$4H^+ + 3Ag + NO_3^- = 3Ag^+ + NO + 2H_2O$ $\quad$ $3H_2O + MnO_4^- + 2C_2O_4^{-2} = Mn(OH)_3 + 4CO_3^{-2} + OH^-$

0 $\quad$ +5 $\quad$ +1 $\quad$ +2 $\quad$ +7 $\quad$ +3 $\quad$ +3 $\quad$ +4

(−3) $\quad$ (−4)

(+1)3

+4 $\quad$ −1 $\quad$ = +3

3. (10 points) What is the oxidation number of nitrogen in each of the following compounds: NH_3, N_2H_4, N_2, HNO_2, and N_3I?

−3 $\quad$ −2 $\quad$ 0 $\quad$ +3 $\quad$ N_3H $\quad$ $-\frac{1}{3}$

$e^- + AgCl \rightarrow Ag + Cl^-$

Anode $\mathcal{E} = \mathcal{E}^\circ - 0.059 \log \frac{1}{1}$ $\quad$ Cathode $\mathcal{E} = \mathcal{E}^\circ$

.22 $\quad$ 0.80

$\Delta\mathcal{E} = \mathcal{E}_{cathode} - \mathcal{E}_{anode} = 0.80 - 0.22 = 0.58$

Barclay Jones called me at 10:35 a.m. to ask if I could help him find a job; he is staying with his daughter, Cathy Beach.

I called Jeanette Wedel in Fran Freeman's office at AAAS in response to Fran's inquiry about the Lilly Foundation, indicating that I had not had a reply from them either.

I attended the biweekly bag-lunch meeting of the SHEIKS with Kratz, Norris, Otto, and Binder. We discussed Binder's program of bombardment of gold with Kr^{84} ions; he will devise a chemical separation procedure in which the gold will be separated first, perhaps by extraction by ethyl acetate, followed by use of the overall scheme used by Liljenzin, Kratz and Norris. We discussed the problems in computer programming brought on by the unexpectedly low resolution of the large germanium crystal (loaned by Diana Lee); Norris is going to put his main emphasis on solving this. We decided that the next uranium bombardments should be with Ar^{40} ions to put the finishing touches on this aspect of our program.

I dropped in to see Edelstein in his lab. He called Richard Lagow at MIT and found he is interested in collaborating with us in a consultant role. He said he has synthesized $U(CF_3)_4$, which is stable and volatile; there apparently are good prospects for interesting analogous lanthanide compounds.

I wrote Alice Strauss (copy attached) about Lewis's death.

Steve, Suki and I took a hike to the water tank. He spent the day making calls to seek employment, without success.

<u>Friday, January 25, 1974</u> - Berkeley

I called John Burnett at Washington AEC to tell him about our new plans for actinide chemistry and heavy ion radiochemistry and our proposed 189 forms.

At 9:30 a.m. we had a meeting of the SHEIKS and other chemists. Present were Ghiorso, Kratz, Norris, Otto, Binder, Nitschke, Nurmia, Jose Alonso, and Hulet. We discussed the problem of measuring the heavy ion beam intensities on the uranium targets and arranged with Hulet for LLL to prepare more of these targets, thick and thin. Ghiorso suggested introducing an additional amplifier for measuring the energy of the fission events, which the SHEIKS will try.

At 10:30 a.m., we went on to the regular SuperHILAC research progress meeting. Ghiorso announced that the scheduled March shutdown has been postponed, perhaps to June. He also reported on the huge recent Kr^{84} beam which started as Kr^{+6} from the Adam source; later use of Kr^{+5} should result in larger beams. The beam time resolution is very good--half width of 0.2 nanoseconds.

Kratz made a preliminary report on the recent Kr bombardments. He mentioned the experiments to determine the mass distribution of yttrium and gold isotopes from uranium as a target. The yttrium curve is double humped, due to the two kinds of fission. In the second bombardment of uranium, the entire yield distribution curve was

January 24, 1974

Mrs. Lewis L. Strauss
Brandy Rock Farm
Brandy Station, Virginia 22714

Dear Alice:

I was greatly saddened to learn of the passing of Lewis. To me this means a loss of a dear friend with whom I have had a close relationship for nearly thirty years.

His country owes a tremendous debt of gratitude to Lewis for his monumental contributions extending over his entire adult lifetime. From my firsthand knowledge and participation, I know that during those thirty years he played a key role in the development of nuclear power and the support of nuclear science. His conception and implementation of the worldwide "Atoms for Peace" program was a tremendous contribution to his country and to the world.

Lewis will be sorely missed. His wise counsel and ever-willing help will leave a void in the lives of so many of us. I hope that your realization of the high esteem in which he was held will in some small measure help to assuage your sorrow at this time.

With sympathy,

Glenn T. Seaborg

GTS/sms

Friday, January 25, 1974 (con't)

determined again. The third experiment had about one microampere for about 20 hours on uranium. There were some spurious counts in the lead fraction due to alpha pileups, but no evidence for superheavy elements--the limit for the cross section for the production of SHEs can now be set at 10^{-34} cm^2.

Hulet then described the method used at LLL for the uranium target used by the SHEIKS in the third (the long, high intensity) bombardment. He also described their method of evaporating $^{248}CmF_3$ from a vitreous graphite crucible onto a thin hot beryllium backing plate; a thickness of 1.25 mg per cm^2 can be obtained. The CmF_3 targets have a very low lead content. The same method can probably be applied to the preparation of Pu-244 targets. Ghiorso has learned that about 6 gm of Ca-48 is available to us in metallic form.

Moretto reported on his group's bombardments of silver and copper with Kr ions. Ghiorso then showed a super-8 cartoon movie which had been sent to Moretto by Flerov; this was difficult to understand.

I returned to my office for the scheduled telephone conference call meeting of the DATRAN Board of Directors, which ran from 12:00-12:25 p.m. Participating were Sam Wyly (Chairman), Erwin D. Canham, Charles J. Wyly, Jr., Glenn Penisten (President), Harry G. Bowles, Sam Heileman (Counsel), and Dean D. Thornton. The primary purpose was to consider approval of amendments to the purchase agreement and stockholders' agreement between DATRAN and Walter Haefner Holding AG, as summarized in Jack Scorce's memorandum of January 22, 1974 (copy attached).

We also took two other actions: I moved the approval of the amendment to the Haefner agreement and it carried unanimously. It was also moved to reduce the purchase price for Bechtel's stock in the same manner and this carried unanimously. We also accepted Sam Wyly's recommendation that Parker Peterman be appointed Finance Officer for DATRAN--that is, Vice President and Treasurer--to replace Harry Bowles (Bowles will remain on the Board and hence Peterman will not be on the Board). Peterman, who was formerly the Controller of Consolidated Edison, will have a starting salary of $58,000 and be given a stock option of 4,000 shares.

After lunch, I met with Professor C. Bradley Moore in my office, joined by our Nuclear Chemistry Divisional Internal Review Committee--Diamond, Harvey, Shirley, and Cerny. We explored the possibility of Moore's associating with the Nuclear Chemistry Division for a least part of his research program, the area of isotope separation. He is interested in separating isotopes, such as carbon, through reactions with laser beams (e.g., formaldehyde to produce carbon monoxide). We also discussed his possible interest in our proposed programs on the separation of uranium isotopes and the development of actinide lasers. We suggested he meet, along with Harvey and me, with Elliot Pierce, head of the AEC Molecular Sciences Branch, when he is here next Wednesday, to investigate the possibility of AEC support.

Gr 25 12 00 Noon

D :

Vienna, Virginia
January 22, 197

TO: The Datran Board of Directors

FROM: Jack Scorce

SUBJECT: Special Board Meeting

A special meeting of the Datran Board of Directors will be held on Friday, January 25, 1974, at 3 p.m., Virginia Time, by conference telephone.

The subject of the special meeting will be your review and approval of the provisions of the enclosed Amendment No. 1 to the Purchase Agreement and Stockholders Agreement between Datran and Walter Haefner Holding AG. Recent negotiations with Haefner Holding AG have necessitated certain changes from the agreement initially signed on December 8, 1973 whereat we received $10,000,000 in exchange for Datran's Convertible Interim Note. We are scheduled to close the second $10,000,000 with Haefner Holding AG on January 29, 1974 subject of course to your approval of the enclosed amendment. Basically, the amendment does two things:

1. Reduces Haefner Holding's purchase price of Datran's Common Stock from $11.00 per share to $10.00 per share, and

2. Wyly Corporation now agrees to repurchase from Haefner Holding at cost the Notes or the Debentures and Common Stock if there is a failure to secure investments in Datran of $10,000,000 by September 30, 1974 and an additional $15,000,000 by December 31, 1974. Previously, Wyly Corporation had until December 31, 1975 to secure additional investments in Datran of $25,000,000.

Jack Scorce
J. M. S.

klb

Enclosure

I then walked down to the campus with Moore to attend a meeting of the Chemistry Department full Professors to consider the promotion of four Associate Professors to the Professor level--R. A. Harris, C. H. Heathcock, W. H. Miller, and J. C. Wong. As chairman of the ad hoc committee to consider Harris, John Rasmussen gave a report and read the supporting letters; we voted unanimously to promote him. Noyce reported on Heathcock; we accepted the recommendation that he not be promoted at this time. O'Konski reported on Wong; we voted unanimously for his promotion. Moore reported on Miller; we voted to approve promotion, with 3 opposed and 2 abstentions.

I received a letter from Yang Fu-chia (copy attached); he will explore the possibility of getting Man and Atom translated into Chinese. I wrote Charles Young, Chancellor of UCLA, and enclosed a letter to Vern O. Knudsen (copy attached), since Helen and I cannot attend the dinner in his honor.

Jonathan Rice called me at 4:45 p.m. and asked if I would tape live a segment endorsing the new natural science series ("Nova") on its first night of airing on Sunday evening, March 3. I indicated that I probably would be able to do this.

Saturday, January 26, 1974 - Mount Diablo - Lafayette

Helen, Dianne, Ben Orlove, Peter Biermann (Jody has returned to New York to resume classes at Columbia; he will return the middle of next month), Suki, Moses, and I spent the day hiking in Mt. Diablo State Park, taking a picnic lunch with us.

I also worked on the AEC form 189 for our Lanthanide and Actinide Chemistry program and on the report on potential small nuclear power reactors for installation and operation requested by Norbert Beyrard.

At 8:30 p.m., Helen, Steve, Dianne, and I watched on TV the UCLA-Notre Dame basketball game from Pauley Pavilion at UCLA. UCLA won easily, 94-75, making fools of the sportswriters and coaches who voted Notre Dame #1 this week on the basis of their 71-70 defeat of UCLA last Saturday.

Sunday, January 27, 1974 - Lafayette

I mowed the wild grass in our backyard in the morning and took a hike with Suki around the rim trail at Lafayette Reservoir in the afternoon. I also worked on my talk scheduled for February 21 at the ABAG General Assembly, read Chem 1B material, and prepared for my talk on energy in the main Chem 1B lecture next Thursday.

Monday, January 28, 1974 - Berkeley

I wired Norbert Beyrard that small 250 MW nuclear power plants would not be feasible from U.S. vendors. I then mailed to him an explanatory memorandum (copy attached).

I attended Pimentel's lecture, then returned to my office to go through my mail. Lewis Branscomb called me at 10:30 a.m. about the dinner that Carey of IBM is hosting in New York on March 8 to honor

Fu-tan University
Shanghai, China
January 18, 1974

Prof. Glenn T. Seaborg
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720
U. S. A.

Dear Prof. Seaborg,

Many thanks for your kind letter of November 27th, 1973 and for your nice book "Man and Atom", which I received just after I sent you a New Year card. I have been reading this book, and do feel that it is so illuminating, outstandingly comprehensive and authoritative. I will try to ask some professors to translate it into Chinese and recommed it to our Book Press. If it works, I myself will certainly join this job.

I should thank you too for your Xmas card with the lovely picture. Please send my warmest regards to all of your family.

Sincerely yours,

Fu-chia Yang

Yang Fu-chia

January 25, 1974

Dr. Vern O. Knudsen
Chancellor Emeritus
University of California
Los Angeles, California

Dear Vern:

I have just learned that Chancellor and Mrs. Young are giving a dinner honoring you and Mrs. Knudsen, taking note of your 80th birthday. I am so sorry that I shall be unable to attend because the date conflicts with the Annual Meeting of the AAAS in San Francisco, which I must attend because I am serving as co-chairman of the meeting.

Yours has been a long and distinguished career at UCLA, extending over its entire lifetime as a University. My own association with UCLA began 45 years ago as a student, marking the beginning of our acquaintanceship. A high point in our association was the period when you served as Chancellor at UCLA and I served in this post at Berkeley. I recall with fondness our extraordinarily fine relationship and your generous and eminently fair posture on all mutual issues that involved our two campuses.

You have also--or I should say preeminently--had a distinguished career in your chosen field as an acoustical physicist. Here your position has been that of world preeminence and your students have played key roles throughout the world in the applications of your teachings.

Helen and I salute you and Mrs. Knudsen at this time, and wish you many more years of productive accomplishments and happiness.

With warm regards,

Cordially,

Glenn T. Seaborg

GTS/sms

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 · TEL. (415) 843-2740
U.S.A.
January 28, 1974

To: Norbert Beyrard

From: Glenn T. Seaborg

Re: Small U.S. Reactors for Installation in Africa

The three types of nuclear power reactors presently available from U.S. vendors are: (1) Pressurized Water Reactor (PWR), (2) Boiling Water Reactor (BWR), (3) High Temperature Gas-cooled Reactor (HTGR). None of these is, nor will be, available in the size 250 electrical MW (250,000 KW) or lower. All five vendors are emphasizing sizes above 1000 MW and do not have the design engineering manpower to divert to smaller sizes and especially not to sizes as small as 250 MW.

In my contacts with all five vendors I urged them to make estimates on the smallest sizes they would be willing to consider; these could then be initially operated at a derated level of 250 MW at relatively higher cost per installed KW and cost per KW-Hr (killowatt-hour) than the values quoted for the design values.

In the following I summarize rough estimates (the only kind possible at this stage) of turnkey capital costs, and corresponding costs for generation of electricity (determined in large part by amortization over a 25-year period at about 10% cost of money with addition of small fuel and operating costs), all in 1974 dollars and for operation in 1982. Although an overseas site was specified, there was disagreement as to costs relative to a U.S. site and thus this doesn't seem to be a factor in the estimates at this stage.

Pressurized Water Reactor (PWR).

One vendor reluctantly made an estimate on a 350 MW reactor on which some past design work had apparently been done. The capital cost would be about $675 per installed KW and the operating cost about 18 mills (1.8 cents) per KW-Hr (of which 15 is due to amortization and 3 to fuel and operating). If this reactor should be operated initially

at the derated level of 250 MW the corresponding initial values, calculated roughly from simple ratios, would be about $950 per KW and 24 mills per KW-Hr.

Another vendor, again apparently on the basis of past design work, was willing to make an estimate on a 500 MW reactor. Here the capital cost would be about $425 per KW and the operating cost about 12 mills per KW-Hr (of which 9 is due to amortization and 3 to fuel and operating). If this is derated to 250 MW the corresponding initial values when operated at this power level would be about $950 per KW and 21 mills per KW-Hr.

The third vendor was unwilling to make an estimate on any reactor below the general level of 1000 MW.

Boiling Water Reactor (BWR).

The one vendor didn't care to make an estimate. When pressed, an estimate for 600 MW was made at $400 to $600 per KW, with no estimate for operating cost. A fair estimate for operating cost might be made by comparison with the above values for PWR to give 12 to 16 mills per KW-Hr. Derating to an initial power of 250 MW should result in multiplication of these values by 2 to 2½.

High Temperature Gas-cooled Reactor (HTGR).

This vendor was very reluctant to make an estimate on the basis that the HTGR is singularly unsuitable for very small sizes. When pressed, an estimate for 250 MW was made at $1500 per KW and 30 mills per KW-Hr (of which 28 is due to amortization and 2 to fuel and operating).

Conclusions.

The answer to your question--Is it feasible for a U.S. vendor to install a 250 MW nuclear power reactor in an African country by 1982?--must be that it is not feasible because no U.S. vendor is willing to undertake this task. The possibility exists for the installation of reactors of somewhat larger sizes which could be derated to 250 MW for initial operation at a cost penalty, with subsequent lower cost (per KW-Hr) as the power is increased to design value when the load demand increases. The first two reactors described above (350 MW and 500 MW) seem to offer some slight

promise in this category. It would be premature to make a choice between them on the basis of the present fragmentary information; these two estimates may not be comparable because of different assumptions, due to lack of information about cost of money, overseas labor, materials, land, etc. Direct comparability could only be achieved by direct negotiations between you or your clients and the U.S. vendors, which I would be glad to help arrange.

Glenn T. Seaborg

GTS/sms

the Nobel prize winners. Branscomb explained that he wants to use the event as an excuse for a major discussion among executives of major industries and scientists about the common interests in science between the academic community, industry, and government. I noted my own efforts along these lines through AAAS and explained that I could not be in New York on March 8. He expects to be at the AAAS meeting next month.

During my office hour, Dana Drath, my teaching assistant in Chem 1C in the spring of 1972, dropped in to ask me to write a general letter of recommendation for him in connection with his application for a teaching position in a community college. I attended the regular Chem faculty luncheon, then taught my lab section in Room M from 1:10-3:00 p.m.

Returning to my office, I met with Bernie Harvey. He told me that the Internal Review Committee are standing firm on their recommendation that Alvin Hebert must terminate because he doesn't measure up to our Division's standards for a Senior Scientist.

I received a letter from Peter Laubereau (copy attached) concerning the arrangements for his forthcoming visit; Norman Edelstein phoned him in response to his questions. I received a letter from M. G. K. Menon indicating that he would be unable to attend the AAAS meeting, and had a copy sent to the Asia Foundation so that Devendra Lal can now be invited.

I attended the Nuclear Chemistry Seminar at 4:00 p.m. Dr. Aaje Winther (University of Copenhagen) spoke on "Heavy Ion Reactions--Direct and Indirect."

Suki and I took our water tank hike. Steve continued looking for a job, including a conference with Ron Kihara at Berkeley.

Tuesday, January 29, 1974 - Berkeley

I received a call from Dr. Irvine Solomon of the ITT Research Institute in Chicago in response to our letter about the environmental chemist position. I suggested he send his vita, etc. W. Marvin Watson phoned me on behalf of Harry Middleton, Director of the LBJ Library, to ask if I would become a Friend of the Library. I said I was interested; he will send information to me.

I wrote Paul McDaniel in response to his letter (copy attached) indicating that he does not plan to seek re-election as President of Argonne Universities Association; I said I shall look forward to learning more about it when we next meet. I sent to Dorothy Schriver some additions and corrections to my guest list for the Science Talent Search Awards Banquet on March 18 (copy attached). I forwarded to Bill Bevan correspondence that I had received from Jack McMinn concerning cooperation between AAAS and the American Society of Civil Engineers. I sent my evaluation of Dana Drath (copy attached) to the Educational Career Services office and acknowledged M. G. K. Menon's letter, expressing disappointment that he cannot attend the AAAS meeting.

Dr.P.G.Laubereau in
HESSISCHE
LANDESANSTALT FÜR UMWELT

62 Wiesbaden, den 23.1.74
Kranzplatz 5/6
Telefon 3 92 51
Telex 4 186 278

1D

In der Antwort bitte vorstehendes Geschäftszeichen angeben

Hessische Landesanstalt für Umwelt, 62 Wiesbaden, Kranzplatz 5/6

1/28/74

Prof. Dr. G. T. Seaborg
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720
U.S.A.
Air Mail

Dear Professor Seaborg,

many thanks for your letter of Jan. 17, 1974. In this letter you are suggesting two seminars with the titles : Organometallic Chemistry of the Actinides, Part I and Part II. Because of these titles I am feeling that there may be a possible misunderstanding about the personal situation in which I am now and about the subjects I can cover in a talk. Therefore please let me tell you with a few words what happened during the past years since I left Oak Ridge :

When I came back to Germany late 1970 I had no more the opportunity to continue my former work or th do something on related fields. Thus I had to accept a job at the state agency : Hessische Landesanstalt für Umwelt. This is an institution similar to your Environmental Protection Agency (EPA). There I have a position where I am responsible for air chemistry (immission analysis; enrichment and analysis of pollutants, gaschromatography, mass spectrometry, tracer experiments), matters of radioactivity and health physics (enviromental problems of nuclear power). On the one hand this job needs a constant and total engagement and on the other hand our institution does not give me the least chance to follow the advances of organometallic chemistry of the actinides and related problems of basic research. Thus practically since I left Oak Ridge I had to concentrate on new fields and to give up contacts with organometallics.

When I got your kind invitation I was very much hesitating to accept it because of these facts. And I thought that I can accept only with the understanding that I report about work in which I was involved at Oak Ridge. However, the titles under discussion indicate that you are expecting something more.

And I feel that there may be a great disappointment in the audience if I report about such old things, which can be handled in one seminar (possible title: Cyclopentadienly Complexes of Transamericium Elements). I think you should discuss this point with Norman Edelstein who once heared my talk at the Gordon Research Conference. Since then, to my great grief, nothing was added by my research to the field of organometallics and a possible talk could not cover more than a talk of 1970.

I would be happy if you understand my peculiar situation. To prevent disappointments and a misunderstanding I suggest a reconsideration of the invitation.

Hoping that I am not causing too much inconvenience, I remain,

sincerely yours,

P.G. Laubereau

P.G.Laubereau

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A

ARGONNE UNIVERSITIES ASSOCIATION

P.O. BOX 307, ARGONNE, ILLINOIS · 60439 · TELEPHONE 312:739-1679

Please reply to:
Suite 211
1155 Sixteenth Street, NW
Washington, D. C. 20036
Tel. (202) 223-8676

January 22, 1974

Professor Glenn T. Seaborg
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

Dear Glenn:

I have sent a letter of endorsement to the Admissions Committee of the Cosmos Club to your and Waldo Smiths nomination of Ted Sherburne for membership in the club. Indeed I have the highest admiration for Ted and writing such a letter was a pleasure.

A few weeks ago I did review the Westinghouse Science Talent Finalist papers. As usual I enjoyed this assignment very much. Earlier I had seen all the entries for I did look over Arthur Ruarks work. My general impression is that the group this year is perhaps more uniform than last year. By that I mean that there are no papers like the General Relativity and Cosmology paper of Armands last year! Perhaps that is a good thing but I do like to see the really superior one every now and again. I attach my comments on each of the Forty Two Winners.

I have told the Chairman of the Board of the Argonne Universities Association that I do not wish to be reelected as their President at the next annual meeting. There are many reasons why I have taken this step, most of which you would probably agree with.

With warm regards,

Cordially,

Paul

Paul W. McDaniel

PWMcD/pwmd

January 29, 1974

Mrs. Dorothy Schriver
Science Service, Inc.
1719 N Street, N.W.
Washington, D.C. 20036

Dear Dorothy:

This is in reply to your letter of January 24, 1974, concerning the guest list for the Science Talent Search Awards Banquet on March 18.

You can delete Mr. and Mrs. Victor Cohn and Dr. and Mrs. Roger O. Egeberg.

Enclosed are names for addition to the list, if they are not already on your master list.

With thanks and best regards,

Cordially,

Glenn T. Seaborg

GTS/sms

Enclosure

1/29/74

ADDITIONS TO SEABORG GUEST LIST, SCIENCE TALENT SEARCH AWARDS BANQUET

Name and Address	Affiliation
Mr. and Mrs. Howard C. Brown, Jr. 9618 Carriage Road Kensington, Maryland 20795	President, Electro-Nucleonics Laboratories (Bethesda)
Mr. and Mrs. William F. Corliss P. O. Box 107 Glen Arm, Maryland 21057	Science writer
Dr. and Mrs. Paul F. Donovan 5437 Potomac Avenue, N.W. Washington, D.C. 20016	National Science Foundation
The Honorable Adrian [illegible] and Mrs. [illegible] 2721 N Street, N.W. Washington, D.C. 20007	Dean, Law School, Georgetown University
The Honorable Peter M. Flanigan and Mrs. Flanigan The White House Washington, D.C. [illegible]	The White House
The Honorable Orville L. [illegible] and Mrs. [illegible] Hudson House, [illegible] Ardsley-on-the-[illegible]	President, Business International, Inc.
Dr. and Mrs. [illegible] Division of International [illegible] U.S. Atomic Energy Commission Washington, D.C. [illegible]	[illegible], USAEC Division of International Programs
Mr. and Mrs. Sylney R. Gaeuler 3910 Montrose Drive Chevy Chase, Maryland 20015	
Mr. and Mrs. John L. Gittins 7203 Farr Street Annandale, Virginia 22003	
Dr. and Mrs. Glen E. Gordon 104 Denver Road Silver Spring, Maryland 20910	University of Maryland
Dr. and Mrs. Richard G. Hewlett 7909 Deepwell Drive Bethesda, Maryland 20039	Historian, USAEC
Dr. and Mrs. Roger W. Heyns American Council on Education One Dupont Circle, N.W. Washington, D.C. 20036	Head, American Council on Education

Name and Address	Affiliation
Ms. Antoinette Joseph Office of Energy and Development Programs U.S. Atomic Energy Commission Washington, D.C. 20545	per address
Mr. Paul Lochak, President Societe Internationale de Technologie 61, Rue des Belles Feuilles 75782 Paris Cedex 16, France	" "
Dr. and Mrs. Benjamin S. Loeb 6310 Tulsa Lane Bethesda, Maryland 20034	USAEC
Mr. Hugh Loweth / and Mrs. Office of Management and Budget Washington, D.C.	
Mr. Fred Malik / and Mrs. Office of Management and Budget Washington, D.C.	
Mr. and Mrs. William P. Markert 5003 Worthington Drive Washington, D.C. 20016	President, National Swimming Pool Institute
Mr. and Mrs. Robert Price 5647 Sixth, North Arlington, Virginia 22205	
The Honorable John Sawhill & Mrs. S Federal Energy Agency Washington, D.C. 20461	
The Honorable Stewart L. Udall and Mrs. Udall 4451 Crest Lane McLean, Virginia 22101	Overview
Mrs. William Washington 3919 Harrison Street, N.W. Washington, D.C. 20015	
The Honorable James Webb & Mrs. W. National Aeronautics and Space Agency Washington, D.C.	NASA
Dr. and Mrs. H. T. Yolken 8205 Bondage Drive Gaithersburg, Maryland 20760	

NOTE TO CANDIDATE

Please fill in spaces below. Give this form to the person who will write this reference, with a stamped envelope, to be mailed directly to this office. We do not accept letters of recommendation delivered by the candidate.

Dana Drath Your Name	M.S. CCC Degree Credential
1056 Fiesta Dr. San Mateo, Ca. 94403 Address	Chemistry Major Minor
(415) 341-6219 Telephone	Community College Instructor Type of Position Sought
Prof. Glenn T. Seaborg Name of Writer	University Professor of Chemistry Position of Writer

NOTE TO AUTHOR OF REFERENCE

The information below will be duplicated and mailed to employing officials. Please TYPE, using dark typewriter ribbon. Please include dates of service and whether or not you would rehire this candidate. If additional space is needed, please complete the statement on a separate sheet of paper—not on reverse side of this form.

In accordance with FEPC policies, authors of references are asked to refrain from comment re illegal discriminatory criteria such as the candidate's race, religion, and national origin; or to political affiliations, beliefs or activities. We keep no records of such information.

PLEASE RETURN THE ENTIRE FORM TO

Educational Career Services, Rm. 8, North Gate Hall, University of California, Berkeley, California 94720

CONFIDENTIAL STATEMENT concerning Dana Drath
Name

UNIVERSITY OF CALIFORNIA
Berkeley
Educational Career Services

I became acquainted with Dana Drath when he served as my Teaching Assistant in a laboratory section of freshman Chemistry 1C in the Spring Quarter of 1972. I was very favorably impressed by his overall grasp of the principles of chemistry and by the clear manner in which he was able to transmit his knowledge to the students. He has a good background in general, inorganic, physical, and nuclear chemistry and should be able to do very well in a teaching program involving any of these areas of chemistry. I have been in touch with him since the spring of 1972, having seen and talked with him on numerous occasions, and have been impressed with his dedication to the field of teaching. He has added to his experience by teaching laboratory sections of Chemistry 1A, 1B and 1C during the intervening two years.

He wants to make a career of teaching chemistry in a community college, and I believe that he has the capacity and the will to do an outstanding job. I can recommend him very highly.

Position of writer University Professor of Chemistry

Organization University of California, Berkeley

City and State Berkeley, California 94720

(Signed) Glenn T. Seaborg

Type or print name Glenn T. Seaborg

Date January 29, 1974

Series 8222

Tuesday, January 29, 1974 (con't)

A student from my class, Brian Rupenthal, came up for help with his Chem 1B problems.

From 2:00-4:20 p.m., I attended the meeting of the LBL Scientific Program Council in Building 50A. Present were Andrew Sessler, Earl Hyde, Jack Hollander, David Jackson, Charles Tobias, Herbert Steiner, Tom Elioff, Frederick Goulding, James Bassham, Kenneth Pitzer, Luis Alvarez, and David Shirley.

Sessler told us that John Teem will be coming on Wednesday and Thursday, instead of yesterday and today, to attend the meeting on the IMRD program. Sessler therefore used the meeting to give us the information of the FY75 budget which he had learned on his recent visit to Washington.

The information on the overall governmental energy portion of the budget is as follows:

(millions of dollars)

Program	FY74	Ray	FY75/Pres
1. Conservation	65	166	116
2. Oil, gas, shale	19	52	42
3. Coal	164	335	427
4. Emission control	65	70	178
5. Fission	530	732	725
6. Fusion: Magnetic Confinement	57	135	102
Laser	44	54	66
7. Solar	14	33	50
8. Geothermal	11	40	45
TOTAL	999	1572	1811
Basic Research		153	
Environment and Health			134
Physical			82
GRAND TOTAL	999	1725	2027

Sessler then gave us a breakdown of this by agency:

AEC	1052	
Interior	406	
EPA	220	
NSF	161	
Total	1838	(millions of dollars)

Sessler then gave us the AEC budget:

FY74	FY75	
2389	3246	(millions of dollars)

The breakdown of the AEC FY75 budget is as follows:

Geothermal	10.7	
Synthetic fuels	4.5	
Solar	0.0	
Advanced cycles	0.0	
Storage	5.8	
Transmission	3.4	
CTR	82.0	
Biology & Medicine	136.0	(19 energy add-on)
Physical Research	287.0	(18 energy add-on)

The Labs receive the following increases in budget:

ANL	+24%
BNL	+16%
LLL	+20%
LASL	+22%
ORNL	+24%
PNW	+37%
LBL	+10% (32.9 → 36.2)

The energy supplement to the LBL budget is:

Geothermal (1.8 + 1.0[eng.])	2.8
Physical Research	1.3
Biology and Medicine	0.3
CTR	0.95
	5.4

We discussed people like Paul Donovan to head up LBL solar work and someone to recommend to Teem for the position of AEC Coordinator of Laboratories. We also discussed the amount of the level of support for the Energy and Environment Program Development Requests for January-June 1974, as presented by Hollander on the attached sheet. I suggested that $330K rather than the listed $479K might be a good compromise and Hollander agreed. Sessler told us that John Abbadessa has found the $670,000 to cover the BEVALAC overrun.

On the way home, I dropped by the SuperHILAC. They are still making experiments on aerosols in the helium jet streams to increase the efficiency of carrying reaction products, preparatory to the element 106 experiment. Ghiorso showed me the FAMSY apparatus, which is out of the machine shop and ready for assembling.

Wednesday, January 30, 1974 - Berkeley - Piedmont

I called George Rogosa at 8:50 a.m. for advice on preparation of our 189 forms. He had the impression that we would be asked for separate forms for the actinide work and the energy-related work, so I said I would prepare them that way. After this, I attended Pimentel's Chem 1B lecture.

I called John Sawhill in Washington at 10:10 a.m. and spoke with his secretary, Frieda Spencer. I invited him to visit the LBL Energy and Environment Program when he is in the area next Monday.

ENERGY AND ENVIRONMENT DIVISION

PROGRAM DEVELOPMENT REQUESTS FOR JAN-JUNE 1974

ENERGY TECHNOLOGY		
SOLAR		
Heating/Cooling of Buildings		$72 K
Banks Engine		$42 K
"Central Tower" Focusing System		$30 K
Measurement of Solar Radiation		$36 K
	Solar	$180 K
CTR		
100 keV Neutral Beam		$14 K
COAL		
Selective Hydrogenation		$20 K
CELLULOSE		
Cellulose Conversion		$27 K
	Energy Technology	$241 K
ANALYSIS AND ASSESSMENT		
Support for Personnel		$29 K
Demonstrate Conservation in Buildings		$8 K
Geothermal Data Center		$33 K
	Analysis and Assessment	$70 K
TRACE-SUBSTANCE PROBLEMS		
Chemistry of Atmospheric Aerosols		$16 K
Metal-Dependent Enzyme Systems		$16 K
Membrane Structure and Function		$16 K
	Trace-Substance Problems	$48 K
INSTRUMENTATION		
Coherent Forward Scattering		~~$60 K~~ 40
Microwave Spectroscopy		$25 K
Low-Level Tritium and Krypton-85		$20 K
	Instrumentation	$105 K
SEISMIC		
Seismic Strain - Hollister, Calif.		$23 K
Seismic Strain - San Bernardino, Calif.		$12 K
	Seismic	$35 K
	Total	~~$499~~ K
		$479 K

Wednesday, January 30, 1974 (con't)

Harvey told me that he has learned that we have officially received on Midyear Review the budget additions that we heard were in the offing, as follows:

My actinide and heavy ion research	$20K
88" ion source research and development	$50K
Ghiorso's work on LASSY at the SuperHILAC	$50K

At 11:00 a.m., Elliot Pierce (Head of the Molecular Sciences Branch of the AEC Physical Research Division) and his colleagues, Richard Kandel and F. Dee Stevenson (brother of our own Lynn Stevenson), arrived (schedule attached). I described to them our interest in new uranium compounds and the use of actinides in solid solutions and crystals for lasers and the attendant possibility of support for this aspect of our program from Pierce's branch.

At 11:30 a.m., Bradley Moore joined us, and we described his interest in joining the Nuclear Chemistry Division in a program of isotope separation and laser investigation, possibly to be supported by Pierce's branch; Moore indicated that he would rather not undergo Q clearance; he wants to stay clear of secret work, and this seemed to be considered feasible. We will consult with Walter Haubach and prepare a 189 form.

Edelstein joined us in the cafeteria for lunch and we described further some of our ideas concerning expansion of the lanthanide and actinide chemistry effort. Pierce agreed with us that our best approach is to prepare a 189 form on this for submission to Rogosa's Nuclear Sciences Branch, together with another form 189 drawing some appropriate line so as to include the new uranium chemistry and possible isotope separation work and actinide laser investigations for submission to Pierce's branch. We took Moore to meet John Teem, Earl Hyde and Andy Sessler.

While I taught my lab section from 1:10-2:30 p.m., Pierce, Kandel and Harvey met with David Shirley, Richard Marrus, Warren Garrison, Amos Newton, and Jack Hollander.

I sent to the National Endowment for the Humanities my rating sheet on Jim Hart's proposed new project out of the Bancroft Library (copy attached).

I returned a call to Sam Aronoff at Simon Fraser University in Vancouver at 4:10 p.m. He invited me to visit there for two or three days in their program "Statesmen of Science." He would like me to be available to give a formal lecture and to meet with students. I said that I didn't think I would be able to do this but that I would at least consider it.

Suki and I took our hike. We watched President Nixon's State of Union address at 6:00 p.m. About Watergate, he said that "one year is enough;" the Watergate investigation should be brought to a speedy conclusion and investigators already have enough information to do it. He said he has no intention of walking away from his job. About

LAWRENCE BERKELEY LABORATORY

January 14, 1974

TO: Earl R. Hyde

RE: Schedule for visit of Elliot Pierce and party, January 30, 1974

9:00 - 10:30	Discussions with M. Calvin. (Visitors will walk from Faculty Club and Durant Hotel)
~10:45	Calvin's people will bring them to Bldg. 70A for discussions with Seaborg and Harvey.
12:30 - 1:15	Lunch, cafeteria
1:30	Meet D. Shirley in Bldg. 70A
2:00	Meet F. Marrus in Bldg. 70A
2:30	Meet W. Garrison in Bldg. 70A
3:00	Meet J. M. Hollander in Bldg. 70A
3:30	Meet A. S. Newton in Bldg. 70A

B.G.H.

B. G. Harvey

BGH:fm

RATING SHEET

Applicant's Surname HART Log No. H-20158

A. Please evaluate each of the following aspects of this proposal:

1. The relative value of the project as a contribution to the given field of study.

The relative value is very high because the project is unique in the field of the history of science and engineering in the western United States, and in the archival documentation of that history with the personal papers of leading scientists and engineers in the western United States.

2. The research design or plan of work.

I believe that the research is well planned, with its direct involvement of the scientists and engineers through the interview process and through the acquisition of their historical files as the result of individual discussions and negotiations.

3. The competence of the applicant for the project proposed; his standing in his field or, if a newcomer, his potential for accomplishment.

James D. Hart, whom I have known intimately since 1958 when he served as Vice Chancellor during my tenure as Chancellor at Berkeley, is intelligent and hard-working, and completely dedicated to this project; he has known many of the subject scientists and engineers for years and has set up a General Advisory Council consisting of people who know them all. Roger Hahn furnishes the complementary expertise in the history of science--making Hart and Hahn an ideal team.

4. Soundness of the budget.

The budget seems generally sound, but I have not made a detailed analysis.

5. Where relevant, comment on the value of the project as a contribution to the understanding of problems of national concern.

Much of the basis for the nuclear age and the age of electronic engineering--central factors in today's technological revolution--was laid in the laboratories whose personnel will be the subjects of this investigation, and an understanding of this basis must be important to contemporary civilization. (Continued below)

B. Please indicate your overall evaluation of this proposal by checking one of the following merit ratings. In addition, where you find it possible, please indicate a funding recommendation.

MERIT RATING	FUNDING RECOMMENDATION
XXX (5). Superior	XXX Fund. 1st Priority
____ (4). Good	____ Fund. 2nd Priority
____ (3). Average	____ Fund. 3rd Priority
____ (2). Poor	____ Not to Fund
____ (1). Incomplete	____ Defer

Signature Glenn T. Seaborg

Institution (include Dept.) Lawrence Berkeley Laboratory University of California, Berkeley SEABORG

If you prefer, feel free to give your evaluation in a letter rather than on this form.

(#5 continued.

A delay in this project could result in irreparable loss of opportunity because a number of the people who would be subjects are advanced in age.

NATIONAL ENDOWMENT FOR THE HUMANITIES
DIVISION OF RESEARCH GRANTS

REVIEWER DATA SHEET

NAME Glenn T. Seaborg

HIGHEST DEGREE AND DATE Ph.D., 1937 (over 40 honorary degrees)

INSTITUTIONAL AFFILIATION University of California

ADDRESS Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

TELEPHONE NUMBER, INCLUDING AREA CODE 415/843-2740, ext. 5661

HOME ADDRESS (if you prefer that we send reviews to you there)

TELEPHONE NUMBER, INCLUDING AREA CODE

PERMANENT SUMMER ADDRESS, IF APPLICABLE

TELEPHONE NUMBER, INCLUDING AREA CODE

FIELD(S) OF SPECIALIZATION (1) Nuclear chemistry and physics research
(2) Teaching of chemistry
(3) Science policy and administration

AREA(S) OF MAJOR OR ESPECIAL CURRENT INTEREST WITHIN YOUR FIELD(S)
(1) Transuranium elements
(2) Heavy ion research
(3) Historical writings research

WE WOULD APPRECIATE HAVING YOUR COMMENTS OR QUESTIONS REGARDING THE REVIEW PROCESS. YOU MAY USE THE REVERSE OF THIS SHEET IF YOU LIKE.

the oil embargo, he said that the Arab nations will hold an urgent meeting in the "immediate future" to discuss lifting the oil embargo against the United States; an end to the embargo, however, will only ease the nation's energy crisis, not end it. About the energy crisis, Nixon said that ending it is the administration's No. 1 priority, hopefully without gasoline rationing; he said that Congress must pass an emergency energy bill to give the administration far-reaching powers to deal with the crisis and a separate bill to tax the oil industry's "windfall profits;" we must achieve self-sufficiency by 1980. About the economy, he said that, although there will be "ups and downs" in the fight against inflation in the coming year, there will be no recession and no new taxes. About defense, he said that the percentage of money requested for defense spending will be cut, but those expenditures will continue to increase in the coming years to keep the United States from becoming the second strongest nation.

About health care, Nixon described an administration proposal for comprehensive health insurance care for all Americans; this plan will not cost $80-100 billion, like some other proposals; there will be new emphasis on preventive medicine. About welfare, he said that the present welfare system must be replaced with one that works; Congress must help reform a welfare system that bleeds the taxpayer, corrodes the community, and demeans those it is meant to assist. About education, Nixon said that we need to reform our system of federal aid to education; busing should be a last resort; there should be tax credits for private school tuition. About personal privacy, he said that the administration this year will propose steps to guarantee the personal privacy of all Americans; there should be a Cabinet-level review of abuses by government and industry. As his accomplishments since taking office, Nixon cited the following: the Vietnam War has ended; new relationships have been developed with the Soviet Union and the People's Republic of China; the rates of crime and drug addiction have begun to decline; the draft has ended; programs have been started to preserve the environment; and peace prevails on the campuses and in the cities.

At the end he spoke extemporaneously about the Watergate affair, pledging, in an ambiguous way, cooperation with the House Judiciary Committee.

At 6:30 p.m., Helen and I attended the reception and buffet at the home of Doreta Chaney in honor of the members of the Citizens Task Force of the East Bay Regional Park District. We talked with: Maynard Munger and his new wife; Assemblyman Ken Meade, who recalled that he was quarterback on the Rose Bowl team while I was Chancellor; Mr. and Mrs. Joseph Engbeck; Mr. and Mrs. Bob Watson; Alvin Darnall; Arthur Emmes; Mr. and Mrs. [Janice] Delfino; Al Baum; Bill Horne; Dick Trudeau; Carol Sibley; Joanne Johnson; George Cardinet; Jane Putnam; Mr. and Mrs. [Ann] Christofferson; Mr. and Mrs. William Dickinson; Kay Kerr; Joyce Burr; Mr. and Mrs. [Helen] Hann; Bill Rogers, the attorney; Mr. and Mrs. Fred Blumberg; and Joe Bort.

At 9:00 p.m., there was a program presided over by Dick Trudeau. He called on Carol Sibley, who gave a charming talk about early days

of the EBRPD as seen through the eyes of her husband Bob Sibley. He then called on William Penn Mott, who gave some encouraging remarks about state funding for parks and hiking trails and emphasized the importance of the passage of the statewide bond issue next June. Trudeau then called on Howard Cogswell, President of the EBRPD Board of Directors, who introduced a number of the people present, including other Board members, the chairman of the Citizens Task Force subcommittees, Assemblyman Meade, etc. Cogswell announced that each member of the Task Force was being presented a certificate of appreciation and a commemorative paper weight which we picked up as we left. He also announced that a permanent Advisory Committee to the EBRPD Board is being created, consisting of 25 members, to be appointed by individual members of the Board and various organizations in the East Bay.

In my conversation with Sue Watson, I learned that she is in charge of arranging the hiking schedule for the Contra Costa Park Council this year. She invited me to arrange and lead a hike over Lafayette Ridge on Saturday, June 1, and I agreed to do so.

Thursday, January 31, 1974 - Berkeley

At 9:45 a.m., Sol Linowitz called from the Salk Institute in La Jolla where he is attending a meeting of their Board of Trustees. When he started to say he wanted to talk with me about an important subject involving Armand Hammer (Chairman of the Executive Committee there), I interrupted to say I was sure it concerns "his intriguing process for in situ recovery of oil from oil shale." This took Sol aback, for it was the topic he had in mind. He went on to explain that Hammer has explained the process to Bill Simon, Senator Jackson, and Dixy Lee Ray, all of whom seem intrigued by it; Roy Ash, however, has removed from the budget the money for developing the process.

Linowitz then put Hammer on the phone and he described the process, said he has spent $5 million to build a pilot plant in northwest Colorado which has an output of 25-30 barrels of oil per day. He plans to spend an additional $5 million for a plant that can produce 500 barrels a day by the end of the year and hopes to have a plant with a capacity of 3,000 barrels a day soon thereafter. He asked if he could fly up with one of his experts to meet with me and I said I could see him tomorrow at 3:00 p.m.

In connection with the lecture I am giving this morning in Chem 1B, I called Jack Hollander at 10:00 a.m. for his assessment of wind as a source of energy. He indicated that, apart from the total amount obtainable, wind presents two problems: (1) the environmental impact of having a huge propeller such as would be required, spaced every 100 feet apart, would have a negative visual impact as well as be a possible threat to airborne wildlife; (2) if the energy of the wind is absorbed at a given point, one has potentially changed the climate downstream. Jack pointed out that the winds are the carriers of our weather pattern and therefore there would be a climatic impact.

At 11:10 a.m., I gave the Chem 1B lecture in PSL, substituting for Pimentel. I talked on the energy problem, summarizing the present energy use, division between various sources, and the future of (1)

gas and oil, (2) coal, (3) conventional nuclear, (4) breeder, (5) fusion, (6) solar, and (7) geothermal as sources.

After this, I attended the regular luncheon meeting of actinide chemistry in Edelstein's area. Present were Streitwieser, Raymond, Smart, Ritter, Hagawara, Edelstein, Starks, Gradl, McLaughlin, Halstead, Parsons, and Baker. Hagawara reported on NMR and UV measurements on di-methyloxyethyl uranocene and Starks on attempts to produce a dimer of uranocene and also $PaCl_5$ preparatory to its to synthesize proactinocene.

About Form 189, we decided to prepare one on general, basic lanthanide and actinide chemistry to go to Rogosa's branch (which will include actinide laser work and Conway's work) and one on the use of basic work in organometallic actinides in waste disposal and blood purifaction to go to Pierce's branch (with Streitwieser and Raymond).

At 2:00 p.m., I went up to the HILAC Building to meet with Nurmia, Raunemaa and Otto--the Heavy Elements Fast Volatile Chemistry group (for which we will have to create an acronym). We discussed various ways of identifying element 106. I then dropped by to see Watanabe, who is working on aerosol helium jet problems.

Dick Shuey, a graduate student of mine who worked on spontaneous fission around 1949-50, with General Electric since then, dropped in to have a cup of tea with me.

I then met with Harvey to discuss a number of administrative items; he wants me to back up the Diamond Review Committee in their recommendation to terminate Hebert.

This morning, Helen hosted a tea for Barbara Langlois and George Wasson, running for Lafayette City council; Ned Robinson was scheduled to come but a court appearance on behalf of a client prevented his coming, so Mardy Robinson appeared in his stead. Among the others who attended were Louise Etzler, Mary Paige, Cathy Sherman, Betty Pugh, Marj Alexander, and Gayle Pulley. Helen also visited with Betty New and drove her to the Oakland Airport.

Friday, February 1, 1974 - Berkeley

Lew Keller called me from Oak Ridge at 9:35 a.m. He asked whether I would support the nomination of Curt Bemis for the ACS Award in Pure Chemistry; when he learned that I am nominating Luciano Moretto, he agreed that my support of Bemis might not be feasible. He said that he is part of a committee at ORNL reviewing the HFIR-TRU situation and in this connection he would like to discuss with me the entire future needs for heavy isotopes. He has heard that we are going to expand our actinide chemistry group at Berkeley, which I confirmed. We agreed that we would discuss this during the AAAS Meeting. We also discussed the progress on Ghiorso's request for some Cf-250. He said a few hundred micrograms had already been made for Curt Bemis's use via the neutron bombardment of Bk-249. I asked whether the route of neutron bombardment of Cm-248 might be worth considering, and Keller was intrigued by this possibility and said he would look into it.

Friday, February 1, 1974 (con't)

Dick Scribner called at 9:45 a.m. to ask if he could approach Bill Hewlett for funding for the AAAS Congressional Fellows Program. I said I could not predict what his chances would be.

Virginia H. Hopper called at 10:05 a.m. and I answered her questions about community priorities for the Junior League of Oakland Community Research Committee survey, as described in her letter. I said that three areas that I would "identify as most pressing and also what, in my opinion, constitute the most feasible avenues to solving these problems" were: (1) the discrepancy in the living standards of the people and the need to improve those of the poor; (2) the need to improve education in general so that people are taught to think rather than just go through rote learning; and (3) the need to have better traffic control and better transportation through mass transmit supported by the federal government.

At 10:30 a.m., the Chemistry Department senior faculty met in Latimer Hall. Present were David Shirley, David Templeton, Bradley Moore, Joseph Cerny, William H. Miller, William Dauben, Henry Schaefer, Bruce Mahan, Frederick Jensen, Leo Brewer, and Kenneth Pitzer. The purpose of the meeting was to discuss whether to invite Yuan T. Lee to join the Department; we agreed to do so.

The Program Committee of the Nuclear Chemistry Division held a bag-lunch meeting in my office from 11:30 a.m. to 2:15 p.m. Present were Joseph Cerny, Richard Diamond, Norman Edelstein, Albert Ghiorso, Norman Glendenning, Hermann Grunder, Bernard Harvey, Earl Hyde, Arthur Poskanzer, John Rasmussen, David Shirley, Frank Stephens, David Templeton, and Stanley Thompson.

Harvey opened the meeting with a discussion of what should be the permanent appointment procedure of the Nuclear Chemistry Division, as outlined in his memorandum of January 16 (copy attached). I reported Ken Street's opposition. We discussed the definition of "permanence" in this context; there was some consensus that a third category is needed (beyond tenure faculty and Senior Staff) to identify those staff people not in those categories but whose work is essential to our programs. We agreed to adopt section 4 as our procedure for hiring permanent staff and said we would discuss terminologies/semantics at a later time.

Shirley described the work of C. Bradley Moore, particularly his recently developed method of isotope separation using lasers. He also told of the approaches of various industries to Moore and our attempts therefore to secure him here. (At 32, Moore is the youngest person ever to be appointed full Professor at Berkeley.) He will prepare a Form 189 and, if successful, join the Nuclear Chemistry Division.

Shirley then described the background and work of Yuan T. Lee, who is presently at the University of Chicago. The sentiment for getting Lee here is so strong the several committee members indicated that they would be willing to sacrifice some of their equipment if his could not be brought with him.

LAWRENCE RADIATION LABORATORY
Room [illegible]

January 16, 1974

To: Members of the Nuclear Chemistry Program Committee
E. K. Hyde

Re: Procedure for Finding and Hiring New Members for Nuclear Chemistry Permanent Staff

1. We need to define very carefully the qualifications that we require of a new permanent colleague, and also spell out in detail exactly how we should go about making appointments.

   The method outlined in Section 4 follows closely the Campus procedure with the LBL Director acting as Provost and the Scienfitic Council subcommittee acting as the Budget Committee.

2. <u>What are the essential qualifications?</u>

   a. The candidate must have demonstrated superior imagination and productivity in a research field of current interest to the Division.

   b. Since few research fields remain "hot" for very long these days, the candidate must convince us that his interests are <u>broad</u> and that he is unlikely to be a flogger of dead horses.

   c. The candidate must have demonstrated major potential for <u>leadership</u>. We are looking for present or future directors of major research efforts, of large accelerators, and possibly of the Division itself.

   d. The candidate should be <u>young</u>, in his late twenties or early thirties. The average age of our present senior staff is too high.

3. <u>What sort of tenure should we offer?</u>

   My feeling is that we should offer the least possible. A young candidate, who knows that his work is good, might (should) be willing to take a chance on a two-year term appointment with the understanding that he will be reviewed again before tenure is granted.

   An older man (mid-thirties) might quite reasonably insist on tenure at once and we should be willing to grant it if we have to.

4. How do we proceed?

a. The Program Committee discusses the reasons for wanting to find somebody in a certain field. If this seems reasonable, a subcommittee is appointed by the Nuclear Chemistry Program Committee (Chairman and one member) and the LBL Director (one member from another Division).

b. The subcommittee reviews the Division's needs, and if it confirms that we should indeed look for candidates, it starts a search. Even when, as might often be the case, a name has already been proposed, the search process must nevertheless be instituted.

c. The subcommittee will study each candidate's publication record and solicit written opinions from at least three qualified people outside LBL. Candidates will then be invited to Berkeley for at least two full days. They will be interviewed by the committee, the Nuclear Chemistry Associated Director, and by the LBL Director (if he wishes).

A candidate will give a full-dress seminar on his own work. He will talk to a large number of Program Committee members.

d. The subcommittee will make a written report to the Program Committee, the Associate Director, and LBL Director. If the Program Committee and Associate Director agree with the choice, the Associate Director will submit the nomination to the Director who will seek approval from a subcommittee of the Scientific Council. The Associate Director, the Director and the subcommittee must all approve the appointment.

A. C. Harvey

A. C. Harvey

ACH:rm

Friday, February 1, 1974 (con't)

The discussion next turned to our efforts in building up our actinide chemistry group, the first step being our involvement of Streitwieser, Raymond, Smart, Bartlett, etc. I reviewed some of Peter Laubereau's background. Cerny asked for a definition of actinide chemistry, which I provided in terms of "working on the synthesis and various oxidation states of the actinide elements." Shirley reinforced that the person who fills the position should be more interested in synthetics than in measurements. We noted that strong candidates are virtually nonexistent in the United States and we will probably have to turn to Europe.

I asked for suggestions of a third person we might suggest to Andrew Sessler for the outside committee; Streitwieser was mentioned. I reported that the search committee for the energy and environmental chemist has turned up no one particularly outstanding so far. Harvey then gave the committee some background on the situation at the 88" cyclotron, calling for someone to replace him. He suggested David Scott (on leave from Oxford).

We planned for the visit of the Visiting Review Committee on February 21-22. There will be 12 people making half-hour presentations all day Thursday and on Friday morning. There was some disagreement as to whether we should present our best people or our worst, or something in between.

I responded to W. Bennett Lewis's frank letter to me about the CANDU reactor (correspondence attached). On this basis, I also suggested to John Howe a correction in my editorial for the first issue of Annals of Nuclear Science and Engineering (letter attached).

Sheila took a call from Dr. William G. Myers, visiting in the Donner Laboratory this quarter, who has been named the new Historian of the Society of Nuclear Medicine. He is developing an archival history of nuclear medicine, particulary to include those first documents reporting radioactive isotopes that represent the beginnings of nuclear medicine itself. She sent him copies of some of my reprints in this connection.

From 3:15-5:00 p.m., I met with Dr. Armand Hammer (Chairman of the Board, Occidental Petroleum Corporation), Richard Ridley (Manager, Oil Shale Research, Occidental; Hammer's expert who had flown in from their Colorado site), Edward A. Grens (Chemical Engineering Department, Berkeley), Thomas K. Sherwood (Visiting Professor, Chemical Engineering Department, UCB), and Jack Hollander.

Their in situ process for recovery of oil from oil shale was conceived by Donald Garrett of the Garrett Research Center, now Executive Vice President of Occidental Petroleum. The process consists of drilling horizontally into the side of the mountain of oil shale to create a room, then drilling down from the top, emplacing explosives, and blasting loose the oil which drains out to the bottom, where it can be removed through the horizontal tunnel. The amount of oil shale rock removed (which is not leachable with water) to make the room comes to about 20% of the total oil shale finally used in the

DEPARTMENT OF PHYSICS
STIRLING HALL

Queen's University
Kingston Canada
K7L 3N6

January 24, 1974.

Dr. Glenn T. Seaborg,
Chemistry Department,
University of California,
Berkeley, California 94720

Dear Glenn:

I am sorry to have to chide you for having lost touch with the international nuclear power scene. John Howe has sent me a copy of your "Editorial" for the Annals of N.S.&E. in advance of publication to "stimulate a further expression of opinion."

Perhaps you are not aware that in 1973 the Ontario Hydro nuclear generating station at Pickering near Toronto delivered the highest energy 1.4×10^{10} kWh from any nuclear power station in the world by a comfortable margin, even though its fourth unit only came into action at the end of May, incidentally breaking all records by taking only 12 days from initial start - up to full power. Its nearest rivals were the BWR's at Dresden and Quad Cities, Ill. with about 10^{10} kWh each. Pickering has 4 CANDU heavy water moderated and cooled natural uranium fuelled units each with a gross generating capacity of 540 MWe. Availability has been outstandingly good for all units.

In your 1964 summary of the 3rd U.N.I.C.P.U.A.E. you noted CANDU but at the 4th conference in your Presidential Address they were ignored. I enclose a copy of two pages from the ANS Nuclear News of 15 October 1971 to remind you. I hope you will also find time to read the enclosed lecture DL-115 on CANDU Potential written a year ago for the staff of B.C. Hydro and given twice more, at U. of Manitoba and to the Canadian Nuclear Association.

These ideas have developed further (Die Naturwissenschaften 60, 501-6, 1973 and DM-140* W.B.L. unpublished) but practical development has been slowed by the great success of the CANDU-PHW reactors. I consider this slowing, caused by the limited resources made available to AECL, a terrible mistake. When, last August, Dixie Lee Roy invited from the ANS suggestions of new developments in the U.S. I persuaded AECL (from which I retired on age last June) to suggest reestablishing the joint program with the USAEC on the HWOCR from which they withdrew in March 1967. Although friends of the

system in U.S. organizations approved, their companies were all too busy to take it up. This I take as only a temporary setback.

I still see the CANDU-OC-Thorium as the leading contender for delivering low cost energy to the world, I doubt if the LMFBR will ever be competitive and the HTGR needs better neutron economy as well as a gas turbine and heat dump. The low radiation levels around the CANDU-OC primary circuit are an overwhelming advantage.

I enclose also BLL-3 revised that may interest you. I will send you copies of my later papers if you wish.

Yours sincerely,

W. Bennett Lewis

WBL:bm

c.c. J.P. Howe

Encl. NN
DL-115
BLL-3 revised

February 1, 1974

Dr. W. Bennett Lewis
Department of Physics
Stirling Hall
Queen's University
Kingston K7L 3N6, Canada

Dear Bennett:

I thank you for your frank letter of January 24, 1974.

I remember our many conversations and have read a number of your articles on the CANDU reactor, but still must confess to a sense of confusion concerning its apparent small impact outside of Canada.

However, although I remember the installations in Pakistan and Argentina (and the evident desire of these countries to use natural uranium as fuel), I hadn't realized that four are scheduled for India (where there is also an evident desire to use natural uranium). Perhaps the CANDU reactor will find its place in the smaller size range.

In view of your memory-jogging (and shall I say prodding) letter, I am suggesting to John Howe a little change in my editorial if it isn't too late.

Your letter also brings to focus another thought about which I was vaguely contemplating seeking information. I have been contacted by a foreign source concerning the feasibility and cost of installing small nuclear power reactors, in the range of 250 MW, in foreign countries such as southern Europe or Africa. Apparently, there is

minimal interest among U.S. vendors to consider this size range. Should a Canadian source be considered here? And if so, could you give a rough estimate for such a complete turnkey installation (in 1982) and the total cost of electric power per kilowatt hour, based on plant amortization over a 25-year period. The estimates can be in terms of 1974 U.S. dollars.

With best regards,

Cordially,

Glenn T. Seaborg

GTS/sms

February 1, 1974

Dr. John P. Howe, Executive Editor
Annals of Nuclear Science and Engineering
Gulf General Atomic Company
Advanced Power Systems
P. O. Box 608
San Diego, California 92112

Dear John:

As a result of a letter from Bennett Lewis, I thought it might be an improvement of my editorial to change the third sentence of the fourth paragraph in the editorial to read as follows:

> "The rate of introduction of the breeder will depend upon its economic competitiveness; here the high temperature gas-cooled reactor and the Canadian heavy water reactor, with their good fuel economy--and even the water-cooled reactor . . ." [continue as is].

With best regards,

Cordially,

Glenn T. Seaborg

GTS/sms

extraction of oil. A room 70 feet high, 30 feet on the side, yields 20-25 barrels per day for a total of 1,200 barrels. A room 250 feet high, 120 feet on the side, would be a commercial plant yielding 500 barrels per day for a total of 500,000 barrels. Their site in northwest Colorado (between DeBeck and Grand Valley) is capable of producing 30,000 barrels per day as a limit, which is technically feasible within three years.

They use oil shale with 22 gallons per ton of oil. In situ retorting uses much less water than conventional retorting; water is needed for refining, of course, which can be done on site. The primary oil product contains 0.8-0.9% sulfur, but it is evenly distributed as opposed to ordinary oil. Oil shale is generally too deep for strip mining.

Occidental is the third largest producer of coal in the United States. They handle 500,000 barrels of crude oil per day and will build the 30,000 barrel-per-day plant at a cost of about $50 million. An AEC task force (Jack Blasey and Bob Tomaharo--reporting to Giller) has been out to see their operation and is favorably impressed.

In response to my questions as to what he wants in the way of financial help, Hammer said he would like to make his patents available on a royalty basis and then set up, with financial help, a Manhattan Project type operation using their process. As those he might turn to for additional help, I suggested Philip Abelson, Robert Seamans, and Philip Handler.

Suki and I hiked to the water tank; Steve drove to Davis for the weekend.

Saturday, February 2, 1974 - Lafayette

Dan Moore called me at home from Cleveland. He said that Ernest Sternglass talked in Cleveland last night and caused a sensation that the Shippingport Nuclear Power Plant at Pittsburgh has caused thousands of leukemia and cancer deaths downstream; I told him about Sternglass's long history of wild, unsubstantiated claims.

Armand Hammer called from his home in Los Angeles. He said Sol Linowitz is lunching with Henry Kissinger on Tuesday and he would like to show Kissinger at that time a letter from me to Dr. Hammer giving my evaluation of the Occidental in situ process; this information might fortify Kissinger in his meeting with representatives of foreign governments on February 11, so he could indicate that the U.S. can become self-sufficient in energy and hence needn't be subservient to oil supplier nations. He will have delivered to me today a copy of a Stanford Institute report by R. J. Murray and Dr. Ivan Just of Stanford University. This report, which I may feel free to quote, states that the Garrett In Situ Process can recover oil at lower operating cost than conventional retorting and leads to no oil shale ash. I will have the letter ready by Monday afternoon.

Suki and I hiked around the Reservoir. Helen, Dianne, and I went to the Rheem Valley Bowl for dinner and a few games.

Sunday, February 3, 1974 - Lafayette

Sol Linowitz called me at 11:30 a.m., having just talked to Hammer. I said I am sufficiently impressed to write him the letter he would like and am in the process of doing so. Linowitz said Teller had mentioned favorably the Occidental process in a recent statement. He has also talked to Emilio "Pete" Collado, Jr., an Executive Vice President of Exxon, who takes the process seriously. Linowitz has advised Hammer to (1) continue his plans to build the 30,000 barrels-per-day plant, (2) continue to offer the U.S. Government a license-free, no-royalty use in which the Government gives a free license back to Occidental, and (3) seek a royalty license arrangement with companies like Exxon.

I called Dr. Hammer to tell him that my letter would be ready at 11:00 a.m. tomorrow.

In the afternoon, Suki and I took a hike around the Reservoir. Steve returned from Davis a little after midnight.

Monday, February 4, 1974 - Berkeley

I prepared my letter to Armand Hammer (copy attached), attended Pimentel's Chem 1B lecture, and held my office hour. I ran into Charles Wilke and asked him who Margie Hollander should get in touch with about the project for recovering early equipment from Gilman Hall; he will let me know.

Mary Anderberg and Mike Johnson--students from Diablo Valley College--dropped in during my office hour to discuss solar power with me. Candy and Wendy Sher (twin sisters) came in to ask me, as a follow-up to my lecture last Thursday, to explain conventional nuclear power and breeder reactors more completely. Catharine Mouton was also present and helped her with some Chem 1B problems.

At noon I attended the regular Chemistry Department luncheon, and afterward taught my Chem 1B lab section from 1:10-3:00 p.m.

I wrote Michael Peevey (copy attached), suggesting changes in his draft Energy Policy Statement of the California Council for Environmental and Economic Balance, since I will not be able to attend the meeting of the Energy Committee. I sent a letter to Northwestern University supporting James T. Waber as a candidate for appointment to the Englehart Distinguished Professor chair in Materials Science of the Technological Institute of Northwestern (copy attached). I also responded to a letter from Pat Davis in which she asked for some personal historical background (copy attached).

Jim Cobble called me at 3:50 p.m. He said that the AEC wants to make a review of work at the Yale HILAC, coordinated by Jack Miller of Columbia. They want Cobble to review his work there, and he in turn would like Roland Otto to go back and do this at the meeting on March 14, which I said I would be glad to have him do at LBL's expense.

I called Bob Budnitz at 3:55 p.m. in connection with the invitation I had received from Jerome Wesolowski at the State Department of

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 TEL. (415) 843-2740

February 4, 1974

Dr. Armand Hammer
Chairman of the Board
Occidental Petroleum Corporation
10889 Wilshire Boulevard
Los Angeles, California 90024

Dear Dr. Hammer:

I have had the opportunity, together with some of my colleagues, to discuss with Mr. Richard D. Ridley, your Manager of Oil Shale Research, your in situ process for recovery of oil from oil shale and also to see your informative movie film depicting this process in pilot plant operation. I have also had the opportunity to read the report by the Stanford Research Institute which makes an economic analysis of this shale oil recovery process.

My analysis of this information leads me to the conclusion that your in situ (underground) oil shale recovery process is technically and economically feasible and is capable of recovering raw shale oil at a cost that is attractive and substantially below that of other (conventional) extraction methods known to me. I am especially impressed by the capability of your process to produce its product with no shale ash disposal above ground, in contrast to the other methods--a tremendous asset in minimizing adverse environmental impact.

I believe that your process shows enough promise to merit the federal government involvement necessary to place it into operation on the massive scale which is needed if the process is to make the large contribution to our nation's future energy supply of which it apparently is capable.

If you feel I can be helpful in discussing my views further with appropriate government officials, I would be pleased to do so.

Sincerely yours,

Glenn T. Seaborg

February 4, 1974

Mr. Michael R. Peevey
Executive Director
California Council for Environmental
and Economic Balance
215 Market Street, Suite 930
San Francisco, California 94105

Dear Mr. Peevey:

Since the meeting of the Energy Committee of the California Council for Environmental and Economic Balance comes at a time when I cannot attend, I shall submit in writing my comments on your draft Energy Policy Statement.

In the first sentence of the fourth paragraph (bottom of page 1) the "18 percent" should be "30 percent"; the second sentence in this paragraph is correct, i.e., is consistent with 30 percent crude oil importation.

In the first sentence of page 2 I believe it is not true that the "majority" of U.S. oil imports comes from the Middle East.

In the second paragraph of page 2 the phrase "slow-development of nuclear power" isn't very appropriate from my perspective. The 1962 AEC report to President Kennedy predicted 40,000,000 KW of nuclear power capacity in 1985; we already have 25,000,000 KW and there is certain to be more than 100,000,000 KW by 1980. To me the rapid development of nuclear power is almost beyond belief.

On page 5 it seems to me you need a new heading between the second and third paragraphs; the following paragraphs concern broader issues than Increasing Supply in California.

In the first paragraph of page 6 I wonder whether "deregulate" isn't too drastic a step. Also, in the third paragraph perhaps the phrase "only as a last resort" overstates the objective--would something like "only as soon as needed" or its equivalent be better?

On page 8, perhaps in the second paragraph, I would be more specific and support the proposed Energy Research and Development Administration (ERDA).

Cordially yours,

Glenn T. Seaborg

GTS/ssk

February 4, 1974

Professor John E. Jacobs
Chairman, Englehart Professorship
Search Committee
Biomedical Engineering Center
Northwestern University
Evanston, Illinois 60201

Dear Professor Jacobs:

In reply to your letter of January 22, 1974, I am pleased to write in support of Professor James T. Waber as a candidate for appointment to the Englehart Distinguished Professor chair in Materials Science of the Technological Institute of Northwestern University.

Professor Waber first came to my attention in 1967 when, as Chairman of the U.S. Atomic Energy Commission, I was in the process of writing a review article, "Elements Beyond 100, Present Status and Future Prospects," for the Annual Review of Nuclear Science. I learned of the calculations of Waber and his coworkers at the Los Alamos Scientific Laboratory on the electronic structures of the actinide elements and the transactinide elements. I was particularly interested in his calculations, with his coworkers, on the electronic structures of the superheavy elements--the elements in the range of atomic numbers 108 to 120 or so for which enhanced nuclear stability is predicted--as well as the group of rare earth-like elements commencing with element 121.

Spurred on by my interest, the Waber group carried out non-relativistic Hartree-Fock, then relativistic Dirac-Slater calculations covering this entire range of elements. They were the first to make these calculations and, due to the widespread interest in this subject,

attracted worldwide attention to their elegant work.

I followed this work in detail and am convinced that the leader in this program, without whom their spectacular degree of progress could not have been made on such an accelerated time schedule, was Professor Waber. He furnished the leadership and spark that led to the recognized preeminence of the Los Alamos group in this exciting field of work.

He has maintained leadership since his move to Northwestern University as the result of his continuing work carried on with a series of unusually competent postdoctoral people attracted to him because of his preeminent position in this field. In addition to his own contributions, he is a catalyst and prime mover of people, with the talent of getting maximum output from the talents of his colleagues. I believe that things will always happen--I mean constructive output--wherever Waber is.

I realize that the Englehart Chair is for work in metallurgy and not in the fields I have described. I do not have a corresponding first-hand knowledge of his contributions here, but am confident that his performance with which I am familiar must be indicative of his ability to contribute to the theory of metals and alloys by the fundamental computational methods at which he is so adept.

Professor Waber possesses imagination and originality, a broad overview of science, an abiding interest in teaching and young people. He has an international reputation in his speciality of theoretical computation of atomic and molecular structure. I believe he is well qualified for the post of Englehart Professor at Northwestern University.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

February 4, 1974

Mrs. James Robert Davis
11134 Horizon Hills Drive
El Cajon, California 92020

Dear Pat:

I certainly do remember our meetings at UCLA and also our visits, including your sister, on lazy spring days to Santa Monica beach and on occasions to your home in Pasadena. Incidentally, I recently heard from Bill Mullin who, as you probably know, now lives in San Clemente.

Getting to the point of your letter, I don't have a very exciting history of early reading experiences and habits to report, and it is difficult to pinpoint their bearing on my subsequent career, life style, or hobbies.

I was born of Swedish parentage in a little mining town in northern Michigan, Ishpeming, where our family lived until I moved at the age of 10 with my family to the Los Angeles region of California. My first language, before starting school, was Swedish and my first reading was Swedish nursery rhymes. We didn't have many books at home, but I read all that we had. I remember reading Lewis Wallace's Ben Hur and Harriet Beecher Stowe's Uncle Tom's Cabin long before my vocabulary should have permitted this. I also remember being a frequent visitor to the Ishpeming city library, often trudging through deep snow, to pick up books of all kinds; I don't have much recollection of titles, but I know this included a wide range of novels and certainly the entire Rover Boys series. I also remember reading, in a sort of pamphlet or paperback form, essentially all of the Horatio Alger books.

When we moved to Home Gardens (now South Gate), California, I remember walking miles to the Huntington Park Library because Home Gardens had no library. Again I don't recall details, but I remember reading many historical accounts and novels including a whole series of books on the Revolutionary and Civil Wars. And I was particularly impressed by Sir Walter Scott's Ivanhoe.

I had no interest in science until my junior year at David Starr Jordan High School in Watts, California (Home Gardens or South Gate had no high school, so we were bussed in to Watts). Then my chemistry teacher inspired in me an interest in chemistry and physics which determined my career. Perhaps the book that inspired me most, at the stage in life when I read it, was Sinclair Lewis's Arrowsmith, which I read while attending UCLA; to me, here was an ideal scientist at work.

So with this background, I leave it to you to judge what bearing my reading experiences and habits had on subsequent life style, career, hobbies, and so forth.

It was good to hear from you and to learn a little of your career. We have six children--four boys and two girls--but no grandchildren as yet. After more than ten years in Washington, D.C., we returned to our home in Lafayette, California, about 2-1/2 years ago, and I have made what I believe to be a successful re-entry into teaching and research at Berkeley.

With warm regards,

Cordially,

Glenn T. Seaborg

GTS/ssk

P.S. I doubt that you would be interested in joining IPA unless you are in a position to attend their annual summer conventions in Washington, D.C.

Health to visit his laboratory on February 20; Bob and Jack Hollander will accompany me.

Heiner Meldner called me at 4:15 p.m to say he is sending for my personal use (because it is a copy with deletions in the process of declassification) his latest version of the paper on the production of superheavy elements through the capture of neutrons in two steps--first, neutrons furnished in an underground explosion and then, after chemical isolation in a few minutes or hours, neutrons furnished from laser fusion, perhaps two steps of laser fusion.

Suki and I took our hike. Dr. Hammer called me at 6:30 p.m. to tell me that he is pleased with the letter.

Tuesday, February 5, 1974 - Berkeley

At 10:00 a.m., I went up to the HILAC to talk to Ghiorso, Hulet, Lougheed, Nitschke, and Jose Alonso. We discussed the progress of the work on aerosols. Hulet and Lougheed have developed a method of reducing curium trifluoride to curium metal with beryllium for target use, which should also be applicable to californium trifluoride. I discussed with Ghiorso the possibility of naming this group the Heavy Element Fast Volatility Research (HEFVOR) Group.

Fritz Schaefer dropped in to see me at 11:45 a.m. He expressed the hope that he would be continued next year for support at his present rate, which is $24,000 for computer time, one graduate student (Liskow), and his own 3-month summer salary. He also asked whether he could assume regular status in the Nuclear Chemistry Division (he is being carried now as a sort of add-on to the general account of the Division Director's office). I suggested that he meet with the Division's Program Review Committee in the course of their present deliberations.

I sent to John Reynolds at the Miller Institute my evaluation of Richard Marrus, who is a candidate for a year's research professorship there (copy attached).

I had lunch with Earl Parker and Victor Zackay.

I wrote John Teem, Elliot Pierce and George Rogosa, inviting them to attend the meetings of the LBL Nuclear Chemistry Division Visiting Review Committee on February 21 and 22.

About 30 people from the Division and the Director's Office staged a surprise party for Earl Hyde in honor of his 25 years of service in the Lab. I made some remarks, citing his monumental contributions to the Lab. I read excerpts from our correspondence in 1948 about his joining the staff of the Radiation Laboratory. Earl and his wife Jean interjected various humorous comments in the course of my remarks. I then presented Earl with his 25-year service pin. Earl expressed appreciation while cake was served.

The tenure faculty of the Chemistry Department met with about 30 people present. We agreed almost unanimously (two abstentions) to begin the approaches toward offering a position to Yuan Lee. We also

bxc: E.Eiland/personnel files

February 5, 1974

Professor John H. Reynolds
Chairman, Executive Committee
Miller Institute for Basic Research
in Science
2334 Bowditch Street
Berkeley Campus

Dear Professor Reynolds:

This is in response to your request of February 4, 1974, for my evaluation of Richard Marrus as a candidate for a year's appointment to a Research Professorship in the Miller Institute at Berkeley.

Since my return to Berkeley in 1971, I have become quite familiar with the program of research that Marrus has under way at the SuperHILAC and have heard him discuss on a number of occasions his future plans. I believe that his proposal for the study of 1- and 2-electron ions of high Z elements is very sound and represents an important and timely area of research. He is optimally situated, with his access to the SuperHILAC and his background of experience, to carry out this program and a Miller Professorship at this time would enable him to establish preeminence in this field.

After beginning his program, using the Heavy Ion Linear Accelerator (HILAC), Marrus was one of the first to effectively use the rebuilt HILAC--that is, the SuperHILAC--in an elegant study of the forbidden decay modes of 1- and 2-electron ions of high Z elements. He has made the first laboratory observations of these decays and the first precision tests of the theory of these decays. It is in the logical expansion of this ongoing program that he would

devote himself under the Miller Professorship.

Before entering his present area of investigation, Marrus made significant contributions through the application of the atomic beam magnetic resonance method to the study of the nuclear moments and electronic structure of the lanthanide and actinide elements. These measurements demonstrated the presence of 5f electrons in the ground state configurations of protactinium (Z = 91) through curium (Z = 96), which provided decisive evidence for the validity of the actinide concept. He also invented a new method for measuring isotope shifts and the Stark Effect in radioactive isotopes using atomic beams, and successfully applied this method to the cesium and rubidium isotopes.

I believe that Professor Marrus is on the verge of significant discoveries in atomic spectroscopy that will provide new tests of relativistic quantum mechanics and quantum electrodynamics of great importance, and that he should be awarded a Miller Professorship to enable him to concentrate his efforts on this program at this time.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

decided to offer a position to Jack Kyte in the biophysical field. Pimentel said that he will be on sabbatical next year. His replacement to teach Chem 1ABC hasn't been chosen yet. A new position to be in charge of the Chem 1ABC labs will be filled next year by Professor Connick. We voted as a one-year experiment (with two voting against) to try a new teaching arrangement for Chem 1ABC in which six 1-hour lectures for the six lab sections would be given on Friday. The six sections would be 4 hours each with a half-hour discussion period at the beginning, usually run by a Teaching Assistant on Tuesday and Thursday mornings from 8:00-12:00 and Monday, Tuesday, Wednesday, and Thursday at 1:00-5:00 p.m. Each of the six lab sections would be individually coordinated with one of the Friday sections.

I signed the certificates of awards for this year's Westinghouse Science Talent Search winners and the certificates of honor for the hundreds of winners of this award and their teachers--about 600 signatures in all. Sheila mailed these back to Dorothy Schriver.

On the radio news on the way home, I heard that Patricia Hearst, the daughter of Randy and Catherine, was abducted from her Berkeley apartment last night.

Wednesday February 6, 1974 - Berkeley

I attended Pimentel's lecture, then met in my office with Hermann Grunder because he wanted to bring me up-to-date on the SuperHILAC. He said that the line item ($2.4 million) must be broken down into component parts by the weekend. In this connection, his consultations lead him to believe that Adam will be able to furnish uranium ions (he estimated 90% probability for U^{+10}) and hence he is not recommending a third injector as part of the line item. He is unable to include the charge separation item, but hopes to get that out of AIP or GPP funds later. He has found a way of restoring the $100,000 to SuperHILAC operations which the AEC accountants had ordered transferred to the time-sharing development. He would like to make some larger-than-usual salary adjustments and said it is okay with Sessler and Hyde.

I wrote Herman Wouk in Washington about our having Sol Linowitz as a guest at the Bohemian Grove this summer. I received and acknowledged a letter from Bernard Feld, which he enclosed with the Russian edition of Man and Atom.

Sheila took a call from Eric Perkowski of Senator John Tunney's office asking if I could participate in a briefing of the Senator's Science and Technology Committee; she expressed my interest.

I lunched in my office, taught my lab section from 1:10-2:40 p.m., then went directly to the Alumni House to serve as a member of the interviewing teams for selection of people for Cal-in-the-Capitol this summer. I participated with Fred Taylor (an Acting Assistant Professor in DIGGS, an interdisciplinary social science program; he recalled that he met me when he was 9 years old and I visited Portland and talked to his dad) and Jean Perata in interviewing John Fouts. He is a second-year law student at Boalt Hall, liberal, interested in public interest law, impressive, and I recommended him highly.

In the second assignment, Sarah Motley (also with DIGGS), Charles Nagle, Norman Ronneburg (a second-year law student at Boalt, who coordinated the program last year) and I interviewed William A. Sokol, a first-year law student at Boalt--also articulate, a little aggressive, and not completely certain of his facts, whom I rated fairly high.

Then, together with Arleigh Williams, Jean Perata and Steve Van Evera (a graduate student in Economics), I interviewed Bruce Leppla, Jr., a second-year student at Boalt. He was knowledgable, likable, not always sure of his facts, and I rated him very high.

In the course of the afternoon, I met: Ann Swidler, daughter of Joe Swidler, former Chairman of the FPC; Kent Stewart, grandson of University President David Barrows; Marily Howekamp, whom Helen and I met at the alumni dinner at the LHS; Joanne Jackson, whom I met last year; and Gail Schwartz.

Helen attended the Chemistry Department tea today. Steve moved to Davis where he will live while looking for a job.

Helen and I attended a dinner at University House hosted by Chancellor and Mrs. Albert Bowker in honor of Andrew Cordier, Regents' Professor at Berkeley this quarter (President Emeritus of Columbia University and formerly the top aide to UN Secretaries-General Trygve Lie and Dag Hammarskjold). Others present were Mrs. Robert Gordon Sproul, the John Perkinses, the Easton Rothwells, the Robert Scalapinos, the Adrian Kragens, Elinor Heller, Garff Wilson, the Ralph Retzlaffs (Political Science Professor and Associate Director of the Institute of International Studies), Joseph A. Moore (Regent, and President of the Mechanics Institute), the Thomas C. Blaisdells, Mrs. Chester Nimitz, the Donald McLaughlins, and Russell Niles (former Chancellor of NYU).

Ellie Heller told me that Alex Sheriffs was behind a good deal of the organized opposition among the Regents to Andy Sessler as Director of LBL. We discussed the impending bill to change the terms and the way Regents are appointed; Ellie and Adrian Kragen think the terms will be 12 years in the amended bill, which they find acceptable.

I had a charming talk with Ida Sproul. She recalled so many interesting mutual experiences from the past and brought me up-to-date on many of her 11 grandchildren. Her grandson Richard (the third son of John) is a student at Hammarskjold House at Davis and a friend of Eric's. John Perkins told me that Bob Hollingsworth is still under consideration for the head of the Statewide Computer Coordinating Office.

Thursday, February 7, 1974 - Berkeley

At 8:50 a.m., I received a call from Anton Schmalz (who works as a consultant to various government agencies, particularly the Energy Committee) in his capacity as the organizer of a World Future Society forum on the energy problem to be held in Washington on April 24-25. He described in some detail the format of the program and invited me to deliver the luncheon address on April 24; I agreed.

Thursday, February 7, 1974 (con't)

I made the rounds to see the various research groups. Paul Lochak called the office at 10:30 a.m. and talked with Sheila. He wants a few lines from me about the whole matter of the 90-day extension by the USAEC to European utilities on their deadline for submitting uranium enrichment orders. He also asked for help identifying individuals who could advise on the best siting for nuclear power plants.

I called John Unik at Argonne at 11:35 a.m. I told him that the SuperHILAC has been delivering good beams of krypton ions and that Ghiorso considers it ready for a bombardment for the ANL group. I told him about the local SHEIKS work and he was concerned about the collaboration with LASL because ANL has been preparing for a year to identify the actinides from such heavy ion bombardments. He would like to work on this while the SuperHILAC is operating at 7.5 MeV per nucleon and then go to the search for superheavy elements when it is upgraded to 8.5 MeV per nucleon.

We had a lunch meeting of our heavy volatile elements research group and SHEIKS in my office--Nurmia, Raunemaa, Otto, Binder, Kratz, Williams, and Norris. We may call the group TransActinide Volatile Elements Research Nuts (TAVERNS). Nurmia, Raunemaa and Otto described their volatility experiments, performed on the owl shift Tuesday morning, on tungsten isotopes produced by the bombardment of dysprosium trifluoride with O^{18} ions. They found preliminary indications of separation of W from Ta activities. They will look for W alpha emitters in future experiments.

We agreed to order the 60cc Ge-Li detector (better than 2 Kev resolution) for $6,900 from ORTEC for the SHEIKS group. Nurmia will check with Ghiorso whether he might buy a Ge detector of x-rays for use by the TAVERN group (cost about $3,000). Otto described a system for measuring the energy of fission fragments which will be in operation next week.

I went to Building 50A to attend a meeting of the Associate Directors from 1:10-3:00 p.m. Also present were Andrew Sessler, Earl Hyde, Ed Lofgren, Jack Hollander, Melvin Calvin, Harold Fidler, Robert Birge, James Born, Leo Brewer, George Pappas, Walter Hartsough, and (as a guest) Harold Wilson. We were only able to cover one item in the time available--discussion of review procedures for scientific programs.

Bernard Harvey gave me a copy of John Teem's FY74 Mid-Year Financial Plan for LBL, addressed to Bob Thorne (copy attached). I sent a long-hand letter to Bill Bevan, along with a photograph as he had requested, for mounting in the AAAS offices (copy attached). I also wrote Catherine and Randy Hearst, expressing Helen's and my hope for their daughter Patricia's safe return (copy attached).

At 3:50 p.m., I received a call from Judy Getz. She and her husband Mel are involved in the open space campaign in Vacaville and she wanted my advice on the basis of our Lafayette experience. I suggested that our dollar figure may have been too high. I noted

REC'D BUDGET OFFICE - BERK.

January 29, 1974

Robert D. Thorne, Manager
San Francisco Operations Office

FY 1974 MID-YEAR FINANCIAL PLAN - LAWRENCE BERKELEY LABORATORY

This is to inform you and the Director, Lawrence Berkeley Laboratory, (the latter by copy of this memorandum) of the actions being taken as a result of our mid-year review of the FY 1974 financial plans under the Physical Research Program, and to offer some programmatic guidance to the laboratory in connection therewith.

The following amounts have been recommended to the Controller:

(Thousands)

Operating Expenses	Current Plan	Change	Revised
High Energy Physics	$ 13,475	$+ 90	$ 13,565
Medium Energy Physics	800	0	800
Low Energy Physics	270	0	270
Math & Computers	150	0	150
Chemistry	10,208	+ 170	10,378
Matallurgy & Materials	2,000	+ 60	2,060
Univ.-Lab. Coop	20	0	20
Total	$ 26,923	$+ 320	$ 27,243

Comments:
Operating Expenses

High Energy Physics: Operating funds in the amount of $90,000 are being made available. $25,000 is intended for the physics research subactivity for additional support of experimental work being carried out at SLAC and NAL. $50,000 is assigned to the accelerator R&D subactivity to permit more rapid progress in the important new areas of development. $15,000 is added to the research subactivity to support use of the LBL central computer by the Cal. Tech. research groups.

Chemistry: Under the NT 05-01 activity, the following changes are made: $50,000 is made available for positron proportional counters for LASSY and debugging data acquisition systems, $50,000 for Heavy Ion source development expansion, and $20,000 for actinide chemistry research. $50,000 is being added to the NT-05-02 activity to permit initiation of a new project by M. Calvin entitled, "Sensitized Photodecomposition of Water to Produce Hydrogen."

Metallurgy & Materials: $50,000 is provided under the 01-01 subactivity for studies of creep resistant alloys and sintering of ceramics. $10,000 is made available for subactivity 02-02 for the Josephson Junction studies. These funds ($60,000) are considered non-recurring.

University Lab. Coop.: Costs should be reported in accordance with financial plan allocations namely 01, 02, 03, 05, levels only.

Capital Equipment	Current Plan	Change	Revised
	(Thousands)		
High Energy Physics	$ 450	$ 0	$ 450
Medium Energy Physics	50	0	50
Low Energy Physics	10	0	10
Chemistry	385	+ 14	399
Metallurgy & Materials	80	+ 15	95
Other Equipment	55	0	55
Total	$ 1,030	$+ 29	$ 1,059

Comments:
Capital Equipment:

Chemistry: $14,000 is allocated for the SuperHILAC User Group equipment pool.

Metallurgy & Materials: $15,000 is provided for partial support of a dilatometer. The remaining funds for this purchase must be made available from the base program.

Original signed by
D. R. Killer

John M. Teem, Director
Division of Physical Research

cc: A. M. Sessler, Dir., LBL

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

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Feb. 7, 1974

William Bevan - A.A.A.S.

Dear Bill,

My intimate association with A.A.A.S. as President-elect, President and Chairman of the Board has been a rewarding experience. My rewards have come through renewal of old and acquisition of new friendships and through my increased understanding of the large contributions made by A.A.A.S. toward the advancement of American science and the benefit of American society as a whole.

I am particularly pleased to see that the increasing emphasis on the applications of science to practical contemporary problems and the promotion of human welfare includes an expanding concern for the direction of these efforts toward the international arena. If I am able to leave any lasting impact on our association I hope that it will be in the international field.

I extend to my successors in office and to the Association as a whole my best wishes for outstanding success in your continuing endeavors.

Cordially yours,
Glenn

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 TEL. (415) 843-2740

Thursday, Feb. 7, 1974

Dear Catherine and Randy,

Helen and I want you to know that we are praying with you for the safe return of Patricia.

Fondly,
Glenn

that we had a problem in that the Lafayette Council didn't want us to identify the property involved and so the opposition cautioned the voters not to buy "a pig in a poke." I said that we had newspaper support and that public voices were mostly for it, but the taxpayers' association was against it of course.

Louis Lazaroff of the Asia Foundation met with me in my office at 4:25 p.m. to review the status of our invitations to the Asian scientists to attend the luncheon at the time of the AAAS Meeting. The Asians do not want to break any international ties they already have, but they are beginning to feel the need to rely more on themselves than on the Western world. I will suggest at the luncheon that they establish a local amalgamation, which must necessarily precede any steps toward an international organization, hoping this will encourage them to get together on their own.

Bill Hewlett called at 4:50 p.m. and we reviewed our respective schedules during the AAAS Meeting. He and Harve Carlson agreed to share the cost of Jane's salary half-and-half.

Suki and I took our hike. Catherine and Randy Hearst received a communication regarding their daughter Patricia from the Symbionese Liberation Army.

Friday, February 8, 1974 - Berkeley

I heard on the radio that the Skylab astronauts--Gerald P. Carr, William R. Pogue, and Edward G. Gibson--splashed down safely in the Pacific Ocean about 175 miles off the coast line of California at 8:17 a.m. after a record-setting 84 days in orbit.

I called Darleane Hoffman at Los Alamos at 9:15 a.m. to discuss their results in the chemical identification experiments. The heaviest actinide they found is curium-242. They also measured zirconium and hafnium yields, but the yield of the light group--zinc, cobalt, etc.--was too small to measure.

David Templeton called at 9:30 a.m. and invited me to be the banquet speaker for the American Crystallographic Association in Berkeley on March 26, which I said I would do. I called Bill Bevan at 10:05 a.m. to report on my conversation with Louis Lazaroff. He will see that Margaret Mead is invited to the Asian luncheon.

I called Harold Price in Washington at 10:10 a.m. to ask for his suggestions on the best people in the U.S. for nuclear power plant siting. He cited NUS (Mort Goldman, Vice President) and Pickard and Lowe. Harold told me that he is now working for the Washington office of Reid and Priest, a New York-based law firm.

At 10:30 a.m., I attended the regular meeting of the SuperHILAC research group. Diamond reported on his yield results from the reaction $Kr^{84} + Se^{80,82} \rightarrow Yb$. The x,n cross sections total only a hundred millibarns or a little more. Ghiorso also reported that Viola's recalculations show only about 130 mb for compound nucleus fission from $Bi^{209} + Kr^{89}$ at full energy. Selph gave a report on the building modifications to begin in late 1974 and extend through 1975.

I had lunch outside the cafeteria with Jorrit DeBoer; we discussed his trombone-playing and the theory behind the operation of such instruments.

I attended the Chem 1B instructional staff meeting. From 2:15-3:20 p.m., I met with Michael Peevey, Executive Director of the California Council for Environmental and Economic Balance. We discussed the proposed initiative on the safe nuclear energy act (copy attached). This initiative is being sponsored by the California Citizens Action Group, a spin-off of Nader's activities, and will require 350,000-400,000 signatures to qualify for the ballot. He wanted my opinion on it, and I said it would be unfortunate if it carried. I described the critical role that nuclear power will play within the next 10-15 years when other sources of energy will not be available.

Bob Thorne returned my call at 2:20 p.m. to discuss the greeting of the Petrosyants party on Sunday evening. He will be out of town then. I explained that I feel obligated to meet them (describing their protocol-consciousness and the high level of greetings I received wherever I visited in the USSR).

Jack Ryan called me from Battelle at 3:20 p.m. Dan Miller in the AEC Division of Research has told them that they will supply $10,000; this is apparently different from the $10,000 that I will supply toward his salary. Ryan indicated that he is already doing some background work for the CAE book revision project and mentioned that G. A. Burney at Savannah River is writing a monograph on neptunium; someone at Battelle is doing one on americium.

At 4:00 p.m., I met with the search committee to find a chemist to head up the Nuclear Chemistry Division's environmental chemistry program--Arthur Poskanzer, Bob Budnitz and Jack Hollander. We went over each name and decided as noted on the list (copy attached).

Helen came in on BART and met me to go to an LBL reception and buffet dinner in the Lab cafeteria. About 275 people were present. We sat with the Leo Brewers, Roderic Parks, Earl Parkers, Paul Witherspoons, and Ted Norris. We met Ruth Lewis, Jack Hollander's new administrative assistant. After dinner, we danced to phonograph music.

Saturday, February 9, 1974 - Lafayette

Helen and I called on the Etzlers, who have sold their house and are moving to a condominium in Orinda-Moraga. We bought a living room chair from them for $75. Peter Biermann visited us for lunch and dinner. In the afternoon, he took a hike around the Reservoir with Suki and me.

Sunday, February 10, 1974 - Lafayette - San Francisco

After doing paper work all morning, Suki and I took our Reservoir hike in the afternoon. In the early evening, Helen, Earl Hyde and I drove to the San Francisco Airport to greet the Petrosyants party upon their arrival from Miami. Also in our greeting party were Kenneth

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

Sec. 1. Title 7.8 (commencing with Section 67500) is added to the Government Code, to read:

TITLE 7.8 LAND USE AND NUCLEAR POWER PLANT SAFETY

67500. This title shall be known and may be cited as the Safe Nuclear Energy Act.

67501. The people and the State of California hereby find and declare that nuclear power plants have a profound effect on the planning for, and the use of, large areas of the state, as do the manufacture, transportation, and storage of nuclear fuel, and the transportation, reprocessing, storage, and disposal of radioactive materials from nuclear power plants.

67502. The people further find and declare that substantial questions have been raised concerning the effect of nuclear fission power plants on land use and land use planning, as well as on public health and safety; for example, including but not limited to, the reliability of the performances of such plants, with attendant economic security, health, and safety results; the reliability of the emergency core cooling systems for such plants; the security of such plants, and of systems of transportation, reprocessing, and disposal or storage of wastes from such plants from earthquakes, acts of God, theft, sabotage, and the like;

and the state of knowledge regarding ways to store safely the radioactive waste products from nuclear fission for the necessary thousands of years.

67503. Nuclear fission power plants and related facilities and activities shall be permitted land uses in the State of California and considered to be reasonably safe and susceptible to rational land use planning, and may be licensed by state or local agencies, and may be constructed in the state only if all of the following conditions are met:

(a) after one year from the date of the passage of this measure, the liability limits imposed by the federal government are removed, as determined by a California court of competent jurisdiction, subject to the normal rights of appeal, to permit full compensation of the people and businesses of California in the event of personal injury, property damage, and economic losses resulting from escape or diversion of radioactive materials at the site of any nuclear fission power plant, and from escape or diversion of radioactive materials in the transportation, reprocessing, and storage or disposal of such materials from such plants; and

(b) after five years from the passage of this measure, if the preceding condition has been met and

(1) the effectiveness of all safety systems, including but not limited to the emergency core cooling system, of any nuclear fission power plant operating or to be operated in the State of California is demonstrated, by testing substantially similar systems, to the satisfaction of the Legislature, subject to the procedures specified in Section 67506; and

(2) the radioactive wastes from such plants can be stored or disposed of during the period in which the waste material remains harmfully radioactive with no reasonable chance, as determined by the Legislature, subject to the procedures specified in Section 67506, of intentional or unintentional escape into the natural environment which will eventually adversely affect the land and the people of the State of California, whether due to imperfect storage technologies, earthquakes or other acts of God, theft, sabotage, acts of war, governmental instabilities, or whatever other sources the Legislature may deem to be reasonably possible.

67504. (a) If the liability limits imposed by the federal government are not removed within one year from the date of the passage of this measure to permit full compensation of the people and the businesses of the State of California as specified in subsection 67503(a), then all existing nuclear fission power plants and such plants under construction shall be operated at no more than sixty per cent of their licensed capacity.

(b) Beginning five years from the date of the passage of this measure, existing nuclear fission power plants and such plants under construction shall be derated at a rate of 10 per cent per year of original licensed capacity unless all of the conditions enumerated in Section 67503 are met.

67505. The provisions of Sections 67503 and 67504 shall not apply to small-scale nuclear fission reactors used exclusively for medical or experimental purposes.

67506. The determinations of the Legislature made pursuant to subsection 67503(b) shall be made only after sufficient findings and only by a two-thirds vote of each house.

(a) To advise it in these determinations, the Legislature may appoint a scientific advisory group, comprised of distinguished experts in the fields of nuclear engineering, land use planning, cancer research, security systems, public health, geology, seismology, energy resources, liability insurance, and other related fields. Members of this scientific advisory group shall represent the full range of opinion on the relevant questions. The group shall solicit opinions and information from responsible

interested parties, and shall make public a final report, including a minority report if necessary, containing its findings, conclusions, and recommendations.

(b) To ensure full public participation in the determinations specified in subsection 67503(b), the Legislature shall hold open and public hearings, within a reasonable time after the publication of the report specified in subsection (a) of this Section, and before making its findings, giving full and adequate notice, and an opportunity to testify and cross-examine witnesses to all interested parties and to the general public, within reasonable limits of time.

(c) All documents, records, studies, analyses, and the like submitted to the Legislature in conjunction with its determinations specified in subsection 67503(b), or to the scientific advisory group described in subsection (a) of this Section, shall be made available to the general public.

67507. (a) The Governor shall annually release to the news media and to the appropriate local officials of afffected communities the evacuation plans specified in the licensing of each nuclear fission power plant.

(b) The Governor shall propose precedures for annual review by state and local officials of established evacuation plans,

with regard for, but not limited to such factors as changes in traffic patterns, population densities, and new construction of schools, hospitals, industrial facilities, and the like. Opportunity for full public participation in such reviews shall be provided.

Sec. 2. Amendments to this measure shall be made only by a two-thirds affirmative vote of each house of the Legislature, and may be made only to achieve the objectives of this measure.

Sec. 3. If any provision of this measure or the application thereof to any person or circumstances is held invalid or preempted by federal law, such invalidity or preemption shall not affect other provisions or applications of the measure which can be given effect without the invalid or preempted provision or application, and to this end the provisions of this measure are severable.

Sec. 4. If any provision of this measure cannot be given full force and effect because it is preempted in whole or part by federal law, that provision shall be treated as a resolution of the people of the State of California, expressing their will regarding the subject matter of the provision.

Mrs Pohlmeyer, Hollander, Pub Health, NTS

2/8

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ENVIRONMENTAL CHEMIST SEARCH COMMITTEE

List of Applicants
8 February 1974

Name (mentioned by)	Inquiry	Application	References
Irvine Solomon Invite to visit after ltrs come		x	
Duane Lerdal J MA S		x	x
James P. Lodge (H. W. Edwards) Invite to apply			
Ronald P. Collé AP Sc		x	
E. L. Kothny (State Pub Health Lab)		x	
Liaquat Husain AP Sc		x	
Kenneth Rahn (Glen Gordon) Ask Winchester			
Lou Rancitelli (Glen Gordon) No			
Royce Filby (Glen Gordon) Invite to apply			
Jack Winchester (Glen Gordon) Shortlist list			
Bernd Kahn Ck refs., invite to visit		x	x
Norman E. Hester No. (27 yr)		x	
Thomas J. Meyers No, [illegible]		x	
Bruce R. Appel (State Pub Health Lab)		x	
Adon Gordus (H. A. Laitinen) Invite to apply			
David F. S. Natusch (H. A. Laitinen) Invite to apply			
Julio J. Ludowieg No	x		
Kurt Kraus#	x		
Dick Perkins Rec on letter			
John Cooper Rec on letter			
Harold Johnston No			
Arnold Greenberg (Head, State Pub. Health Lab)			

Heard (AEC/SAN Security Officer), Peter Bernard (SAN General Counsel), and Raymond Commerford.

The members of the traveling party were: Professor Andronik Petrosyants, Chairman, USSR State Committee on the Utilization of Atomic Energy (SCAE); I. G. Morozov, Deputy Chairman, SCAE; A. Maksimov, Deputy USSR Minister of Energetics and Electrification; A. G. Meshkov, Deputy Chairman, SCAE; D. S. Yurchenko, Director of Energetics Factory; N. A. Titkov, Section Chief, SCAE (interpreter); A. S. Veselovsky, Deputy Section Chief, SCAE; Abraham S. Friedman, Director, AEC Division of International Programs; John G. Yevick, Senior Technical Assistant, AEC Reactor Research and Development Division; Melvin Abrahams, Consultant, East-West Affairs, AEC/DIP; and William Penkowsky, East-West Affairs, AEC/DIP. Morozov, Meshkov and Yurchenko were just en route to visit Hanford, scheduled to leave early tomorrow morning.

Petrosyants was delighted that Helen and I had come to meet him. (We were told that he had asked repeatedly if he was going to see us.) Meeting Yurchenko, whom we had met at Shevchenko, was a pleasant surprise. He told me that the fast breeder reactor at Shevchenko has been operating since last July at 300 MW thermal, generating 25 MW of electrical power, the remainder going into the desalting of water from the Caspian Sea. We were also delighted to see our old friend Meshkov, who played such a prominent role as a host to our visit to the Soviet Union in 1971.

Monday, February 11, 1974 - Berkeley

While I was attending Pimentel's Chem 1B lecture, Paul Lochak called and talked with Sheila. He asked for information on how important safety-related considerations are in a gaseous diffusion enrichment plant and whether I know any officers of Sargent and Lundy.

I sent a letter to Walter Brown at Bell Labs for the occasion of Walt Gibson's 15th anniversary celebration. I returned to the MIT Press the corrected manuscript of my paper, "From Mendeleev to Mendelevium--And Beyond," for the Jerzy Neyman Copernican volume. I said that I would not be able to produce the bibliographic references they requested on such short notice. I wrote Donald Bright my evaluation of Bob Leachman, who is applying for the position of Dean of the School of Mathematics, Science and Engineering at California State University, Fullerton (copy attached).

At 10:20 a.m., I met with Peter Laubereau and Norman Edelstein. Laubereau arrived Saturday night and will visit with us until next Friday. I told him we are going to hire an actinide chemist and hope to get better acquainted with him in order to assess possible mutual interest in his fulfilling this role.

I walked down to the campus for my office hour. Ann Thor came in and I worked a number of problems for her. Nancy Brown, lecturer in our Chemistry Department, dropped in to discuss problems of possible theoretical research in the energy field; she is under consideration for an Assistant Professorship in the Mechanical Engineering Department if she can establish a satisfactory research problem. I suggest-

February 11, 1974

Professor Donald B. Bright
Chairman, Search Committee
Department of Biological Science
California State University, Fullerton
Fullerton, California 92634

Dear Professor Bright:

This is in reply to your request for my evaluation of Dr. Robert Leachman in connection with his application for the position of Dean, School of Mathematics, Science and Engineering at your University.

I have known of the scientific work of Bob Leachman for more than 20 years and have known him personally for about 15 years. I have a very high opinion of him as a scientist, as an administrator, and as a broad-gauged person.

In his research, he has made significant contributions in elucidating the mechanism of the nuclear fission reaction and in the relatively new field of heavy ion reactions. His work is characterized by originality and imagination, and he is responsible for the training of many scientists in connection with his research program.

Indicative of his breadth of interests are his contributions to the safeguarding of nuclear fuels. His book with Phillip Althoff, Preventing Nuclear Theft: Guidelines for Industry and Government, is a significant contribution to this important area. I believe that he did a good job in his administrative position as Head of the Physics Department and Director of the Nuclear Science Laboratory at Kansas State University. He has also had additional administrative experience as Special Assistant to the Deputy Director for Science and Technology, Defense Nuclear Agency, U.S. Department of Defense. This experience should be of value in connection with the requirements of your Dean's position to coordinate and cooperate with divergent influences within the academic world.

I have the impression that Bob Leachman is ready for a high-level administrative position in a university, and I believe that California State University at Fullerton would do well to acquire his services at this time.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

ed gasification and liquefaction of coal, recovery of oil from oil shale, production of alcohol from cellulose, and production of hydrogen through use of solar energy as possibilities. I offered her the use of my file of papers and books, and she will come up to my office on Wednesday afternoon to take advantage of this.

Herman Wouk called and we agreed that I could invite Sol Linowitz as my guest to the Bohemian Grove this summer.

I had lunch with the Chem Department faculty and sat next to Bernie Alder of the Lawrence Livermore Laboratory who introduced me to his friend, Dave Chandler, an inorganic chemist from the University of Illinois. I then taught my Chem 1B lab section from 1:10-3:15 p.m.; I put in a good deal of effort in preparing them for Wednesday's quiz.

I returned a call from Alan Nixon who told me he is considering running for a second term as President of the American Chemical Society and is therefore interested to know my interest in professionalism, which he has done so much to promote in ACS and hopes to see continued; I said I am in favor of the ACS being in this area and would continue to promote it if I am elected President. I sent him a copy of my statement on ACS issues.

I attended the Nuclear Chemistry Division Seminar, where I introduced Peter Laubereau who spoke on "Cyclopentadienyl Complexes of Transamericium Elements." He did a good job in my opinion, but he may not have impressed the critics of my proposed expansion of the actinide chemistry program.

Tuesday, February 12, 1974 - Berkeley

I mailed advance draft 189 forms on two new programs of work in the actinide field--covering the applied work in the energy and laser fields--to Elliot Pierce. I sent to George Rogosa the advance draft copies of 189 forms for the Heavy Ion Radiochemistry program. I then sent copies of these advance draft forms to George Pappas.

I wrote Paul Lochak in connection with his inquiries to the office yesterday (copy attached). I sent to Jacob Bigeleisen my evaluation of Hans Gutbrod, who is a candidate for a faculty position at the University of Rochester (copy attached).

At 10:00 a.m., I met the Petrosyants group in front of Building 50 and accompanied them to Sessler's conference room. Present at the briefing were Andronik Petrosyants, A. Maksimov, N. A. Titkov, A. S. Veselovsky, John Teem, Abraham Friedman, Peter Bernard, Kenneth Heard, Andrew Sessler, Earl Hyde, Hermann Grunder, Thomas Budinger, Cornelius Tobias, Edward Lofgren, and Dr. Rolland Johnson.

Sessler made some welcoming remarks and Petrosyants expressed his thanks graciously. Sessler then introduced Lofgren, who gave an introductory briefing on the BEVALAC, followed by a further description by Grunder and a description of the proposed biomedical research program by Budinger and Tobias. At 11:00 a.m., the whole group toured the Bevatron.

February 12, 1974

Mr. Paul Lochak, President
Societe Internationale de Technologie
61, Rue des Belles Feuilles
75782 Paris Cedex 16, France

Dear Paul:

In reply to your inquiry, I can't recall any officers of Sargent and Lundy that I know personally. However, I am sure that I must have met some of them and in any case would be glad to arrange for you to meet with someone in that firm. I believe their headquarters are in Chicago.

The safety considerations concerning gaseous diffusion enrichment plants are much less serious than for a nuclear power plant. Nevertheless, it would be good practice to include the latest knowledge and experience related to safety into the design of any new uranium enrichment plant. The reasons the plant at Oak Ridge is far removed from population centers are related primarily to the secrecy aspects that were so important when it was built during the war.

My best present guess would be that I will be visiting Europe in June, with the exact dates not yet determined, and hence it would be most convenient for me to visit with you in France during that month.

With best regards,

Cordially,

Glenn T. Seaborg

GTS/sms

February 12, 1974

Professor Jacob Bigeleisen, Chairman
Department of Chemistry
University of Rochester
River Station
Rochester, New York 14627

Dear Jake:

This is in reply to your request for my assessment of Dr. Hans H. Gutbrod for a faculty position at the University of Rochester.

Dr. Gutbrod has spent a good deal of time at Berkeley working in the Lawrence Berkeley Laboratory during the last couple of years since my return from Washington, and so I have had the opportunity to get quite well acquainted with him. I would rate him as a first-class physicist. He has worked here on heavy ion experiments at the SuperHILAC with a group of outside users, including people from the University of Rochester, and has served as a key member of the group. We found him outstanding in the design of the experiments, the setting up of the instrumentation, and in the theoretical treatment of the results.

Dr. Gutbrod has a very pleasing personality and gets along very well with his co-workers and the others with whom he is associated in his relationships in the Laboratory. I would be most happy to have him as a colleague.

Indicative of the high regard in which he is held is the plan, as I understand it, to have him be in charge of the beam development program of the UNILAC at GSI when, and if, he returns to Germany.

All in all, I can recommend Dr. Hans H. Gutbrod very highly.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

bcc: Eileen Eiland

Tuesday, February 12, 1974 (con't)

Afterward, I brought Petrosyants and Titkov to my office and showed them a copy of the Russian edition of Man and Atom. We then continued up to the cafeteria for the buffet luncheon. Those present from LBL were Robert Birge, Harold Fidler, Albert Ghiorso, Hermann Grunder, Jack Hollander, Earl Hyde, Rolland Johnson, Denis Keefe, Edward Lofgren, Robert Pyle, John Rasmussen, Andrew Sessler, Paul Witherspoon, and Victor Zackay.

After the meal, Petrosyants introduced his people and Sessler introduced ours. I then made some welcoming remarks, referring to my new role in which I am free to criticize the AEC rather than to be continually criticized by others, our pleasant visit to the Soviet Union in August 1971 with its tight schedule, and our revenge in providing an even tighter schedule for this visit.

It was raining, so we rode in the bus up to the 184" cyclotron, where the group was shown the patient treatment room. We then rode in the bus to Building 71 for a tour of the SuperHILAC. Ghiorso invited Soviet scientists to come work at the SuperHILAC.

In the course of the tour, Teem asked me to read the document on "Cooperation in Research on the Fundamental Properties of Matter," which contains the recommendations to the Joint Committee on Cooperation between the US and USSR Scientists, sponsored by the USAEC and the Soviet SCAE. Teem asked whether I would be willing to serve as the lead individual on the US side, in which capacity I would be working with him as the AEC representative. I said I would think about it and he will get in touch with me about it.

The group then went into the conference room for a briefing by Jack Hollander on the LBL non-nuclear programs in geothermal and solar energy. Following this, they were scheduled for a briefing on inorganic material research at the IMRD Building and then a tour of the Lawrence Hall of Science.

I returned to my office and returned a call to Bill Lear. He told me that he is trying to find out about a fluid material that the AEC in Canada might have for use in a steam system; he had called Dr. Taylor and Bill Bradley at Chalk River. I indicated that I had not heard of this; it appears that he will have to use water.

I went up to LHS at 4:45 p.m., met the Petrosyants party, and drove home with Petrosyants, Maksimov and Titkov, followed by the others in their cars.

Helen and I hosted a cocktail party with the following people present: Petrosyants, Maksimov, Titkov, Veselovsky, Friedman, Abrahams, Penkowsky, the Sesslers, Hydes, Grunders, Lofgrens, Rolland Johnsons, Chancellor and Mrs. Albert Bowker, Calvins, Witherspoons, Frank Walter, Kenneth Heard, the Bernards, David Shirleys, and the Templetons. Helping us to serve the drinks was Leigh Jordan, son of Professor John Jordan of the UCB Department of English.

In the course of the evening, Petrosyants presented Dianne with a packet of Soviet stamps and a box of Soviet chocolates, and he presented me with a set of three 25 million-year-old shark teeth excavated from the site of the Shevchenko reactor and an amethyst set in a plastic case. Helen and I presented him with a set of redwood burl bookends. Petrosyants and his colleagues seemed to enjoy themselves very much, and he commented that he particularly liked the informality of meeting people in their homes. The party ran from 5:30-7:15 p.m., at which time they departed for Jack London Square where they were scheduled to have dinner.

Wednesday, February 13, 1974 - Berkeley - Washington

I attended Pimentel's lecture. Sheila returned a phone call to Jeremy Stone, indicating that I would not be able to participate in a Federation of American Scientists delegation to Moscow to approach the Soviet government about Solzhenitsyn. She also reported on her phone conversations with Michael Moravcsik and Catherine Borras about Moravcsik's request for an additional $350 for his symposium at the AAAS meeting.

At 10:30 a.m., Diamond dropped by in his role as chairman of the Nuclear Chemistry Division's program review committee to worry further about the actinide chemist we are about to hire and who he will report to; he is afraid that Edelstein is not sufficiently broad to supervise this whole program. I dropped by to visit with the SHEIKS (Kratz, Norris and Binder) and went up to the HILAC to talk to Nitschke about yesterday's experiment; they found that a beryllium window cooled with cold nitrogen can stand up to 15 microamperes of O^{18} ions.

I had lunch in my office, then drove down to meet my Chem 1B lab section; we gave them the second quiz of the quarter (copy attached).

Helen came in on BART and drove me to San Francisco International Airport. Here I boarded TWA flight No. 68, which left at 3:15 p.m. and arrived in Washington at 11:00 p.m. I shared a taxi with Dr. Robert E. Ward, Director, Center for Research in International Studies, Stanford University, where he recently moved after 25 years at the University of Michigan. He specializes in Asian Studies and is involved in a joint effort with Berkeley.

At Harrison Street, I talked with Jane and Pete, who looked fine and seemed to be in good spirits.

Thursday, February 14, 1974 - Washington - Vienna, Virginia - New York

I had breakfast "at home," then was picked up by a DATRAN driver, rode by National Airport to pick up Walter Haefner and Phil Erard (of Loeb, Rhodes & Co.), and then rode to the DATRAN headquarters in Vienna. We briefly met with Glenn Penisten, Charles Wyly, Sam Wyly, Sol Linowitz, Erwin Canham, Harry Bowles, and Bob Strauss in Penisten's office. Sol told me that he gave my letter to Dr. Hammer to Secretary Kissinger and that it was also included in President Nixon's reading matter a night or two ago.

Chem 1B Section 2
2nd Quiz Feb. 13, 1974
40 points OPEN BOOK
40 minutes Show all work

Name_____
Locker No._____
T.A._____

1. (30 points) From the tables in your text, compute ΔH for the reaction

$$CH_3OH + 3/2\ O_2 = HCO_2H + H_2O$$

Show that this result is the same as that obtained from the heats of combustion of methyl alcohol, CH_3OH and formic acid HCO_2H. What is ΔE for the combustion of the alcohol?

$$\Delta E = \Delta H - \overset{-\Delta PV}{-\ \tfrac{1}{2}RT}$$

+ 300 cal.

2. (10 points) Complete and balance the following reactions;

$Cu^{++} + I^- =$

$Cu + SO_4^{--} =$ acid solution.

Thursday, February 14, 1974 (con't)

We then went into the Board Room for an executive session to approve Sam's recommendation for a raise in salary and bonus for Glenn Penisten. The others--Penisten, John Scorce, Dan Young, Phil Erard, Ralph Johnson, and Virgil Awkes--joined us to start the regular Board meeting (agenda attached).

Penisten gave a summary of the DATRAN 1974 Annual Calendar. Dan Young gave a status report on construction and operations of the network. Ralph Johnson then spoke on the Status of Marketing Available Capacity of the Network. Harry Bowles reported on the Status of Budget and Financing. Erard reported on visits with possible investors; he is optimistic about finding one. Bowles then brought the meeting to a conclusion with a summary of the negotiations under way to obtain a bank loan.

Some of us remained for a buffet lunch, during which there was much discussion of the energy crisis. Penisten told me that Bob Hollingsworth has accepted a job with a West Coast firm. Strauss asked me to serve on a Democratic Party policy task force to consider domestic and foreign relations problems. With the proviso that I might not be able to attend more than one meeting a year, I agreed.

A driver took me to AAAS headquarters for a meeting with Phil Abelson to discuss the in situ oil shale recovery process of Occidental Petroleum. He is conducting research at the Carnegie Institution on the recovery of oil from oil shale. He thinks that the Occidental process is the best process now available and that in situ recovery is the only way to do it. He didn't understand, however, why Dr. Hammer thinks he needs Government support; I said he at least needs to have the Government make the oil shale land available to Occidental. Abelson said he is willing to see Dr. Hammer or his representative.

I then walked to Sol Linowitz's office at One Farragut Square and met with Sol in his office. He brought me up-to-date on his conversations in Washington regarding the Occidental process. Kissinger's interest increased when he saw my letter of evaluation. Sol has also discussed the matter with Bill Simon, head of the Federal Energy Office, and Fred Dent, Secretary of Commerce. George Shultz is also interested in these discussions. The Occidental process has also been discussed with representatives of the AEC and they seem to be ready to investigate it with their funds; Sol advised Hammer to be sure this doesn't mean loss of his rights in the process.

I took a taxi to National Airport and caught the 5:00 p.m. Eastern Shuttle to La Guardia Airport in New York. I checked into the Chemists Club, had dinner, and took a walk along Broadway.

Friday, February 15, 1974- New York - Lafayette

I had breakfast in the Chemists Club dining room, then walked to the General Motors Building to attend the meeting of the Board of Directors of the Dreyfus Third Century Fund. The meeting began at 10:10 a.m. with the following present: Directors David Burke (who presided in the absence of Howard Stein), Lucy Benson, John McCloy,

AGENDA
DATRAN BOARD OF DIRECTORS
FEBRUARY 14, 1974

APPROVAL OF MINUTES OF PRIOR MEETING	
INTRODUCTION	GLENN E. PENISTEN
STATUS OF CONSTRUCTION & OPERATIONS OF THE NETWORK	DAN YOUNG
STATUS OF MARKETING AVAILABLE CAPACITY OF THE NETWORK	RALPH JOHNSON
STATUS OF BUDGET AND RECONCILIATION TO ANNUAL PLANNING FINANCIAL REQUIREMENTS	HARRY BOWLES
STATUS OF FINANCING	HARRY BOWLES
LUNCH	

DATRAN - STRICTLY PRIVATE

George Harrar, and Robert Goheen; plus Michael Glass, Marcella Fava, Kenneth Oberman, Leonard Leiman, Margaret Evans, Jeffrey Friedman, and E. Paull.

We followed the agenda as attached. There was a good deal of discussion as to whether the Third Century Fund should invest in governmental securities or bonds of foreign countries (France was prominently mentioned as an example), and the staff was instructed to make a study to determine the degree to which this is consistent with the wording of the public description of the Fund.

At 1:00 p.m., I took a taxi to the Chemists Club where I had lunch with Paul Slawter and Charles Griffith, the outgoing President of the Club. They told me that the Club is doing a little better financially. I did some reading in the Club lounge area, got a haircut in the adjoining barber shop, and took a taxi to Kennedy Airport. Here I boarded TWA flight No. 49 which left at 6:10 p.m. and arrived at San Francisco Airport at 8:10 p.m. I met Dr. and Mrs. Dick Bolt at the airport; he and his group have been asked to study further possible tape erasures (of President Nixon).

Helen, after picking up my mail at LBL, met me and drove me home. Eric arrived shortly after we did to spend the long weekend. At Berkeley today, Edwin McMillan's secretary Peggy Fox called Sheila to report that McMillan won the lawsuit against Richmond and has stopped the developers of the Mira Vista project.

Saturday, February 16, 1974 - Lafayette

I spent the morning reading papers accumulated during my absence. After lunch, Suki and I hiked around the Rim Trail at Lafayette Reservoir. Sheila drove out in late afternoon, played tennis with Eric and Dianne, and had dinner with us; it was her birthday and a cake topped off the occasion.

Sunday, February 17, 1974 - Lafayette

I worked on my speech on energy to the State Legislature on March 5. In the afternoon, Eric, Suki and I drove to San Pablo Reservoir to look over the hiking trails, found them not too interesting, and drove on to Briones Regional Park where we hiked to the top of Black Oak Knob and on around to the far end of the Park and back via Briones Road. We talked about his possible choice of major; he is still undecided and I raised the possibility of a science like molecular biology.

Christine Seaborg, my aunt in Menominee, Michigan, called to say she and three friends will be visiting San Francisco next week; we made arrangements to get together. Steve returned home from Davis at about dinner time; he hasn't found a job yet.

Monday, February 18, 1974 - Lafayette

Today is the Presidents' birthdays holiday. I read material for Chem 1B and took my Reservoir hike with Suki. Steve drove Eric back to Davis after lunch and stayed there himself.

AGENDA

Meeting of The Board of Directors of
The Dreyfus Third Century Fund, Inc.

10:00 a.m. -- Friday, February 15, 1974

I. Approval of Minutes of Previous Meeting

II. Legal Matters

A. Annual Review of Fidelity Bond

III. Investment Matters

A. New Industries

1. Aluminum
2. Engineering and Construction

B. Industry Reconsidered

1. Chemical
2. Supermarket
3. Newspaper

C. Industries Reviewed

1. Paper

D. Special Consideration Companies

E. Valuation of Restricted Security

IV. Investment in Foreign Issues

V. Portfolio Review and General Business Discussion

Tuesday, February 19, 1974 - Berkeley - Stockton - Lafayette

I wrote Vitalii Goldanskii, expressing hope for his quick and complete recovery from the heart attack he suffered in December and recently wrote me about. I wrote Lad Kuzela, West Coast Editor of Industry Week, in response to his questions on nuclear energy (correspondence attached). I responded to a letter from Oscar Quihillalt, in which he reported that he is resigning as Chairman of the Argentinian Atomic Energy Commission, thanking him for writing to tell me this. I wrote Chet Holifield to express my regret upon learning that he has decided to retire from Congress at end of the present term.

Ghiorso called to tell me about their "breakthrough" in passing 15 microamperes of O^{18} ions through a beryllium foil and to discuss our respective presentations to the Nuclear Chemistry Division Visiting Committee next Thursday morning.

I went by to see Kratz; the SHEIKS received an argon bombardment of uranium last week and separated yttrium and gold to measure the distribution of isotopes in these two elements.

I drove back home and joined Helen at 10:00 a.m. and we drove to the University of the Pacific in Stockton, where I was scheduled to speak to the "Forum on National Priorities," sponsored by the Associated Students, on "The Energy Problem."

We attended a luncheon in our honor. Present were: President and Mrs. Stanley McCaffrey; Clifford Dochterman, Vice President/Executive Assistant; Emerson Cobb, Chairman, Chemistry Department; Carl Wulfman, Chairman, Physics Department; Robert Anderson, Physics Department; Alistair McCrone, Academic Vice President; Lee Rosenberg, Chairman of the ASUOP Forum on National Priorities; and Professor Margaret Cormack, President of the Academic Senate.

After lunch, Stan and I walked to Anderson Hall where I met in the Gold Room with a number of students and faculty. (During this time, Helen stayed at the President's House, and she and Beth walked around the campus.) Among these were Fay Goleman (Alvin Weinberg's older sister, Professor of Education and Sociology, and Head of UOP's Affirmative Action Program), Neil Lark (nuclear chemist trained at Cornell, has worked at Brookhaven and with Diamond at LBL on Coulomb excitation), Walter Zimmerman, Robert Anderson, Carl Wulfman, Calvin Potts (Professor of Chemistry and long-time friend from student days), Emerson Cobb, Don Wedegartner (Professor of Chemistry), Larry Speer (Professor of Chemistry), and students Steve Hoffman, Loren Quan Noy Hoberman, D. M. Peterson, and Judy White. The discussion ranged around the energy crisis, the role of the breeder, etc.

After this, I walked with McCaffrey and Dochterman to the area in front of Knowles Hall where a TV camera was set up for Channel 3; I was interviewed by John Ryme on the energy crisis, energy sources for the future, and our future standard of living.

I then walked with Dochterman to Raymond College and gave my talk, "The Energy Problem," illustrated by about 35 slides, in the Great Hall. There were about 100 people present.

INDUSTRY WEEK *A Penton Publication*

PENTON PLAZA · CLEVELAND, OHIO 44114 · PHONE 216/696-7000

Reply to LAD KUZELA, West Coast Editor
3250 Wilshire Blvd., Los Angeles, Calif. 90010
Phone: 213/380-0412

February 12, 1974

Dr. Glenn Seaborg
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

Dear Dr. Seaborg:

I would like to prepare an article on the outlook for the generation of power via nuclear energy and would like to interview someone who has been in government.

Would you be kind enough to sit down with me and answer a few questions, at your convenience. I don't believe I will take more than an hour of your time, and will try to use even less. Whatever you can do for me will be appreciated.

Here are the questions I'd like to ask:

1. As a former administrator of the nation's Atomic Energy Commission how do you currently view the status of nuclear energy in this country as a source of peaceful use of power?

2. Do you feel this country can and should move faster in establishing nuclear reactor generating plants?

3. Do you feel some critics have a valid complaint that nuclear reactors are not safe to establish in some areas or regions, or still are not safe, period?

4. Besides the issue of safety, what do you see as other limitations restricting the faster establishment of nuclear reactor generating facilities in this country? Do you think the U.S. has sufficient raw materials in the way of uranium to install an adequate number of generating facilities or would we still have to rely to some extent on fossil fuels? If so, by how much?

5. Do you think this country is proceeding fast enough in developing the more advanced type of nuclear facility such as the fast breeder, or, as I've heard it referred to, fusion reactor? Can it proceed faster, and if so, how could this be accomplished?

6. Do you see any other developments which may hasten the establishment of nuclear generating facilities in this country?

7. There has been a report the Russians are studying a nuclear-powered blimp for transporting people and baggage. This country once studied nuclear-powered aircraft, and surface vessels. Do you think development should be directed again toward such transportation? Is it possible we could ever develop nuclear-powered automobiles?

8. Any other views you may have relative to nuclear power would be appreciated.

Sincerely,

Lad Kuzela

February 19, 1974

Mr. Lad Kuzela, West Coast Editor
INDUSTRY WEEK
3250 Wilshire Boulevard
Los Angeles, California 90010

Dear Mr. Kuzela:

Since my schedule precludes an interview within the next few weeks, I'll try to briefly answer the questions posed in your letter of February 12, 1974, in the order that they were posed.

1. Nuclear energy has an excellent future in this country, as exemplified by the fact that a total nuclear capacity of more than 200 million kilowatts is in operation, under construction, or committed by our utilities.

2. Our utilities are moving about as fast as is feasible toward nuclear power.

3. Nuclear reactors constructed and operated under the regulations of the Atomic Energy Commission are safe.

4. The capability of our industry to build complex nuclear power plants, while great, has limitations and sets the maximum pace. The United States has sufficient uranium to last for decades with conventional nuclear power plants and hundreds of years or more with breeder reactors. We will continue to install electric generating facilities operated on fossil fuels in order to meet the anticipated demand. Nuclear power will generate about 50% of our electricity in the year 2000 and fossil fuels the other 50%.

5. The fast breeder and the fusion reactor are two different things. The fast breeder will begin to make contributions by about 1990, and the fusion reactor

sometime (impossible to predict now) after the year 2000. We are proceeding in both cases as fast as is feasible.

6. The rate of establishment of nuclear generating facilities before 1980 can't be accelerated much. If the country turns to a huge program of electrically powered mass transit and so forth, and to other electricity-using industries and so forth, the development of nuclear power will be hastened after 1980.

7. I do not consider a nuclear-powered blimp or nuclear-powered aircraft to be feasible. Nuclear-powered surface ships are definitely feasible and their development should be encouraged. It will never be possible to have nuclear-powered automobiles.

8. We must develop all potential sources of energy--solar, geothermal, fusion, coal gasification and liquefaction, recovery of oil from oil shale, and nuclear.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

After my talk, Helen and I visited with Stan and Beth some more, then drove back to Lafayette, arriving at 6:45 p.m.

Mary Bowerman called at 9:00 p.m. to ask me to appear in Oakland tomorrow in connection with plans for the allocation of funds to be available, hopefully, as a result of the June state bond issue for the purchase of park lands; she hopes to obtain substantial funds for the expansion of Mount Diablo State Park. I said I didn't have time to attend and suggested she call Joyce Burr.

Wednesday, February 20, 1973 - Berkeley

I called Bradley Moore at 8:45 a.m. to give him my feedback on the draft of his Form 189, which he put in my mailbox yesterday afternoon. I suggested that he cross-reference to the Edelstein program in a low-key way and that he be more specific in listing the personnel budget. He said he hopes to continue the NSF and Army Research Office support and to get a fresh Ph.D. out of one of the laser groups at Stanford.

At 8:55 a.m., I received a call from Dr. Uznanski, NSF Office of International Programs, who said that Francois David is one of the finalists among applicants for one of their grants. I indicated that we would accept David at Berkeley with enthusiasm if he gets the award and strongly endorsed his work.

I attended Pimentel's lecture, then returned to my office. At 10:25 a.m., I called Arnold Greenberg at the State Department of Public Health and invited him to apply for the position of environmental chemist. He has given it some thought and is inclined to think this represents a direction different from that which he has been taking in his professional development. We left it that if he decides he is interested after all, he will write us.

Thomas Sherwood (Chemical Engineering Department, Berkeley) called me to report on conversations he recently has had with other experts in the oil shale field. Sherwood feels that Armand Hammer did not give us the whole story about his process. As an example, he cited Hammer's reporting a 60% yield by his process; Sherwood indicated, however, that Occidental made no measurements of the yield--they estimated this figure on the basis of a Bureau of Mines aboveground retort experiment which yielded 60%. Sherwood's contacts estimated that Hammer's yield is probably 20%. Sherwood further observed that there is no place in Colorado that has the shale above the mahogany ledge (which Hammer's process assumes); Sherwood concludes that Hammer's disposal is just about the same as mining the shale with 100% yield. Sherwood fears that the shale program, which could produce 10 million barrels a day by 1985, will be held up because everyone is awaiting the outcome of Hammer's efforts. Sherwood thinks the in situ retorting will need another 15 years' development. In response to my queries, he acknowledged that the in situ process must be developed.

I met with Joel Levinson to discuss his talk at the Graduate Research Conference tomorrow; I am on his qualifying examination committee.

Wednesday, February 20, 1974 (con't)

Gert Friedlander came by at 10:45 a.m.; he is here as chairman of the outside review committee which is meeting here tomorrow and Friday. We discussed procedures and plans for our senior staff reporting to his Visiting Committee.

I sent to the American Chemical Society my letter nominating Luciano Moretto for the 1975 Award in Pure Chemistry (copy attached).

At 11:00 a.m., Mason Willrich met with me in my office. We discussed the nuclear fuel theft problem and methods of prevention. He is optimistic about it if the nuclear electric industry is required to have the nuclear fuel reprocessing and fabrication plants on the same sites and if the guarding is performed by federal personnel. He is opposed to an amalgamation of the proposed Nuclear Energy Commission with the Federal Power Commission because safety and economic regulation should be separated; otherwise, there could be a conflict of interest. He agrees with me that the nuclear weapons function should stay with ERDA (if the AEC is transformed) and not be transferred to DOD. He also agrees with me that international problems are more important than domestic environmental problems.

I had lunch at my desk and then we went over to the Building 50 Auditorium. Here Willrich gave his talk at the Energy and Environment Colloquium on "Nuclear Theft: Possibilities and Safeguards." He said the problem of nuclear theft focuses on plutonium and enriched uranium fuel elements (for the HTGR). He said the motives for theft are (1) economic, (2) intimidation, and (3) coercion. He thinks the problem is international with actions in one country affecting those of another. He mentioned the confusion that has existed, and the near losses, in the unguarded shipments of plutonium and enriched uranium. His studies and the US Comptroller General's have uncovered these deficiencies. New regulations went into effect in December 1973. The nuclear industry has not cooperated with the AEC so far.

I taught my Chem 1B lab section from 1:10-2:15 p.m., then walked to the State Department of Public Health Building and went to the office of Dr. Jerome J. Wesolowski, Chief of the Air and Industrial Hygiene Laboratory. Here Art Poskanzer, Bob Budnitz, Jack Winchester, and I met with Wesolowski, who described the organization of the Lab and some of the work in progress. We toured the lab areas and met Bruce Appel and Avolde Kothny (both candidates for our environmental chemist position) and Jim Sandberg (of the Bay Area Air Pollution Control District). After Winchester gave a talk in the auditorium, we all rode back up the hill.

I met in my office with Kratz, Norris and Binder to go over our experimental results in preparation for my talk to the Visiting Committee tomorrow. Norris told me that we have two spontaneous fission counts in the lead fraction of our large uranium-krypton bombardment. This is interesting.

I then stopped by the HILAC Building on the way home. Ghiorso told me they are having good success and getting (collecting) good yields of recoils in the gas stream preparatory to the 106 experi-

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 □ TEL. (415) 843-2740

February 20, 1974

Dr. Justin W. Collat
Awards Program
American Chemical Society
1155 Sixteenth Street, N.W.
Washington, D.C. 20036

Dear Dr. Collat:

I am writing to nominate Dr. Luciano G. Moretto for the 1975 Award in Pure Chemistry. The Award is proposed for his experimental and theoretical work on the mechanism of the nuclear fission process, the microscopic aspects of statistical nuclear properties, the statistical distribution in the collective and macroscopic degrees of freedom of nuclei, and the use of heavy ions in the study of nuclear reaction mechanisms and nuclear structure.

Moretto was born at Bisuschio, Italy on February 18, 1940. In 1959 Moretto began his studies in chemistry at the University of Pavia. At the same time he obtained a scholarship at Collegio Borromeo in Pavia, which was renewed annually for six years. During the summer of 1963 he began research at the Nuclear Euratom Center in Ispra, where he conducted his thesis work on the radiochemical determination of the fission yields from ^{232}Th irradiated with pile neutrons. He obtained the Ph.D. degree <u>summa cum laude</u> in July 1964.

From July 1964 until October 1965, Moretto was professore incaricato esterno at the University of Pavia. During this time he taught a chemistry course in Quantitative Chemistry. At the same time he worked at the Laboratorio di Radiochimica, where he carried out research on the fission yield curve of ^{237}Np irradiated with pile neutrons.

In October 1965, he joined Dr. Stanley G. Thompson's group at the Lawrence Radiation Laboratory. He returned to the University of Pavia in 1968 and, in 1970, was named Assistente Ordinario for the chair of General and Inorganic Chemistry in the Faculty of Engineering. In January 1971 he obtained the Libera Docenza in Radiochemistry. In July 1971,

he was appointed Assistant Professor in the Chemistry Department at the University of California, Berkeley, and he resumed his research with the Thompson group at the Lawrence Berkeley Laboratory. He was promoted to Associate Professor in 1973.

At the outset of his time in Berkeley, Moretto concentrated his attention on various aspects of the fission process. He measured the fission barriers and the fission fragment angular distributions in medium-heavy elements. He studied the fission process induced by high energy electrons. He also participated in a preliminary search of superheavy elements both in nature and by means of heavy ion reactions. During the latter part of his residence in Berkeley, while in the process of analyzing some experimental data on fission cross sections, he became interested in the statistical properties of excited nuclei. Such interest has dominated and determined his research up to the present. Moretto's research work has covered both theoretical and experimental aspects of nuclear chemistry.

In the theoretical field he has been working on the microscopic aspects of statistical nuclear properties. The shell model and the pairing Hamiltonian have been used to generate various microscopical and statistical quantities such as the distribution in deformation of excited nuclei, shell level densities, moments-of-inertia and angular velocities. Superfluid and superconductive quantities and their fluctuations have been calculated, as well as their dependence upon energy and angular momentum. The disappearance of shell and pairing effects with angular momentum and excitation energy has been investigated. These theories have been applied in interpreting fission excitation functions and in obtaining reliable fission barriers from experimental data. The dependence of the stability of superheavy nuclei on excitation energy has been studied, as well as the effect of pairing fluctuations on spontaneous and induced fission of heavy nuclei.

A second aspect of Moretto's theoretical research, supplementary to the first, is the study of the statistical distributions in the collective and macroscopic degrees of freedom of nuclei. A comprehensive formalism has been developed which describes the statistical emission of charged particles such as Li, Be, B, C, etc., from compound nuclei. In one limiting case this theory gives a description of neutron evaporation, and at the other extreme it gives a description of the fission process.

Moretto's experimental activity has dealt mainly with the study of fission and heavy ion reactions. The study of fission fragment angular distributions has led to the discovery of an anomalously small saddle point moment-of-inertia, which seems to be due to an enhanced pairing correlation.

The determination of fission barrier heights over a broad range of medium-heavy and heavy nuclei has led to the most comprehensive and useful set of fission barriers available. These barrier heights (related to fission thresholds or activation energies) give very valuable data for the determination of liquid-drop and newly developed droplet model parameters. For example, in the liquid drop case the fission barriers give accurate values for the ratio of the nuclear electrostatic energy to the surface energy. These results are the basis for most of the calculations which have been made for the stabilities of heavy and superheavy elements when corrections are made for shell effects.

I believe Moretto also has every quality that should be found desirable in one who is being considered for the ACS Award in Pure Chemistry. He has extraordinary intellectual powers, imagination and vigor, and has coupled his scientific insight both with skill in experiments and skill in theoretical formulations.

Moretto's work has made it possible to understand and interpret quantitatively important aspects of nuclear reactions and fission which had remained unexplained for a long time. He has made great contributions to our understanding of the statistical properties of nuclei and to experiments which support the results of his theories. All of the work discussed here has been carried out in the United States.

His colleagues and I believe that Luciano G. Moretto is the best nuclear chemist in his age group in the United States. He has our very highest recommendation for the ACS Award in Pure Chemistry.

Sincerely yours,

Glenn T. Seaborg

GTS/sms
Enclosure: Publications List
Under separate cover: 8 copies each
of five publications.

2/20/74

LUCIANO G. MORETTO PUBLICATIONS

submitted with Glenn T. Seaborg nomination of
Dr. Moretto for the 1975 ACS Award in Pure Chemistry.

1. J. R. Huizenga and L. G. Moretto, "Nuclear Level Densities," Annual Review of Nuclear Science, 22 (1972) 427.

2. L. G. Moretto, "Statistical Description of Deformation in Excited Nuclei and Disappearance of Shell Effects with Excitation Energy," Nuclear Physics, A182 (1972) 641.

3. L. G. Moretto, "Shell-Model Calculations of Fission Decay Widths and Probabilities in Superheavy Nuclei," Nuclear Physics, A180 (1972) 337.

4. L. G. Moretto, "Studies on Statistically Excited Shell Model Nuclei: The Dependence of the Shell Structure and of the Pairing Correlation upon Angular Momentum," Nuclear Physics, A216 (1973) 1.

5. L. G. Moretto, "Statistical Description of a Paired Nucleus with the Inclusion of Angular Momentum," Nuclear Physics, A185 (1972) 145.

ment. He told me that Batzel has decided not to allocate a third man to Hulet's group (which consists only of Lougheed and him). We decided to allocate money from the $100,000 supplied by LLL to support SuperHILAC operations to make it possible to add the third man.

Suki and I took a hike to the water tank. Helen went with Mary Paige to the Lafayette City Council meeting. Bob Locker--new pitcher with the Oakland A's from the Chicago Cubs--and his family moved into the Etzlers' house early this week.

Thursday, February 21, 1974 - San Francisco - Berkeley

I was met at my LBL office at 8:00 a.m. by Joseph Bort, Chairman of the Alameda County Board of Supervisors and Chairman of the Association of the Bay Area Governments. He drove me to the Hyatt Regency Hotel in San Francisco, where I was scheduled to give the keynote address at the ABAG General Assembly. We went into Grand Ballroom A on the first floor, where I was introduced by Donald Dillon, the outgoing President of ABAG. I then gave my address, "Energy Supply: Can Technology Do It?" which was well received.

Among the people that I met were Revan A. F. Tranter, Executive Director of ABAG; Rudy Platchek, Chief Planning Officer for ABAG; Jim Turner, City Manager of Albany; Lou Howell, Mayor of Albany; Fred Cooper, Alameda County Supervisor; and Ed Sajor, Public Relations man with PG & E. After my talk, I gave a copy of the text to Charles Petit of the San Francisco Chronicle. Joe Bort drove me back to LBL.

Returning at 10:35 a.m., I went to the meeting of the Visiting Review Committee (program attached), which was just beginning, to hear the presentations of our staff members. Ghiorso spoke first on the SuperHILAC operation and outside user program. I then spoke on the program on new and superheavy elements, which included a description of the SHEIKS and TAVERNS work.

We had the luncheon meeting of the SHEIKS and TAVERNS in my office. Present were Kratz, Norris, Otto, Binder, Nurmia, Raunemaa, and Williams. Norris reported on their last U-Ar bombardment to work out the beam current measuring device and to obtain the isotope distributions in yttrium and gold. We also discussed a proposed program of SuperHILAC bombardments (copy attached). Kratz suggested we present a paper on our results at the conference on complex reactions at Nashville in June, and I agreed; I may also present a paper at the ACS meeting in September.

Nurmia reported on their experiments on the formation of tungsten isotopes. We agreed to look for light mass tungsten alpha emitters and also tantalum and rhenium isotopes. Otto reported on his gas chromatography experiments on tungsten fluorides, etc. After the meeting, he asked me if we could put Taisto Raunemaa on the payroll, and I said I would look into it.

I joined the Visiting Committee in the cafeteria and talked to John Burnett, who told me that George Rogosa had been forced to turn down Van Tuyl's request for the support of Jack Ryan because Van Tuyl had called and asked for $60,000.

Sheila

LAWRENCE BERKELEY LABORATORY
Room: 3307 Bldg.: 70A Ext.: 5670

62a

14 February 1974

MEMORANDUM

TO: Group Leaders and Speakers

RE: Arrangements for Visiting Committee

Here is the program for the Visiting Committee:

Thursday, 2-21-74

09:00	Pick-up at Durant and Faculty Club
09:15-10:30	Discussions with G. T. Seaborg and myself
10:30-11:00	A. Ghiorso: SuperHilac operation and Outside User Program
11:00-11:30	G. T. Seaborg: New and Superheavy elements
11:30-12:00	R. M. Diamond/F. S. Stephens: Their research
12:00-12:30	R. Marrus: Atomic physics at SuperHilac
12:30- 1:15	Lunch
1:30- 2:00	D. J. Clark: 88" Cyclotron operation and development
2:00- 2:30	J. Cerny: His research
2:30- 3:00	D. K. Scott: Heavy ion experiments
3:00- 3:30	H. E. Conzett: Polarization, few-nucleon experiments
3:30- 4:00	N. K. Glendenning: The Theoretical Group

Friday, 2-22-74

08:30	Pick-up
08:45-09:30	Executive session
09:30-10:00	M. C. Michel: Beam foil spectroscopy
10:00-10:30	W. M. Garrison: Radiation chemistry
10:30-11:00	S. G. Thompson/L. G. Moretto: Heavy ion experiments
11:00-11:30	D. A. Shirley: His research
11:30-12:00	J. M. Hollander: Energy and Environment at LBL: The rôle of Nuclear Chemistry
12:30- 1:30	Lunch
1:30- ?	The Committee will break up and visit laboratories and accelerators.

By request of the Chairman, the audience in the Building 70A Conference Room will be limited to Nuclear Chemistry Group Leaders, but members of a group should be present during the presentation of their work.

Bernard G. Harvey

BGH/eee

SHEIKS

PROPOSED HILAC IRRADIATIONS, FEBRUARY - MAY, 1974

Att'd to 2/21/74

I. BINDER, J. KRATZ, T. NORRIS

19 FEBRUARY 1974

	TARGET	FORM	INCIDENT PARTICLE	ENERGY MeV/A	INTENSITY	DURATION	PURPOSES
1.	^{238}U	LLL 30 mg/cm²	^{84}Kr	7.2	2 μA	24 hr	SHE search, particularly Pb fraction with fragment energy measurement. Use depleted ^{238}U for ^{235}U σ via γ-rays. Additional LASL sample
	IF RESULTS ARE POSITIVE, THEN:						
2.	^{238}U	LLL 30 mg/cm²	^{84}Kr	7.2	2 μA	1 week	SHE search. Additional Pb chemistry. Add neutron counting? LASL actinide sample
3.	^{238}U	0.5 mil foil	^{40}Ar	7.2	0.3 μA	2 hr	Complete chemistry for σ measurements, with emphasis on A ≈ 60.
4.	^{197}Au	0.5 mil foil	^{84}Kr	7.2	2 μA	2 hr	Complete chemistry for σ measurements.
5.	^{238}U	LLL, ~2 mg/cm², plus Al foil stack	^{84}Kr	7.2 6.5 6.0 5.5 5.0 4.0	2 μA	2 hr, each energy	Excitation function measurements. Heavy rabbit car products will be stopped in thin Al catcher foils and γ-ray counted directly. Au and Y chemistry will be performed on the thick Al foil at the end of the Al foil stack.
6.	^{238}U	LLL, 30 mg/cm²	^{132}Xe	7.2	2 μA	2 hr	SHE search, full chemistry, σ measurements.
7.	^{238}U	LLL, 30 mg/cm²	^{132}Xe	7.2	2 μA	24 hr	SHE search. LASL actinide sample.
8.	^{197}Au	THIN Au plus Al foil stack	^{84}Kr	7.2 6.5 6.0 5.5 5.0	2 μA	2 hr, each energy	Excitation function measurements for heavy rabbit car, fission. Chemistry required. I. BINDER

I telephoned the SAN office and talked with Anthony Vergari, inviting them to send anyone they would like to sit in on the Visiting Committee meetings.

At 1:35 p.m., I met in my office with Art Poskanzer and Jack Winchester to go over the list of prospects for our environmental chemist position. Winchester made a number of quick appraisals, as follows: John Cooper--not an environmentalist; Royce Filby--good geochemist; Adon Gordon--good in measurements; Bernd Kahn--not a world leader; E. L. Kothny--not for us; Kurt Kraus--interesting possibility; Jarvis Moyers--high opinion; Glen Gordon--very good; and Lou Rancitelli--good. James Lodge is out of a job due to the close-down of the chemistry work at the National Center for Atmosphere Research. Dick Perkins, a man in his 40's, is Winchester's first choice and he said we should get him. Kenneth Rahn, a young postdoctorate, would be a good member of the group, taught Weselowski what he knows, and is a man that we should get. Winchester said he will give this further thought and then meet with Poskanzer on Saturday morning to go over the situation again.

I walked to Lewis Hall to attend the Graduate Research Conference. The first speaker was Robert A. Rubin, who spoke on "DNA Synthesis in Drosophilia." The other speaker was Joel L. Levinson, who spoke on "Collective and Macroscopic Phenomena in the Reaction of Heavy Ions with Silver." I prepared my evaluation forms on both (copies attached). After the seminar, I walked back up the hill and mailed to H. Burnham Tinker a letter supporting the nomination of Paul Kuroda for the Midwest American Chemical Society Award (attached).

At 6:30 p.m., I drove down to the Faculty Club to attend the dinner of the Nuclear chemistry Division Visiting Committee. Present were committee members Gerhart Friedlander (chairman), J. C. D. Milton, Jacob Bigeleisen, Jack Winchester, John Blair, and Stanley S. Hanna. Also present were John Burnett and A. Blair of the AEC, as well as Andrew Sessler, Earl Hyde, David Templeton, David Shirley, and Richard Diamond. During the dinner, Sessler told me that he and Hyde met with James Born last Friday afternoon to tell him he is being terminated as Director of Donner; this led to an explosion from John Lawrence, Glenn Campbell, Ed Teller, and others.

Friday, February 22, 1974 - Berkeley

At 8:30 a.m., I met with John Burnett to go over our 189 forms. He said we have a good chance of getting support for the two programs submitted to Rogosa's Division. We also discussed the problem of funding for Jack Ryan's participation in the revision of Chemistry of the Actinide Elements, and Burnett will look into this. I took him by to see Nugent and Edelstein, then he went to hear the remainder of the Visiting Committee's meeting.

I went to the SuperHILAC Research Progress meeting. Nitschke reported on his infrared sensor for the determination of target heating and temperature. Tsang reported on his and Swiatecki's latest calculations on the fusion of heavy nuclei as affected by frictional forces.

SEMINAR EVALUATION

Student [illegible] Seminar Date February 21 Prelim Committee Member [illegible]

Please briefly describe below your opinion of the major strengths and weaknesses of this seminar presentation. Such subjects as A) organization, B) clarity of expression, C) depth of understanding, D) level of achievement, E) critical awareness, and audience response might be considered.

The content of his talk seemed to be good but he displayed apparent nervousness and some hesitation in his presentation. He spoke with his back to the audience at times; however I would guess that he will overcome such deficiencies of presentation with more experience.

Please evaluate below the overall performance of this student compared to others at this stage in their careers.

Superior Excellent (Good) Mediocre Poor

Please return completed evaluation form to 419 Latimer

Please return Friday, Feb 22

63b

SEMINAR EVALUATION

Student [illegible] Seminar Date February 21 Prelim Committee Member [illegible]

Please briefly describe below your opinion of the major strengths and weaknesses of this seminar presentation. Such subjects as A) organization, B) clarity of expression, C) depth of understanding, D) level of achievement, E) critical awareness, and audience response might be considered.

Overall it was an adequate, perhaps good, seminar. His organization was good (perhaps too good because he read part of his talk), clarity of expression was very good, depth of understanding difficult to assess and level of achievement at least average for this stage of his development. He handled the questions fairly well. His reading of the first part of his talk indicates some lack of confidence, but presumably he will overcome this with more experience.

Please evaluate below the overall performance of this student compared to others at this stage in their careers.

Superior Excellent (Good) Mediocre Poor

Please return completed evaluation form to 419 Latimer

February 21, 1974

Dr. H. Burnham Tinker
Chairman, Midwest Award
Monsanto Company
800 North Lindbergh
St. Louis, Missouri 63166

Dear Dr. Tinker:

I am writing in support of the nomination of Professor Paul K. Kuroda for the Midwest American Chemical Society Award.

I have followed the work of Professor Kuroda since he came to the United States from Japan more than twenty years ago. He has established an outstanding reputation in radiochemistry, geochemistry, and nucleosynthesis. He is especially well known for his work on the identification of naturally occurring short-lived isotopes produced in the spontaneous fission of uranium and for his analysis of the natural occurrence of such extinct isotopes as iodine-129 and plutonium-244. In these and related areas of investigation of naturally occurring radioactive isotopes, he is perhaps preeminent in the world.

He has demonstrated his ability as a teacher by the large number of excellent graduate students who have obtained their advanced degrees under his direction.

I strongly recommend Professor Kuroda for the Midwest Regional American Chemical Society Award.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

Friday, February 22, 1974 (con't)

I had lunch in the cafeteria with the Visiting Committee, then attended the meeting of the Chem 1B instructional staff.

Returning to my office, I called Jesse Johnson in Washington and described to him the interest of GEOMET and its President George Milly in securing the services of Philip Merritt. I asked him to encourage Merritt to talk with Milly and to take him seriously when he calls. I then called George Milly to report on this conversation. He said that he has already met with Philip Merritt. He indicated that New Court Securities appears to be highly encouraged, first by the possibility of getting Merritt involved, and also because Texas Gulf is ready to sign a contract to take over our property in Wyoming. Milly said that he will call Johnson immediately.

I received a call at 2:55 p.m. from Edward Thomas in San Francisco, who had seen the coverage of my ABAG talk on television last night. He is trying to get financing for a small company in Connecticut which is trying to develop a synthetic fiber which will be totally recyclable. They need a big industrial partner for this, and he asked if I could suggest who he might contact. I indicated that I didn't know where he might go in terms of government agencies, unless Interior was a possibility. As a longshot, I suggested Dr. Hammer.

At 3:00 p.m., I received a call from Val Williams of the UC Audio News Service. I taped for him some of the highlights of my speech "1994?" which will be given at the World Future Society Symposium at the AAAS Meeting next week.

I called Alice Thompson to inquire about Stanley's status after his bladder operation yesterday and then called him at Alta Bates Hospital. The operation went very well and the prognosis is good.

I received from Craig Hosmer a nice letter of appreciation in response to mine about his plans to retire from the House of Representatives. I wrote John Erlewine a letter of congratulations upon his having been appointed General Manager of the USAEC, succeeding Bob Hollingsworth. I received and acknowledged an invitation from G. K. Skriabin (Acting Chief Scientific Secretary, Praesidium of the USSR Academy of Sciences) to attend the 25th anniversary celebrations of the Academy in May 1974, which I had to decline.

After their last session, Harvey and I met in my office with the Visiting Committee. I told them that we want their assessment of the strengths and weaknesses of our program. I said heavy ion research is our first priority. I said I feel we should build up our actinide chemistry group and they seemed to agree; Bigeleisen said he had talked to Edelstein and found him to be a very capable person.

I drove down to the Berkeley BART station, picked up Helen, and we drove to the Marriott Inn at the Berkeley Marina. Here we attended the annual student-faculty dinner of the Student Affiliates of the American Chemical Society. About 75 people were present, including: Professor and Mrs. William Miller (SAACS Faculty representative), Professor and Mrs. William Jolly, Professor and Mrs. Rollie Myers,

and Professor and Mrs. Norman Phillips. Helen and I sat at a table with Thomas Bernard, President of SAACS. After dinner, I gave my talk; my subject was "Journey to China," illustrated by about 75 slides. The students seemed to be intensely interested.

Dianne was home today with a bad cold or flu.

Saturday, February 23, 1974 - Lafayette

I called Sol Linowitz at his home in Washington at 3:00 p.m. to tell him about the conversation I had three days ago with Thomas Sherwood. I told Sol that the purpose of my call was to caution him; I do not necessarily believe that Sherwood's informants, advocates of above-ground retorting, are totally unbiased. Sol said that Hammer is scheduled to confer with Bill Simon next week and he will let me know the results. Apparently, the AEC is prepared to spend substantial funds (perhaps $50 million) investigating the process, and I indicated that this is probably still appropriate.

Suki and I took a hike around the rim trail at the Reservoir. Dianne had a fever of 104°F today.

Sunday, February 24, 1974 - San Francisco - Lafayette

After lunch, Helen and I drove to San Francisco and checked into room 960 of the Hilton Hotel. Helen went to the women's hospitality lounge for the AAAS to serve as hostess at the Family Activities information center. I registered for us and Yoshie Kadota (who can't attend herself) for the AAAS Meeting, which is being held this week in San Francisco. I met a number of people, including Ann Miller, Mrs. Palmitier and Joan Cochran of ARCS, and Barbara Huff, a friend of Jane Kingston. I also met Devendra Lal and invited him to visit the SuperHILAC on March 4.

When Helen finished her work, we visited our hotel room for a few minutes, then left to spend the night in Lafayette.

Monday, February 25, 1974 - Berkeley - San Francisco

I attended the Chem 1B lecture, which was given by Professor William Gelbart because Pimentel is in Europe.

At 10:35 a.m., I returned a telephone call to Joyce Burr. She told me that the EBRPD Board will meet on March 5. At that time, CUWA might try to get onto the agenda to get the Park District to acquire the Villa Mira Vista land (the development which Ed McMillan's lawsuit has just stopped). I agreed with her that CUWA should definitely get involved. She will poll the membership by telephone and prepare a letter for my signature which will be presented at the Board meeting.

I then returned a call to Edwin McMillan. He said that the judge ruled that the plan for the development was in general violation of the plan of the City of Richmond. The response of the City Council now will be to modify the plan so that the development matter can be brought up again. In the meantime, they hope the Park District will try to acquire this land immediately.

I responded to an invitation from Melvin Laird to attend a meeting of the Advisory Council of the American Enterprise Institute National Energy Project in Washington on March 14 (on the basis of which I will decide whether or not to accept his invitation to become a member of the Council).

I held my office hour and worked some problems for Ann Thor, then had lunch with the Chemistry Department faculty. After, I taught my lab section from 1:10-2:40 p.m., then I drove to the Hilton Hotel in San Francisco. Here I met with Russell Train and his three assistants, Jim Oberwetter, John Burns and Andy Arndt.

At 4:30 p.m., I introduced Train to the crowd in the Imperial Ballroom, and he gave his talk, "Environment Today." CBS-TV was present to record excerpts of his talk, which was very well received.

Helen arrived and drove me to the de Young Museum in Golden Gate Park, where we and the William Hewletts hosted the Co-Chairmen's Reception for attendees at the AAAS Meeting. The crowd of 3-400 people included: the Edward L. Bennetts, Russell Bergs, Irwin Binder, Philip Boones, Ian Campbells, George Cardinets, Ann and Bill Chilcote, Edith and Norman Coliver, Ray Colvigs, Lee Davenports, William Dickinsons, Norman Edelsteins, Sanford Elbergs, Joseph Engbecks, William Evers, Jay Fromans, Robert Gros, Jack and Margie Hollander, Garth Hulls, Allan Jacobs, Jane Kingston and Dave Richards, Frank Koches, Jens Kratzes, Stanley Larsens, Manfred Lindners, Edward Lofgrens, Kenneth Mallorys, George Maslaches, William Myers and his wife Michal Artzy, Ted Norris, Robert Orrs, Roland Ottos, Tom and Barbara Parsons, John Saunders, Sheila Saxby, Andrew and Gladys Sessler, Gunther Stent, David Stewarts, David Templetons, Frances Townes, Carl Trexels, Howard Vespers, Victor Violas, David Wallaces, Bob and Sue Watson, Edgar Wayburns, Edward Wenk, Dan and Evelyn Wilkes, Kim Williams, Mason and Patricia Willrich, and the Meredith Wilsons.

There from the AAAS staff were: Leonard Rieser, Roger Revelle, William Golden, Margaret Mead, William Bevan, Lewis Branscomb, Ward Goodenough, Caryl Haskins, Richard Trumbull, Hans Nussbaum, Philip Abelson, Richard Scribner and Harve Carlson.

After the reception, Helen drove home to take care of Dianne and I stayed at the Hilton.

<u>Tuesday, February 26, 1974</u> - San Francisco

I had breakfast in my room, then went down to the Francisco-Cabrillo Room to preside over the first session of the Co-Chairmen's Symposium, "The San Francisco Bay Area: Looking Toward the 1990's." I opened the Symposium at 8:40 a.m. with facilities for recording by KPFA (Bonnie Maly) and KQED-radio (Gene Parrish) on hand and operating; they recorded the entire two-day Symposium, with KQED broadcasting it directly over the air.

I introduced G. J. Bongard (Chief Economist, Pacific Telephone & Telegraph, San Francisco) as the first speaker who spoke on "Bay Area Population Trends," illustrated by slides. After one question, I went

on to introduce Carl A. Trexel (Group Manager, Energy Economics Division, Stanford Research Institute, Menlo Park) who spoke on "Energy Use in the Bay Area." Oil and gas supply 90% of the energy in California. By 1990, this should be 80% with nuclear energy contributing 15% (equivalent to 700,000 barrels per day of oil).

I next introduced James E. Vann (Architect, Manager for Technical Operations, Housing Allowance Demand Experiments, Abt Associates, Cambridge, Massachusetts) who spoke on "Housing Needs and Directions: A Regional Perspective." After this, Allan B. Jacobs spoke on "Quantity vs. Quality in the Urban Environment."

I brought the morning session to a close with some remarks about the success of the session and invited the radio audience to come to the remainder of the Symposium. I was then interviewed by Gene Parrish on the reason for the Co-Chairmen's Symposium.

I took a taxi, with Mr. and Mrs. Harvey Perloff (UCLA School of Architecture and Urban Planning) to the Sheraton-Palace Hotel. Here I went to the Garden Room for the luncheon of the Symposium on "Architecture and the American Future: The Coming Showdown," organized by Nathaniel Owings. Nat introduced me to Mrs. Fairfield (Marjorie) Osborne, Bill Reilly (President of the Conservation Foundation), and Archibald Rogers (President of the American Institute of Architects).

After lunch, Alf Heller (of California Tomorrow and son of Ellie Heller) introduced Owings, who gave his talk "The Coming Showdown." I then gave my prepared talk "Technology Can Do It."

I walked back to the Hilton, where I ran into Guy Stever. I persuaded him to accompany me to the Exploratorium to attend the public meeting of the AAAS Committee on the Public Understanding of Science. I participated along with Frank Oppenheimer (Director, The Exploratorium), David Perlman (Science Writer, San Francisco Chronicle), Michael Ambrosino (Executive Producer, WGBH-TV, Boston), Amitai Etzioni (Director, Center for Policy Research, Professor, Department of Sociology, Columbia University), and James C. Butler (Director, Communications Programs for the Public Understanding of Science, AAAS, Washington, D.C.). Ken Thimann opened the meeting and introduced me, and I made my Introductory Remarks. I stayed for the talks by Oppenheimer, Perlman and Ambrosino.

At 6:45 p.m., Aunt Christine Seaborg came to the Hilton and Helen and I took her to dinner in Henri's Room on the top floor of the Hotel. Helen dropped Christine off at the Palace Hotel on her way home to Lafayette; I spent the night at the Hilton.

There arrived at the office today a 16-inch globe depicting the Martian surface. Sheila had brought in a letter for me to sign, thanking Jim Fletcher at NASA for the globe and commending the Mariner 9 orbital mission.

Wednesday, February 27, 1974 - San Francisco

I had breakfast in our room, then went down to the Franciscan Room to check on the Co-Chairmen's Symposium. I then walked to the

Wednesday, February 27, 1974 (con't)

Fairmont Hotel to attend the Symposium on Energy Economies in Building Design sponsored by PG & E and the California Council for Environmental and Economic Balance. I talked with Shermer Sibley, who agreed with me that the energy problem is very serious and that the White House would do well to adopt a Churchillian attitude of "blood, sweat and tears."

Sibley opened the Symposium with some welcoming remarks and introduced Edmund G. (Pat) Brown, who acted as moderator. He described the organization and function of the Council, then J. Y. De Young (Vice President, Commercial Operations and Coordinator of Energy Conservation Planning, PG & E), who spoke on "Energy Outlook in Northern and Central California." He emphasized the shortage of oil and the delays in construction of and finding sites for nuclear power plants.

Next Brown introduced Dr. Erwin Stelzer (President, National Economic Research Associations, Inc.) who spoke on "Economic Effects of the Energy Crisis." He began by saying he hated to address a crisis which President Nixon, "an unimpeachable source," has said doesn't exist. He seemed to indicate an increasing supply of oil and hence a diminishing problem in the future; he feels higher prices will lead to the discovery of considerably more oil at the price of $7-8 a barrel.

I left at 10:00 a.m. and walked back to the Hilton where I heard Charles Hitch speak on "Future of Higher Education in the Bay Area." I met Renee Schneider and her friend Shirley Barsha.

I then went up to Bevan's suite to meet with the Latin American group. Present were Carlos Perez Martinez (Colombia), Jose de Magalhães Pinto (Brazil), Edmundo de Alba (Mexico), Rieser, Bevan, and Abelson. We agreed on the formation of a Coordinating Committee for the Associations for the Advancement of Science in the Americas. Perez will act as secretary and invite all the leading American countries to appoint representatives to the Committee, whether they have an Association for the Advancement of Science or not.

Louis Lazaroff came by and delivered a small calculator to me, a gift of Hahn of Korea (here at my invitation).

I then walked to the Sheraton-Palace Hotel to attend the luncheon of the World Future Society, given by DCM Associates and the Institute of the Future. Present were Roy Amara (President, Institute for the Future, Menlo Park), Margaret Mead (American Museum of Natural History, New York and President-elect AAAS), Theodore J. Gordon (President, The Futures Group, Glastonbury, Connecticut), Willis W. Harman (Director, Center for the Study of Social Policy, Stanford Research Institute, Menlo Park), John Platt (Mental Health Research Institute, University of Michigan, Ann Arbor)--all panel participants with me; other attendees were Edward Cornish (President, World Future Society, Washington), Ted Fry (Corporate Planners Association and Assistant to the President, Crown Zellerbach Company, San Francisco), William H. Brickner (Chairman, Management Department, San Jose State

Wednesday, February 27, 1974 (con't)

University), George T. Coker, Jr. (Exploratory Planning Branch, Shell Oil Company, San Francisco), Norman O. Gunderson (Director, Cybernetic Systems Program, San Jose State University), Ronald L. Hunt (Professor of Education, San Jose State; President, Hunt Productions; Co-Director, ADVENT Program, DCM Associates, San Francisco), C. Cameron Macauley (Director, Extension Media Center, UCB), Elizabeth M. Marvin (Founder, West Coast Independent Schools, Hillsborough), David C. Miller (DCM Associates; Adjunct Professor, Cybernetic Systems Program; Co-Director, ADVENT Program), Virginia Miller (DCM Associates), Arnold Mitchell (Social Economist, SRI), E. Riggs Monfort, III (Manager, Client Relations and Development, Long Range Planning Program, SRI), Peter Schwartz (Futures Research and Planning Consultant, Palo Alto), Harry W. Sigworth (Long Range Project Coordinator, Standard Oil Company of California, San Francisco), and Charles Spector (Assistant Vice President for Planning, Bank of California).

We then went to the Ralston Room for the Symposium on "Major Features of the World of 1994." Amara introduced me and I gave about 15 minutes of excerpts from my talk "1994?" Amara then introduced Gordon who gave a much more pessimistic paper than I did. He identified the crisis, between now and 1994, of (1) nuclear war, (2) food shortages, (3) deterioration of our biosphere, (4) imbalances in our distribution of wealth, and (5) deficiencies of energy sources.

Amara next introduced Dr. Platt, who spoke on the many shocks (food shortage, etc.) and the overcoming of these. The power of the nation state is giving way to the power of the multi-national corporation and multi-nation states. The treatment of women throughout the world is disgraceful. Unlimited economic growth must change to conservation of natural resources. We need new perceptions: (1) ecological ethics, personal ethics, (2) human potential movement, (3) existential component, and (4) cybernetic guidance (biopolitics).

Amara then introduced Harman, who emphasized that there is no single way of looking at the future. He stressed the many shocks that lie ahead. He spoke of psychic research data on strobe lights. All psychic phenomena, termed nonsense, require re-examination; a new metaphysics is emerging and should be taken seriously.

Amara then introduced Margaret Mead, who said we are in the first age when man could label his age while it was happening. Man has a tendency to forget pain. Within the next 20-25 years we are not going to conquer pollution, but will soon thereafter. Pollution of our air is a common worldwide danger. People should take a longer look into the future than they tend to; do this by knowing small children.

At 3:45 p.m., Amara threw the session open to questions from the floor. I was asked questions about how to change the US power structure; how we can reach a steady state society without helping the developing countries; prospects for advances in gerontology, cracking of genetic code, half-brain usage, extraterrestrial intelligence; how to develop the type of people depicted in my world of 1994; and how to accomplish the world I envisage through cooperation in science.

The session ended at 4:30 p.m. I met Helen and we joined Christine and her friends, Milly Ewald and Ada Salen in the Pied Piper Bar for a few minutes, then went up to the second floor of the Hilton to meet Ben Orlove at the Symposium at which he spoke.

After changing to our formal clothes, Helen and I walked to the Bohemian Club to attend the Past Presidents' reception and dinner. Present were the Riesers, Revelles, Bevans, Goldens, Bolts, Chauncey Starrs, Chauncey Leakes (the hosts), Caryl Haskins, Walter Roberts, de Alba, Perez Martinez, Goodenough, Ruth Davis, Margaret Mead, and Dael Wolfle. In the course of the evening everyone spoke, some very briefly, in the traditions of these dinners.

After dinner, Helen and I walked back with Margaret Mead. She indicated a great interest in my attempts to form international Associations for the Advancement of Science and said she hopes that I will continue to give this leadership. Helen and I learned that Bevan has accepted the William Few Professorship in Experimental Psychology at Duke University and will head a "Roundtable" there in Science and Society.

We went to the Imperial Ballroom where Revelle Introduced Rieser, who gave his Retiring President's address "The Role of Science in the Orwellian Decade." He did a very good job.

Helen and I then went to the Continental Room for the traditional reception and afterward went up to our room. Dianne is feeling better, so Helen spent the night at the hotel.

<u>Thursday, February 28, 1974</u> - San Francisco

Helen and I had breakfast in our room, then I walked to the St. Francis Hotel and went to the California West Room. Here I served as Chairman of the Symposium on "The Superheavy Elements" (program attached). I made some introductory remarks, using two summary slides. I then introduced G. Herrmann who spoke on "Review of the Search for Superheavy Elements in Nature." After the talk, Devendra Lal rose to defend his work; he still believes he may have found superheavy elements in moon samples. I mentioned Maly's recent observation of possible superheavy elements in the hafnium fraction from monazite; Herrmann doesn't believe this work.

I then introduced Ray Nix who spoke on "Outlook for the Stability and Possible Production of Superheavy Elements." He believes superheavy elements cannot be made by neutron capture and hence can not exist in nature, but he thinks it may be possible, under special circumstances, to make them by heavy ion bombardment. He emphasized the direct transfer mechanism $Pu^{244} + Zr^{96} \rightarrow 114^{300} + Ca^{40}$. He also focused on the reaction $Cm^{250} + Ca^{48} \rightarrow 116^{291} + 7n$.

Next I introduced Lewin Keller who spoke on "Predictions of the Chemical and Physical Properties of Superheavy Elements." He showed a Mendeleev Periodic Table of 1871 from Liebig's Annalen. We had a good discussion following Keller's talk. I then introduced Albert Ghiorso who spoke on "The SuperHILAC" and general attempts around the world to produce superheavy elements by heavy ion bombardments.

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I THE MATHEMATICAL & PHYSICAL UNIVERSE

The Superheavy Elements

Arranged by Glenn T. Seaborg
(University Professor of Chemistry, and Associate Director of the Lawrence Berkeley Laboratory, University of California, Berkeley)

Thursday, February 28 — **St. Francis, California West**

8:30 a.m. Chairman: Glenn T. Seaborg

Review of the Search for Superheavy Elements in Nature
G. Herrmann *(Prof. of Chemistry, Institut für Kernchemie, Universität Mainz, Mainz, Germany)*

Outlook for the Stability and Possible Production of Superheavy Elements
Ray Nix *(Staff Member, Univ. of California, Los Alamos Scientific Lab., Los Alamos, N.M.)*

Predictions of the Chemical and Physical Properties of Superheavy Elements
O. Lewin Keller *(Dir. of Transuranium Research Lab., Oak Ridge Natl. Lab., Oak Ridge, Tenn.)*

The Super Hilac
Albert Ghiorso *(Dir. of the Superhilac, Lawrence Berkeley Lab., Univ. of California, Berkeley)*

There are theoretical indications that superheavy elements in the range of atomic numbers 110 to 120 will have sufficiently long half-lives to be synthesized and identified. This symposium will include papers on the predicted nuclear stability and methods of synthesis of superheavy elements, their possible presence in nature, their predicted chemical properties, and accelerators that might be used to produce the heavy ions by which superheavy elements might be synthesized.

[Sponsored by AAAS Section B]

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Thursday, February 28, 1974 (con't)

The Symposium ended on schedule at 11:30 a.m. I then met with Robert Glass of Micro Futures, Bruce P. Kelly of The Energy Institute, and Brian Quickstadt. They described work on the production of hydrogen from water by catalyzed photo-decomposition; I said this is related to what Calvin is doing--they will send me more information.

I went to the Asia Foundation for the luncheon with the Asian delegates. Present were: Dr. B. R. Deolalikar (Operations Research Group, Sarabhai Industries, Ahmedabad, India), Dr. Y. Fukushima (Agricultural Section, Science Council of Japan, Tokyo), Dr. Hahn Sang Joon (Korean Institute of Science and Technology, Seoul), Dr. Yusof Hashim (Malaysian Agricultural Research and Development Institute, Kuala Lumpur), Dr. Quintin Kintanar (Biological Research Center, National Institute of Science and Technology, Manila), Dr. Devendra Lal (Director, Physical Research Laboratory, Ahmedabad, India), Dr. Lee Kum Tatt (Science Council of Singapore), Dr. Angha Sabhasri (Secretary-General, National Research Council, Bangkok, Thailand), plus Leonard Rieser, Roger Revelle, Margaret Mead, Philip Abelson, Irene Tinker (all from AAAS), and Louis Lazaroff of the Asia Foundation.

After we ate, I described the organization and functions of the AAAS and its recent move toward international involvement. I also described the meeting with representatives of Latin American countries and indicated that, as a result of this meeting, a similar Coordinating Committee might be set up hopefully with the initiative coming from our Asian guests present. I then called on each of the seven Asian guests to give an assessment of the situation with respect to broad scientific organizations in his country and to give a reaction to my proposals. They all expressed interest in the concept of a cooperative effort of some kind.

Lee made the point that the scientific groups in the Asian countries are weak and therefore it will be hard to get started with a cooperative movement. Lazaroff made the observation that it is his experience that Asian scientists need to know each other better. He also made the point that education is a general Asian problem and that relations with the People's Republic of China need to be generally explored.

Abelson thought the idea of a Pacific Pugwash (which I had suggested in my remarks) represented the best course. Attention was also called to the Pacific Science Association and the Pacific Free Trade Association (PFTA), which might serve as a model for what we have in mind.

Lazaroff said that the Asia Foundation would be willing to fund another meeting of this group that might be held in Asia if the representatives exhibit some interest in going ahead with a coordinating mechanism. I closed the meeting by saying we had been successful in opening the issue and that, if any further progress is to be made, the initiative must come from the Asians themselves.

At 3:15 p.m., Abelson and I walked back to the Hilton. He gave me a copy of Business Week with an unfavorable article about Dr. Hammer's business activities and a candid assessment of the prospects for his in situ oil recovery process.

Irwin Hepsman and Michael R. McConnell of Antioch College came by my room to talk to me about energy sources and the future after hearing my talk yesterday. Helen came back from her tour of East Bay museums at about 4:30 p.m.

At 5:00 p.m., we went with Jane Kingston and Dave Richards to the Asia Foundation to attend a reception for the Asian guests, Bob Swates (our host--Vice President, Asia Foundation), Harvey White, David Ridgway, the Scalapinos, James Cayton (an artist who showed us his ink wash art on display on the wall), Edith Coliver, Lazaroff, and the Revelles.

When we arrived, the Asian group was meeting to discuss future plans and, when this broke up, Hahn came to me and said that he had been chosen as the coordinator and that he will host a meeting in Seoul in October, 1974.

We then drove to the Mandarin Restaurant in Ghiradelli Square to attend the dinner sponsored by the American Academy of Arts and Sciences. I sat at a table with the Clayton Riches (Dean of the Medical School at Stanford), the Franklin Ebaughs (formerly Dean of the Medical School at the University of Utah; now at Stanford), the William Schwarzers, and Victor Rabinowitch. Others present included the Kenneth Pitzers, James Harts, Clinton Ballous, Bruce Ameses, Ralph Dorfmans (the head of Syntex), the Yuan Ren Chaos, Kenneth Thimanns, Roger Revelles, Melvin Calvins, Lincoln Constances, Robert Scalapinos, William Daubens, Linus Paulings, Luis Alvarez, and Dael Wolfle.

We had a Chinese banquet, then Murray Gell-Mann gave me a flowery introduction. I introduced Carl Djerassi who gave his talk on "Birth Control in the People's Republic of China: Promise and Delivery," which was well received. Then I introduced Professor Victor Li of Stanford Law School (who made comments about law or lack thereof and general conditions in China) and Dr. Ling Lie Wang (who spoke on her recent visit to China and brought out many of the same points that I do in my talks). I brought the meeting to a close by thanking the three speakers.

Friday, March 1, 1974 - San Francisco - Berkeley

Helen and I had breakfast in the Gazebo Room at the Hilton with Stan and Renee Schneider. We checked out of our room and met Professor Gunter Herrmann, who rode to LBL with us. On the way, he told me that Bernd Eichler, the East German chemist working at Dubna, has visited him at the University of Mainz; no recent progress has been made there on the superheavy elements and he is somewhat reserved on his estimate of the Dubna work on elements 104 and 105. Helen dropped us off at Building 70 and we went to the SHEIKS' lab. The lead fraction of the last Kr^{84} bombardment of uranium showed another (the third) high energy event this morning at 8:00 a.m. The new spontaneous fission counter showed this to have an energy of 45 Mev.

Friday, March 1, 1974 (con't)

I received a letter from John Unik of ANL (copy attached) expressing dissatisfaction with his lack of bombardments and suggesting a long one in March. I wrote Richard Trudeau, requesting that Citizens for Urban Wilderness Areas be given a place on the Board of Directors meeting agenda on March 19. We want to make a short presentation concerning Wildcat Canyon Park and the significance of the west slopes of Wildcat Canyon.

I had lunch with Herrmann, Kratz and Otto. Herrmann agreed that we can pay GSI for the pulse analyzer they bought for us and then we can keep it here.

Dick Frankel called at 2:05 p.m., as part of an informal polling of the Board of Directors of the Kevex Corporation, to report that he and Edward Woo have recommended the promotion to corporation officer status of Rolf Woldseth, David Porter and Gary Kramer, in recognition of their contributions in the past and potential for the future. They would each carry the title "Vice President of the Corporation." Accordingly, the Corporation would have six officers: President Frankel and five Vice Presidents--Woo, Cushing, Woldseth, Porter, and Kramer. I observed that this is a historic step, and Frankel agreed, indicating that it reflects the growth of the company. A change in salary has not yet been evaluated. I agreed to this action, and he said he would send me a copy of our announcement to the employees.

Colin Watanabe dropped in to see me at 2:30 p.m. to tell me that he has decided that he is not making any useful contributions in his work at the SuperHILAC and doesn't foresee any possibility of doing so and thus he would like to terminate his employment as of early next week. I told him that I was sorry that he felt this way, that people at the SuperHILAC feel that he is doing fine. However, he feels that he has made this decision and wants to carry it out. He will talk to Ghiorso and Nitschke on Monday.

Diana Lee came in at 2:45 p.m. to talk about the possibility--raised by Harvey in discussion with him--of transferring from Markowitz and working with either me or Rasmussen. I said I would let her know what our decision on this is.

Shortly before 4:00 p.m., Rasmussen and I rode down in the rain to the campus with Sheila. We went to Room 120 Latimer Hall, where we met Dr. William Evans (a postdoctorate at Cornell who obtained his Ph.D. with Fred Hawthorne at UCLA) and became acquainted with him by discussing his interests and research program. He is a candidate for an Assistant Professorship in the Department of Chemistry here and is interested in working with our group on the hill on actinide and lanthanide chemistry. He gave a talk, "Metallocarboranes: Synthesis and Structure of Polyhedral Molecules" to the Inorganic Seminar.

I called Darleane Hoffman to offer the actinide fraction of the impending large bombardment of uranium with Kr^{84} ions so they can work on it as they did with the previous bombardment. She is not sure they have the time for it and will let me know Monday morning; if she doesn't want it, she agreed I might offer it to Unik.

U of C-AUA-USAEC

ARGONNE NATIONAL LABORATORY

February 26, 1974

Dr. G. T. Seaborg, Director
Chemistry Division
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

Dear Glenn:

Since I have not heard from you recently regarding the proposed meeting of the SHEIKS which we discussed several weeks ago, I presume that there is some difficulty in finding a time for the meeting which is mutually agreeable to all. Since the Super-HILAC is now consistently achieving high currents of Kr, we are most anxious to have an irradiation on the Super-HILAC during March, and I would hope that our run would not be delayed because of this meeting. I am most concerned since I have recently been informed that Dick Diamond is currently scheduling the outside users for the month of March, and if we do not formally have time assigned to our experiment in the next week or so, our program will be delayed another month.

We initially would like to study the actinide elements produced as well as search for superheavies by bombarding a uranium target with krypton. As you know, we have been actively proposing to do this for several years. We have searched for actinides and superheavies in multi-GeV proton and electron interactions utilizing secondary reactions. Most recently, we have checked all of our chemical separations and counting systems by analyzing uranium targets which were irradiated in the Faraday cup during our recent in-beam experiments at the Super-HILAC. Through these early experiments we have gained some cross-section information as well as complete confidence in the methods we have developed. We would now like to begin, in earnest, a series of high-level irradiations in order to achieve the production levels necessary to see some of the more interesting activities. From our recent counter work, we have found that the fusion cross-sections are extremely low for 7.2 MeV/amu Kr, with a strong indication that the fusion cross-sections are sharply increasing with increasing bombarding energy. Therefore, we view the 7.2 MeV/amu irradiations as interesting from the standpoint of actinide-element production via multinucleon transfer reactions and setting much lower cross-section limits than previously obtained for the superheavies. Following this study, we would be most interested in studying the reaction products and mechanisms at 8.5 MeV/amu Kr, which should be available shortly. In addition to the

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actinide and transactinide elements, we also routinely measure the cross-sections for production of as many fission and transfer products as we can and thus achieve additional information of value in investigating the reaction mechanisms taking place.

After actively proposing these experiments for several years as well as spending a great deal of time developing both the chemical and counting techniques to be used specifically for this SHEIKS program, we were all quite disappointed to learn that the first good, high-level sample of actinides was sent to LASL rather than ANL for analysis. We strongly feel that through the large effort we have made in developing these techniques, we are the best prepared laboratory for such research.

Due to the press of time, let me make the following suggestions. First, that we schedule a long irradiation during the week of March 18 or 25. I shall fly to Berkeley with the target, supervise the irradiation, and bring the target back to ANL as soon as possible with me for processing and looking at activities with half-lives $\gtrsim$ 5 hours. While I am at Berkeley, as many of the SHEIKS as available can meet to discuss future directions. At this time, I would like to make firm plans to send Phil Horwitz, Carol Bloomquist and Kevin Wolf to the Super-HILAC for a week or two in April to study the production of shorter-lived actinides and transactinides in collaboration with your group. Hopefully, the 8.5 MeV/amu beam may be available at this time. If it is not, then we would propose to do the work initially at 7.5 MeV/amu. We can bring much of the chromatographic columns and counting equipment with us as necessary in April. However, it will be important to find out in our earlier meeting in March what equipment is available at LBL for our use and what equipment we must bring with us.

Please let me know as soon as possible if these suggestions are acceptable to you. If they are, then I shall immediately try to get a firm date in March for our first irradiation, and we can then find out which other SHEIKS participants will be available to meet at Berkeley a day or so prior to this irradiation.

Sincerely yours,

John

John P. Unik
Chemistry Division

JPU:st

Helen drove me home. We changed to formal clothes and drove to the Lawrence Hall of Science through rain. Here we attended the Northern California Chapter Dinner of the ARCS Foundation in honor of the American Association for the Advancement of Science. As honored guests, Melvin Calvin, Hans Mark, Margaret Mead, L. C. Pakiser, Leonard Rieser, Carl Sagan, Guyford Stever, Jerome Weingart, Marina Whitman, and I were present. William Hewlett, Watson Laetsch, Molly Lawrence, and Harvey White attended as Special Guests. There were about 175 people present (list attached).

In the after dinner program, Joan Cochran made some welcoming remarks, Carl Sagan made some remarks about the importance of science, and the honored guests were introduced and presented with a plastic cylinder with a tree-like pattern induced by electron bombardment.

Dianne's cold was considerably better today. Steve left during the day and drove back to Davis with his friend Steve, who had stayed with him at our house during Helen's and my stay in San Francisco.

Saturday, March 2, 1974 - San Francisco - Lafayette - Berkeley

Right after lunch, Helen and I drove to Potrero Hill Junior High School in San Francisco where I was scheduled to talk at a conference session of the Bay Area Learning Center. My talk, "A Journey to China," illustrated with 78 slides, was followed by a question-and-answer period. Gloria Chew introduced me and presented me with a ceramic teapot made in the People's Republic of China, with an inscription on the side, "The plums of spring rejuvenate one's spirit once more." Helen and I met Mei Huang of the Center for Chinese Studies at Berkeley. The audience of 30-40 consisted of junior and senior high school teachers and seemed quite interested.

Today is Helen's birthday. I gave her a scarf and a box of Sees candy. Steve called to extend his good wishes.

After dinner, Helen and I drove to the Earl Hyde home in Berkeley to participate in the celebration of their 25th wedding anniversary (January, 1949) and the 25th anniversary of his start to work at LBL (February 1, 1949). Present were the Sesslers, Batzels, Rasmussens, Streets, Harveys, Poskanzers, Diamonds, Nurmias, Swiateckis, Edward Bennetts, and Sherman Maisels. The evening included folk and square dancing, but Helen and I didn't participate.

Sunday, March 3, 1974 - Lafayette - San Francisco

After dinner, Helen and I drove to San Francisco to KQED Channel 9 to participate in "Call In" during Membership Week. After talking to Jonathan Rice, Station Manager, we joined those taking phone calls of people calling to pledge financial support. At 8:05 p.m., George Dusheck interviewed me on camera. In answer to questions, I told of my early service in 1953, before KQED started in 1954, on the faculty educational TV committee at Berkeley with Donald Coney as chairman, the resistance of some faculty to the concept of educational television, the membership of the Seaborg family in KQED from the beginning to the present, including our 10 years in Washington (where we couldn't receive San Francisco Channel 9 due to interference from

ARCS FOUNDATION, INC.
BENEFIT DINNER
FRIDAY, MARCH 1st, 1974

ALDRICH, Mr. Vernon 28
ANDERSON, Mr. Wally 11
ATKINS, Mr. & Mrs Victor 4

BAKER, Mrs. Wakefield 6
BECHTEL, Mr & Mrs Kenneth 7
BEHRENS, Mr & Mrs Earl 5
BEHRENS, Mr & Mrs Richard 14
BODENSON, Mr. Fred 23
BOWES, Mr & Mrs John 2
BOWLES, Mr & Mrs John 1
BROOKS, Miss Brenda 23
BURKE, The Hon & Mrs Lloyd 24
BURKE, Mr. William 32
BURNETT, Mrs. Sidney 17

CALVIN, Dr & Mrs Melvin 5
CARLSON, Mr. James 32
CARMICHAEL, Mr & Mrs 19
CARPENTER, Mrs. Lewis 18
CARRODUS, Mr. & Mrs John 21
CASEY, Mr & Mrs Lyman 22
CASTLEMAN, Mr & Mrs. William 22
CATRON, Mr & Mrs Courtney 11
CEBRIAN, Mrs. Louis 33
CHICKERING, Mrs. A. Lawrence 29
CLAY, Mr. John 25
COCHRAN, Mr & Mrs Dwight 6
COCHRAN, Mr & Mrs Joseph 1
CONTENT, Mr. Robert 8
COOK, Mrs. Philip 16
COOK, Mr. & Mrs. Ransom 4
CROCKER, Mr & Mrs Charles 16
CUTLER, Mr & Mrs Leonard 9

de DAMPIERRE, Mrs. Genevieve 33
de SANZ, Mr. Juan 33
de TRISTAN, Mr. Marc 16
DUNHAM, Mr & Mrs Laurence 22

EHRLICH, Mr & Mrs John 27
ESCHER, Mr & Mrs Thomas 29
ESTLER, Mr. William 18

FAY, Mr & Mrs Paul Jr. 25
FOLGER, Mrs. Mojie 29
FURTH, Mr & Mrs Alan 19

GETTY, Mr & Mrs Gordon 22
GINZTON, Dr & Mrs. Edward 17
GOODRICH, Mr & Mrs Judson 31
GRANT, Mr & Mrs Spencer 10
GRIFFIN, Mr & Mrs. Donald 16
GRIFFIN, Mr & Mrs Percy 26
GRIFFINGER, Mr & Mrs Theodore 27

HAMMOND, Mr & Mrs Donald 9
HARTNESS, Mrs. L Weeks 11
HARTSHORNE, Mr & Mrs Richard 30
HARTZELL, Mrs. Edwin 18
HAYWOOD, Mrs. Marshall 25
HEARFIELD, Mr. David 18
HEIMBUCHER, Mr & Mrs Clifford 17
~~HELMHOLZ, Mr & Mrs Carl 24~~
HEWLETT, Mr & Mrs William 4
HINE, Dr. & Mrs Charles Henri ~~2~~
HOGGARD, The Rev & Mrs Robert 32
HOWELL, Mr & Mrs Warren 11
HUDSON, Dr. Fred 18
HUNTINGTON, Mr & Mrs John 14

JAMESON, Mr & Mrs Owen 11
JAMPOLSKY, Dr. Gerald 12
JENSEN, Mr. Jonathan 29
JOHNSON, Mr & Mrs Lloyd 15

KUHN, Mr. George 29

LAETSCH, Dr & Mrs Watson 19
LaFOLLETTE, Mr & Mrs Charles 12
LANG, Miss Phyllis 32
LAWRENCE, Mrs. Ernest 6
LI, Dr & Mrs. C. H. 5
LOGAN, Mr & Mrs John 10
LUDWIG, Mr & Mrs James 27

MAC KAY, Mr & Mrs Barry 21
MAC LEELAN, Mr & Mrs Charles 15
MARK, Dr & Mrs Hans 1
MARTHEDAL, Mrs. Louisa 20
MATLAY, Mr. Geoffrey 20
MATTEI, Mrs. Albert C. 3
McCAVDRICK, Mr & Mrs John 26
McCLOUD, Mr & Mrs James 14
McILROY, Mr & Mrs Malcolm 30
McQUILKIN, Mr & Mrs John H. 30
McVICKAR, Mr & Mrs Malcolm 31

MEIN, Mr & Mrs Gardner 23
MERRIAM, Mr & Mrs John 19
MERRILL, Mr & Mrs Harvie 28
METCALF, Mr & Mrs Lawrence 14
MEYER, Mr & Mrs Horst A. 7

MILLAR, Mr & Mrs Ward 10
MILLER, Prof John David 3
MILLER, Miss Marian 32
MILLER, Mr. Otto 3
MILLER, Mr & Mrs Richard K. 2
MORCH, Mr. Albert 23
MORIARITY, Mr & Mrs William 24
MORRISON, Prof & Mrs 27

NALL, Mr & Mrs Donald 25
NASSER, Mr & Mrs Theodore 26

OLIVER, Dr & Mrs Bernard 8
ORR, Miss Robin 25
OSGOOD, Mr & Mrs Edgar 21
OTTO, Mr & Mrs Alfred, Jr 2
OWEN, Mr & Mrs Frank 18

PAKISER, Dr & Mrs L. C. 7
PARMENTER, Mr & Mrs Derek 12
PARMENTER, Miss Letitia 20
PARSONS, Mrs. Sherill 28
PATMONT, Mr & Mrs Robert 31
PETIT, Mr & Mrs Charles 29
PEAU, Mrs. Spencer 23
PHILLIPS, Mrs. Soto-Hall 10
POPE, Mr & Mrs George 16

QUIGLEY, Miss Joan 9
QUIGLEY, Miss Ruth 8
QUIRKVIS, Mr. Edward 20

REED, The Rev Thomas 5
REID, Mr & Mrs Thomas 15
~~REYNOLDS, Dr & Mrs Roger 35~~
REYNOLDS, Mrs. Ralph 20
RICHTIN, Dr & Mrs Eberhard 9
RIDSER, Dr & Mrs Leonard 8
ROCKRISE, Mr. George 23
ROSENBANS, Mr & Mrs John 15
ROSS, Mrs Adalene 21
ROTH, Mrs. William P 3
RUSSELL, Mr. Donald 3
RUSSELL, Mrs. Donald 6

SAGAN, Dr & Mrs Carl 2
SAINT. AUBYN, Mrs Cassell 18
SCHLENDORF, Mrs. Betty 23
SCHOENBORN, Mr & Mrs F. Karl 1
SEABORG, Dr & Mrs Glenn T. 3
SHUMATE, Dr. Albert 9
SNODDY, Col & Mrs Clavert 28
SOONG, Mrs. T. A. 5
SOTO-HALL, Dr. Ralph 10
SPROUL, Mr. & Mrs John 20
STARR, Miss 32
STEVER, Dr. H. Guyford 6

TAAY, Mrs. Anne 26
TIDMARSH, Ms. Susie 7
TOBIN, Miss Patricia 20
TOWNSEND, Mr & Mrs Charles 24
TOWNSEND, Mr. Larry 20
TOWNSEND, Mrs. Stephen 25
TRAIN, General & Mrs William 23
TUCKER, Mrs. Nion 7

VARIAN, Mrs. Russell 17
VIETOR, Mr & Mrs John 33

WEINGART, Dr.Jerome 4
WELISCH, Mr & Mrs J. C. 31
WHITE, Dr & Mrs Harvey 17
WHITE, Mr & Mrs Ian 12
WHITMAN, Dr. Marina 12
WHITRIDGE, Mr & Mrs Frederick 6
WICKERSHAM, Mr & Mrs James 30
WICKETT, Mr. Walt 33
~~WINSTON, Mr. Frank 35~~
WITTER, Mrs. Dean 3

ZIEGLER, Mr. Carl 21
ZINGMAN, Mrs. Irene 4

Washington's Channel 9), my role in the ten educational TV programs on "The Elements," made in 1956, including three programs on the synthetic elements shown to millions of high school students affording the only filming of Ernest Lawrence (and now shown to visitors to the Lawrence Hall of Science).

Among the staff members Helen and I met were Matha Glessing, Membership Director, and Jean Alexander, in charge of Focus, the programming magazine, and sister to our neighbor Ken Alexander. We left at 8:20 p.m. and drove home. We learned from Dianne that she had seen us during our appearance on KQED.

Monday, March 4, 1974 - Berkeley

I called Darleane Hoffman at LASL at 8:30 a.m. She told me that they are too busy to work on the actinide fraction from the impending bombardment of uranium with krypton ions. I then called John Unik at ANL and offered it to him; he will check to see if they can handle it and call me back.

I attended Pimentel's Chem 1B lecture from 9:10-10:00 a.m.

Richard Hewlett (USAEC Historian) called me from Washington at 10:25 a.m. to tell me that a classification review team is at Berkeley and he wondered if I would like to have them review my materials at Livermore. Apparently this is a one-time effort on their part. I said I would give it consideration.

Robert Thorne called me at 10:30 a.m. to tell me that he is leaving as Manager of the AEC San Francisco Operations Office to become John Erlewine's Deputy at AEC in Washington. He hopes that Don Reardon will be named as his replacement.

I called Luna Leopold at 10:50 a.m. in connection with the letter I am sending to the EBRPD Board of Directors asking that CUWA be placed on the agenda of the March 19 meeting. I asked if our citation of his interest in the Mira Vista project was accurately represented, particularly as cited in the recent Oakland Tribune article. He replied that the article had a distortion of emphasis. He indicated that he appeared briefly before the Richmond City Council last week and attempted to explain the consequences of accelerated erosion and the increased probability of landsliding as a result of run-off water coming from any housing development on a ridge of that kind. He suggested that he would rather have a paragraph in our letter along these lines, and I said that we would do this.

I held my office hour, then had lunch with the Chemistry Department faculty. Joe Cerny raised with me the question of whether Fritz Schaefer's work is sufficiently relevant to the program in our Nuclear Chemistry Division to warrant his continued support.

John Unik called back to say he wants us to ship the actinide fraction to ANL. I mailed him the flow sheet on the fraction. I received a letter (copy attached) from Jack Winchester discussing our search for an environmental chemist. I sent to Charles Slichter a letter supporting the nomination of Lauriston S. Taylor for the

Department of Oceanography

The Florida State University
Tallahassee, Florida 32306

February 28, 1974

AA 3/4/74

Dr. Glenn T. Seaborg, Director
Nuclear Chemistry Division
Lawrence Berkeley Laboratory
Berkeley, California 94720

Dear Dr. Seaborg:

Thank you for giving me the opportunity to visit the laboratory as a member of the visiting committee and to learn first hand many impressive aspects of your program.

I have given considerable thought to your selection of an environmental chemist. It now seems to me that you should build on your present strength, specifically in studies of the physical chemistry of aerosols and especially related to the impact of air pollution on human health. You have excellent capability already at LBL in the chemical analysis of aerosols, and there is good capability in California in designing monitoring networks and the study of the distribution of air pollution on a regional basis. LBL scientists are already working with AIHL and the EPA in some of this research. What seems to be lacking is a high level scientific effort to relate pollution aerosols in the atmosphere to their effect on human health. As you know, during the last few weeks, Georges Desaedeleer and I have been working on direct measurement of the deposition of lead in the respiratory tract. Last week in California we spoke with a number of people about our preliminary results, and we are even more convinced that this work is timely and important.

One of your top candidates for the environmental chemist position is David Natusch of the University of Illinois. Art Poskanzer and I read over a large number of resumes on Saturday and screened him out as the most obviously top flight young scientist of the group. I do not know him personally but I have already read his paper in Science, 183, 202-204, 18 January 1974. By coincidence, we also obtained from AIHL a preprint of another paper in which he calculated probable deposition efficiency in different portions of the human respiratory tract for several different trace elements based on their particle size distributions in the atmosphere. I was impressed by this paper and am writing to him today to establish contact since his interests and ours are so nearly the same.

3/4/74
XC from GTS
to BGH
EE (AP got copy)

By all means, you should invite him personally for an interview. Just a couple of days ago I received a phone call from a friend at an eastern university asking if I thought Dave Natusch could be recruited to join his department. So I gather Dave Natusch is being sought after.

If you and Art Poskanzer keep me posted on your recruiting efforts, I will plan to continue to think of directions your program should follow.

Very best regards,

Yours very sincerely,

John W. Winchester
Professor and Chairman

JWW/re
cc: Art Poskanzer

Department of Oceanography
The Florida State University
Tallahassee, Florida 32306

February 28, 1974

D. F. S. Natusch
School of Chemical Science
University of Illinois
Urbana, Illinois 61801

Dear Dr. Natusch:

A few weeks ago, I was pleased to read your paper in Science, 183, 202-204, 18 January 1974 and just last week in California I saw a preprint copy of a new paper of yours in which you calculated lung deposition probabilities for various trace metals in air pollution. We have been working along similar lines during the last few weeks and I would like to establish contact.

Enclosed is a selection of research papers from our laboratory on trace element concentrations in the atmosphere. Could you perhaps send me reprints or preprints of your current work?

Last week I visited as a member of the visiting committee of the Nuclear Chemistry Division, the Lawrence Berkeley Laboratory, and discussed with Glenn Seaborg their plans for hiring an environmental chemist. I noticed that you are a candidate. I was quite impressed with their program and aspirations, especially their attempts to interface with Jack Hollander's new Division of Energy and Environment. You should seriously consider joining them.

During the last few weeks Georges Desaedeleer, a visiting short term research associate from Louvain, Belgium and I have been measuring the direct uptake of lead and calcium in ambient aerosols by breathing into a cascade impactor. We do our measurements by proton induced X-ray emission (PIXE) analysis and have sensitivity enough to measure the lung deposition of aerosols as a function of particle size. In a short while, we hope to have a report on these experiments which I can send you. May I hear from you shortly?

Yours very sincerely,

John W. Winchester
Professor and Chairman

JWW/re

National Medal of Science (copy attached). I also wrote to Dixy Lee Ray to extend my congratulations on the occasion of her receipt of the First Citizen Award for 1973.

At 6:15 p.m., I went down to the Faculty Club and joined the group in the Howard Room for their sherry hour proceeding the dinner of the KOSMOS Club at which I was scheduled to speak. At dinner, I sat next to Y. R. Chao, President, and Arthur Hutson. Also present were Stephen Diliberto, Will Dennes, E. Gorton Linsley, Murray Emeneau, Charles Jones, Curt Stern, David Boyden, Paul Martin, Gordon MacKinney, Lincoln Constance, Ewald Grether, Kenneth Pitzer, Robert Heizer, Richard Jennings, Edward Strong, John Whinnery, Harry Wellman, Sheldon Messinger, and Robert Walpole.

After dinner, I gave my talk, "Alchemy Revisited," illustrated with 34 slides, which was followed by a question period.

Tuesday, March 5, 1974 - Sacramento - Berkeley

I drove to the State Capitol in Sacramento to participate in the Symposium on Energy Resources and Technologies. I went to the office of Bob Moretti, Speaker of the Assembly, and met with him, his assistant Ken Elia, and the other members of the Symposium--Jack Hollander, Melvin Calvin, Paul Witherspoon, John Harte, Richard Post, and Barney Rubin (for Gary Higgins, who was ill).

We walked to the Assembly Chamber. I met Jack Finn, Majority Leader of the Assembly. Present in the audience were Art Rosenfeld and David Stewart of PG & E. I gave a copy of my talk to John Berthelsen of the Sacramento Bee.

The Symposium began at 9:30 a.m. (program attached). During Witherspoon's talk, Assemblyman Carlos Bee came in and began to conduct a session of the Assembly, apparently oblivious of what was going on (Moretti told me later that he often does this, apparently related to a drinking problem).

During the luncheon, I met Assemblyman Newton Russell from Burbank and Assemblyman (Dr.) Robert McLennan from Downey. Charles Warren, Assemblyman from Southern California and Chairman of the Assembly Subcommittee on State Energy Policy, joined us and we began a free-wheeling discussion of energy and conservation, in which we were joined by many of the others standing around as a group. Warren was critical of the safety aspects and the waste disposal aspects of nuclear power and especially critical of Dixy Lee Ray for advocating nuclear power, which he feels detracts from the public understanding that energy conservation is a central issue.

As I was leaving, I met Assemblyman Bill Bagley. As I drove back to Berkeley, I heard my talk referred to on KCBS.

I mailed to the Yale College Premedical Office a recommendation for Nina Tabachnik's admission (copy attached). I received from A. E. Greenberg (Chief of the Bioenvironmental Laboratories Section in the State Department of Health) a letter indicating that he has decided not to be a candidate for our environmental chemist position.

March 4, 1974

Mr. Charles P. Slichter
Chairman, President's Committee on
the National Medal of Science
National Science Foundation
Washington, D.C. 20550

Dear Mr. Slichter:

I am writing in support of the nomination of Dr. Lauriston S. Taylor for the National Medal of Science.

Dr. Taylor's contributions have been basic to the growing nuclear energy industry in our country. The existence of a nuclear energy industry and of the manifold applications of x-rays and of radioactive isotopes in science, medicine and technology depend upon the development of reliable sensitive methods for checking the amount of radiation to which individuals may be exposed, and on the existence of generally accepted standards regarding the amount of radiation exposure which cannot be safely exceeded.

In the development of measurement standards, and especially in the much more subtle and difficult problem of establishing nationally and internationally accepted tolerance levels for exposure to radiation of various types, Lauriston Taylor has been for decades the generally recognized leading authority. He has been from their beginnings the leading light and a major moving force in both the International Commission on Radiological Protection and the U.S. National Committee on Radiation Protection and Measurements. Without his efforts, it is hard to imagine how the commercial utilization of nuclear energy could have advanced, or the general use of radiation sources and

radioactive isotopes in scientific research. The indirect impact of his work on the advancement of science and engineering is immeasurable.

The award of the National Medal of Science to Lauriston S. Taylor would afford an official recognition not only of his personal contributions, but of the efforts of the many dedicated people who have worked with him in the difficult and controversial task of establishing official radiation safety standards.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

PROGRAM

9:15 a.m. INTRODUCTORY REMARKS

Bob Moretti, Speaker
California State Assembly

9:30 a.m. KEYNOTE

Dr. Glenn T. Seaborg, Nobel Laureate; Former Chairman of the Atomic Energy Commission; Professor, Department of Chemistry, University of California, Berkeley; Director, Nuclear Chemistry Division, Lawrence Berkeley Laboratory.

10:15 a.m. INTRODUCTION OF SYMPOSIUM FORMAT

Dr. Jack M. Hollander, Director, Energy and Environment Division, Lawrence Berkeley Laboratory.

10:30 a.m. SOLAR ENERGY

Dr. Melvin Calvin, Nobel Laureate; Professor, Department of Chemistry, University of California, Berkeley; Director, Chemical Biodynamics Laboratory, Lawrence Berkeley Laboratory.

11:15 a.m. GEOTHERMAL ENERGY

Dr. Paul A. Witherspoon, Professor, Department of Geological Engineering, University of California, Berkeley; Head, Geothermal Energy Program, Lawrence Berkeley Laboratory.

12:00 noon LUNCHEON

Legislators and Symposium Speakers will be served in the Assembly Lounge.

1:30 p.m. ENERGY CONSERVATION

Dr. John Harte, Senior Physicist, Energy and Environment Division, Lawrence Berkeley Laboratory.

2:15 p.m. NUCLEAR FISSION

Dr. Lawrence Ruby, Professor, Department of Nuclear Engineering, University of California, Berkeley; Associate, Lawrence Berkeley Laboratory.

2:45 p.m. Dr. John P. Holdren, Assistant Professor of Energy Resources, University of California, Berkeley.

3:15 p.m. NUCLEAR FUSION

Dr. Richard F. Post, Senior Physicist, Controlled Thermo-nuclear Division, Lawrence Livermore Laboratory.

4:00 p.m. FOSSIL FUEL RESOURCES: COAL, OIL AND GAS

Dr. Gary H. Higgins, Energy Research Group Leader, Lawrence Livermore Laboratory.

4:45 p.m. ADJOURN

YALE COLLEGE PREMEDICAL OFFICE
211 SSS - GROVE & PROSPECT STREETS
NEW HAVEN, CONNECTICUT 06520
TELEPHONE 436-0284

ALL DATA
STRICTLY
CONFIDENTIAL

NAME TABACHNIK, Nina Felice
last first

DATE March 5, 1974

ADDRESS

CLASS

With the trend away from precise grading of academic accomplishment, the personal evaluation of each student becomes even more important--critical it is fair to say--in the case of candidates for admission to medical school where competition is intense and acceptance tantamount to certification for licensure to practice. Your thoughtful comments will be greatly appreciated, held in full confidence, and eventually presented to the admissions officers of the schools of the applicant's choice.

Adding a dimension to the minimal information conveyed by the official transcript, we are assured such personal judgments on each individual case are read and studied very carefully. The effort and time you devote to preparing your evaluation of aspirants for the profession are likely to contribute importantly to the increasingly careful selection of future doctors.

Admissions committees will weigh carefully your evaluations of this student's strong attributes as well as whatever deficiencies you may have observed, together with your feeling as to his potential and his development of it thus far, your opinion of the strength of his motivation, and how he may compare with other candidates for medical school you may have known.

Thank you,

PREMEDICAL OFFICE

Your Personal Evaluation of This Student

I first became acquainted with Nina Tabachnik as one of the forty participants in the Westinghouse Science Talent Search in Washington, D.C. in March 1972. She won first place among the forty--a very impressive accomplishment. The participants, who come from all over the United States, are interviewed extensively by a group of knowledgeable judges and also put together a scientific experiment upon which they are judged. Nina was clearly superior in this group, and was as well qualified as any of the other first-place winners that I have had contact with in the period of over ten years in which I have been judging. I had further contact with her as one of the participants in the American Academy of Achievement program in Salt Lake City in July 1972. I have remained in contact with her since that time, and have the impression that she has maximized whatever opportunities have come to her, including her work in the Cold Spring Harbor Undergraduate Research Participation Program in the summer of 1973, and her undergraduate work in Chemistry at Yale.

Nina is a truly remarkable person in all respects and I foresee a remarkable future for her. She is intelligent and poised, is a serious and thorough student, and is deeply committed to a science-related career. I am very enthusiastic about her potential, and can strongly recommend her without reservation for admission to the Yale College Premedical Program.

Just before dinner, I went to the Nootbar residence and voted for Barbara Langlois, George Wasson and Ned Robinson for Lafayette City Council.

Colin Watanabe called to tell me that he had talked to Al Ghiorso and Mike Nitschke and decided that he had set too high standards for himself. Therefore he has decided to continue working as he has been on the helium jet system and to start computer work with the Alonsos, and thus will pick up where he left off. I told him that that is fine and that the door to my office is open to him at all times and that I would be glad to see him whenever he wants to come around to talk. Thus we might avoid similar misunderstandings in the future.

Wednesday, March 6, 1974 - Berkeley

I gave my lecture on the energy situation, with emphasis on the technological aspects of future supply, to the Chemistry 1B lecture section in PSL from 9:10-10:00 a.m.

At 10:45 a.m., I returned a call to Marian Lewinstein, who is writing an article for Fortune Magazine. She asked for my view on how the University of California and Lawrence Berkeley Lab have contributed seeds to industrial growth and for my view on why there is less of it in the East Bay than on the Peninsula. I indicated that it is a matter of the general atmosphere and availability of land, not knowing where they would locate in Berkeley in a way comparable with the set-up on the Peninsula. I pointed out differences--the Peninsula's country living, highway access, proximity to airport, climate, and so forth. She asked why Livermore had not been similarly settled; I thought the climate is not that attractive and pointed out that LLL was highly specialized as a weapons laboratory and didn't have that kind of interaction with industry as a general practice.

I sent to Robert Amoils, Senior Editor of the Keter Publishing House in Jerusalem, the manuscript of my article, "The Occurrence of the Transuranium Elements in Nature," for inclusion in the English edition of Recent Contributions to Geochemistry and Analytical Chemistry being prepared by the Israel Program for Scientific Translations. I wrote Vance Cooper upon the news of his retirement from the General Electric Company Research and Development Center in Schenectady and anticipated move to the Bay Area.

I sent thank you letters, for their contributions to the success of the AAAS Annual Meeting in San Francisco, to Sara Lofgren (Chairwoman of the Family Activities Subcommittee), Frank Koch (Chairman of the Public Information Subcommittee), Garth Hull (Chairman, Tours Subcommittee), Philip S. Boone (Chairman, Special Events Subcommittee), Lee Davenport (Chairman, Session Aides Subcommittee), and Ernest Rook (Chairman, Exhibits Subcommittee).

I dropped by to see the SHEIKS. The Kr beam was so large yesterday that it burned out the gold target (which had been put on for a 2-hour bombardment, interrupting the uranium bombardment).

I taught my Chem 1B lab section from 1:10-3:00 p.m., then walked back to my office.

I learned from the Oakland Tribune that Langlois, Wasson and Robinson won the seats on the Lafayette City Council.

Thursday, March 7, 1974 - Berkeley - San Jose - Lafayette

The 3-day bombardment of uranium with krypton ions ended at 8:00 a.m. Kratz, Norris and Binder performed the chemistry (with Otto observing). They separated volatile, SHE, and lead fractions according to our flow sheet, to look for spontaneous fissions from SHE. Norris made arrangements to ship the actinide-lanthanide fraction to ANL as air freight on a midnight plane.

At 10:00 a.m., I drove to California State University at San Jose, where I was met at the San Fernando Gate by Dean Lester Lange (School of Science) and Ed Barton of the administrative staff. They took me to meet President John H. Bunzel and we rode to Paolo's Restaurant for lunch in the Wine Cellar Room.

Present at the luncheon were Dr. James S. Kahn (of Lawrence Livermore Laboratory, scheduled to speak this evening), Dr. Peter C. Stevenson (of Livermore, who did postdoctoral work with me at LBL about 20 years ago), Dr. Gerald F. Palino (a radiochemist at San Jose), Dr. Allen B. Tucker (physicist, specializing in nuclear science), Dr. Robert F. Clothier (mechanical engineer), Dr. John A. Neptune (Chairman of the Chemistry Department), Dr. Ruth P. Yaffe (who designed the Nuclear Science Facility and seems to be in charge of it; she is a Chemistry Professor), and Dr. Burton R. Brazil (Executive Vice President).

After lunch, we drove back to San Jose State and, at 2:30 p.m., went to Morris Daily Auditorium, where President Bunzel introduced me and I gave my talk on "National Energy Problems." It was videotaped under the auspices of the Santa Clara Valley section of the ACS.

Following my talk, I was interviewed by Chris Prenger of the San Jose State radio-television news center and Janet Parker of the Spartan Daily. I also met Yuriy V. Pavlov, an organic chemist (Vice Consul of the USSR, Science, Technology and Education Exchanges, San Francisco).

Many of us then walked over to the Nuclear Science Facility where we were given a complete tour by Ruth Yaffe. This is an outstanding facility and many students are trained in their nuclear and radiochemistry curriculum. Many are sent to LLL for additional training in their summer program. I suggested to Ruth that she get in touch with us so we might work out a liaison for her students to also work with us at LBL.

After the tour, Lange and I went to his office where I was interviewed by Bob Borden of the campus television Journalism Department on videotape, to be shown on television station KTEH (Channel 54, Santa Clara County). Lange gave me an inscribed copy of a lovely illustrated book entitled The Shell: 500 Million Years of Inspired Design, by Hugh and Marguerite Stix and R. Tucker Abbott. I then drove home to Lafayette in the rain to find that Helen was suffering from a cold and was feeling rather miserable.

California State University, San Jose: President James S. Kahn and GTS: March 7, 1974.

Friday, March 8, 1974 - Berkeley

Attila Pavlath, head of a grassroots movement in the ACS, called at 9:05 a.m. and I agreed to meet him here on March 22. He wants to talk with me about aspects of my statement on ACS issues.

Monti Reynolds called me from Davis at 9:20 a.m. He reported that Eric and his friends had staged a bet with him: that for every inch of hair they cut from their own heads, he would have to grow an inch. They proved to be serious, so now he is having to cope with something besides the crewcut that he has worn for years. He said that he had a long talk with David three nights ago. Monti feels that David has done everything he could possibly do toward getting a research adviser and that the Berkeley people have dealt irresponsibly

with him. I replied that David might have been a little inflexible as to whom he will work with; I mentioned that I had suggested his talking with others, but don't have the impression that he has.

Cathy Stitt from the LBL Personnel Office came in and notarized my signing the form on the estate of Edith Ericson.

I attended the regular meeting of the SuperHILAC Research Progress groups in the conference room of the HILAC Building from 10:30 a.m. to noon. We reported that our bombardment averaged 1.08 microamperes of Kr ions for 63 hours; this corresponds to $6 \times 10^{12}/20 = 3 \times 10^{11}$ ions per second. No spontaneous fission counts have been observed as of this morning.

Nurmia discussed a paper by Zvara which summarized the Dubna volatility chemistry experiments on element 104 and 105, etc. A presumed element 104 spontaneous fission activity, as a chloride, behaved like hafnium chloride. A presumed element 105 spontaneous fission activity is spread very wide and in the region where hafnium chloride deposits. In another experiment the presumed element 105 S.F. activity deposited in a more concentrated manner, but in the region where hafnium chloride deposits and before the region where niobium chloride deposits. Stephens reported on an experiment he and Diamond did last week with an outside user group from ORNL--the Coulomb excitation of rotation band levels in Th^{232} by Kr ions. They measured levels up to spin 16 and are attempting to deduce their half-lives.

I had lunch in the cafeteria, then attended the weekly meeting of the Chem 1B instructional staff and returned to my office.

At 2:30 p.m., I met with Bernard G. Saunders, whom I knew as a student here in the Physics Department before the war. I outlined to him my need for help in writing the Met Lab Section C-1 history and he expressed great interest. I phoned Tane Nutting in Personnel to ask her what a reasonable rate would be for Saunders; she will look into it. I formally offered the position of technical writer, to work on the Travels project, to Jane Kingston and she accepted.

Suki and I took a hike to the water tank. From 7:00-11:00 p.m., Helen and I hosted a reception and buffet dinner for a number of my close associates in the Nuclear Chemistry Division and past and present teaching assistants in freshman chemistry. Present were: the Norman Edelsteins, Reinhard Gradls, Tom Parsons, Christopher Ritter, Jens Kratzes, Ted Norris, Roland Ottos, Kim Williams, Irwin Binder, Matti Nurmias, Carol and Jose Alonso, Mike Nitschke, Taisto Raunemaas, Kenneth Hulets, Sheila Saxby, Sylvia and Ron Kihara, Eileen and Emmett Eiland, Jane Kingston and Dave Richards, Ben Orlove and Miss Landow, Bernard Harveys, Margie and Jack Hollander, Dave and Cindy Denley, Mark and Sue Watts, and Barbara Baron.

<u>Saturday, March 9, 1974</u> - Lafayette

Helen and I had a long phone conversation with Lynn Joy, now working as an assistant to the President of Radcliffe, concerning UC Santa Cruz. She is contemplating marrying a professor who has been

offered a Provost position there. During the evening, I watched on TV the basketball game at the Los Angeles arena between UCLA and USC; UCLA won decisively, 82-52, winning the Pacific Eight championship and qualifying for the NCAA play-offs.

Sunday, March 10, 1974 - Lafayette

As we had yesterday, Suki and I took a hike around the rim trail at the Lafayette Reservoir. Lynne called at 8:30 p.m. Everything is going well; she plans to finish her Master's thesis by the end of the summer session.

Monday, March 11, 1974 - Berkeley

Helen told me this morning that David had called Friday night. He told her he has received notice from the Zoology Department that he should terminate his graduate work at Berkeley by taking the examination for a Master's degree this spring. The main reason is that he hasn't started his research. He has done satisfactorily on his course work, but did only fair in his teaching and his seminar.

I attended Pimentel's lecture, then went directly to Building 50A to attend a meeting on the distribution of funds between the Physics and Accelerator Divisions in the FY75 budget. Present were Sessler, Hyde, Harvey, Birge, Grunder, Poskanzer, Steiner, Lofgren, Elioff, Alvarez, and Goulding. Further meetings will be required to resolve this problem.

Roger Reeve called the office. Some of the CUWA people visited the Mira Vista property yesterday. He indicated that Barbara Vincent thinks things are too sensitive in the City of Richmond for CUWA to ask the EBRPD BOard to purchase the land. We will therefore suggest that the Board should lease the land at this time.

I held my office hour and Ann Thor came in to have me help with her with calculations in the kinetics experiment and with some problems. I then attended the Chem Department luncheon but left early to look in on a luncheon in the Popper Room attended by Buford Price (host), Herbert Strauss (Chemistry Department), Louis Lazaroff (Asia Foundation), Devendra Lal (guest, from India), and Gene Ershik.

I taught my Chem 1B lab section from 1:10-3:00 p.m. and we gave them another quiz (copy attached).

I sent to the Cosmos Club a letter supporting the application of William Chapman Foster for membership (copy attached). I acknowledged A. E. Greenberg's letter, expressing our disappointment that he has decided not to apply for the environmental chemist position. I sent letters analyzing the status of the AAAS International Science Programs (as advised by Arthur Solomon) to Solomon (copy attached), Philip Abelson, Albert Baez, Michael P. Greene, Michael Moravcsik, Claire Nader, Glenn E. Schweitzer, W. Murray Todd, Charles Weiss, Jr., Thomas B. Owen, and Herman Pollack, with copies to Rieser, Revelle, Bevan, Mead, Foncannon, Phillips, Stanford, and Tinker.

47.8 136.5
3 171.0
143.4 307.5

Chem 1B Section 2
Quiz, March 11, 1974
45 points OPEN BOOK
45 minutes Show all work

Name _____
Locker No. _____
T.A. _____

80.
54.
38
173.

1. (30 points) Consider the reaction

$$CH_3OH + O_2 = HCO_2H + \cancel{CO_2}\ H_2O$$

60.0
45.1
105.1
57.3
47.8

57.8
90.4
148.2
−48.0
100.2

All of the species are to be considered to be gaseous. What are ΔH°, ΔG° and ΔS° for this reaction at room temperature, 298°K. What is the equilibrium constant at this temperature? What is the ratio of the alcohol to the acid at this temperature. Will this ratio increase or decrease with temperature.

	ΔH°	S°	ΔG
HCO_2H	−90.5	60.0	−80.
~~CO_2~~	~~−94.1~~	~~51.1~~	~~−9~~
CH_3OH	−48.0	57.3	38.
H_2O	−57.8	45.1	−5

$\Delta H° = -57.8 - 90.5 - (-48.0) = -100.3$ kcal

$\Delta S° = 60.0 + 45.1 - 57.3 = -1.2$ cal/deg mole (−49.0)

$\Delta G° = -80.2 - 54.6 - 38.7 = -173.5$ kcal

$\Delta G° = \Delta H° - T\Delta S° = -100.2 - (298)(478)$
$= -100.2 - 143 = -179.5$

2. (10 points) Complete and balance the reaction for the lead storage battery

$$4H^+ + 2SO_4^{-2} + Pb + PbO_2 = 2PbSO_4 + 2H_2O$$

Remember that H_2SO_4 is the electrolyte. What additional data would you need apart from that given in your text in order to compute ΔH° for the reaction? ΔH H_2SO_4 (liq.) $\rightarrow 2H^+ + SO_4^{-2}$

80.2
54.6
134.8
38.7
96.1

$\Delta G° = -80.2 - 54.6 - (-38.7) = -96.1$

$\Delta G° = -100.2 - \frac{298(-1.2)}{1000} = -99.9$

3. (5 points) What restrictions, if any, are necessary to make the following equations true?

a. PV = RT ideal gas

b. ΔE = q-w

c. G = H-TS

d. ΔS = q/T reversible ΔS for system

e. ΔS ≥ 0 any spontaneous process

March 11, 1974

Admissions Committee
The Cosmos Club
2121 Massachusetts Avenue, N.W.
Washington, D.C. 20008

Gentlemen:

I am writing in support of the application by William Chapman Foster for membership in the Cosmos Club in the category "recognized as distinguished...in public service."

I had the opportunity to work closely with Bill Foster during his service as Director of the Arms Control and Disarmament Agency during the Kennedy and the Johnson Administrations. I met with him periodically during that entire period as a member of the Committee of Principals which he chaired; this gave me an excellent opportunity to watch him in action.

Bill was very effective in coordinating the efforts on arms control and disarmament during this period, and was responsible for a number of significant moves towards this objective. He played a central role in the attainment of the Limited Test Ban Treaty, one of the most significant accomplishments in this field in the decade of the '60s. He also worked effectively and tirelessly for the attainment of the Nonproliferation Treaty, another most significant accomplishment.

Mr. Foster was held in the highest regard by the representatives of the various countries with whom he negotiated and served as a very effective representative of his country. His personal integrity, sincerity,

understanding, and knowledgeability contributed greatly to the success of his endeavors. I believe that he must be rated as one of the most effective diplomats in the post-war period.

Bill Foster is intelligent, an interesting conversationalist, and a gentleman. He possesses, as does his wife Beulah, so many of the attributes that I believe members of the Cosmos Club like to see in their members, that I recommend strongly his election to membership in our Club.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

11 March 1974

Prof. A. K. Solomon
Biophysical Laboratory
Harvard Medical School
Boston, Massachusetts 02115

Dear Art:

You are right in suggesting in your letter of February 7, 1974, that I owe letters of explanation to the individual members of the AAAS Study Group in International Science. I am writing each of them along the lines of this letter to you.

The Board was favorably impressed by the Report and its recommendations but, unfortunately, the meeting at which it was discussed (December 1973) found the Board faced with a severe problem of budget balancing. Thus the price tag of $100,000 per year, or even an appreciable fraction of this, seemed imprudent at that time. (If it had been my personal decision to make I might have plunged but I am known to be so prejudiced in this direction that I felt it might be irresponsible of me to press hard.) The budget stringency was so severe that we had to hold a special meeting of the Executive Committee later, on December 14, 1973, in order to make a further substantial cut in the budget and to recommend some increases in AAAS membership dues.

However it was agreed that a focal point for International Programs would be created under the Executive Officer supported by a small budget from AAAS funds and the remainder of the Rockefeller grant. This should provide a start for international science activities and a basis for developing proposals for funding.

Actually a number of activities have been and are being undertaken along the lines of the recommendations in the report. These, which I find encouraging, include:

(1) Follow-up to the Mexico City meeting. Bill Bevan and Len Rieser have been energetic in this area. At the time of the San Francisco meeting there were a number of meetings with our Latin-American friends which resulted in the formation of a "Coordinating Committee for the Associations for the Advancement of Science in the Americas." The next meeting of this Committee will be held in Brazil in July, and plans are being formulated for another interAmerican meeting "Science and Man in the Americas: II" and possibly an interAmerican journal of science.

(2) Also in San Francisco, meetings were held with representatives from seven Asian countries (brought to San Francisco under a grant from the Asia Foundation), which led to a coordinating committee for Asian science that arranged to hold its next meeting in Seoul, Korea, in October 1974. (I would like to see similar meetings involving representatives of African countries during the AAAS meeting in New York next year.)

(3) Bevan has offered the services of AAAS to the U.S. Department of State in its assistance toward the establishment of a Pakistan Science Foundation.

(4) A AAAS Committee has been created to work with the British Association to establish a number of joint activities in connection with the U.S. Bicentennial in 1976 with emphasis on the AAAS meeting in Boston that year. (This might be a good opportunity to involve a number of European countries in the 1976 Boston meeting.)

(5) The bilateral exchange program between AAAS and Znaniye (US and USSR) is being actively pursued by the AAAS staff. (I have been in correspondence with Arthur Livermore in this connection.)

(6) The San Francisco meeting had a gratifying number of programs with an international theme. These included: "Science and the People's Republic of China," "A New Approach to Technology for Developing Countries in Asia: The 'Barefoot' or 'People's' Technologist," "Some Needs of Science in Less-Developed Countries," "National Administration of Science," and "How Can Technology in the U.S. be Directed toward Helping Less-Developed Countries." (I have already expressed the hope that the New York and Boston meetings will emulate the San Francisco meeting in this regard.)

All of these international activities are along the lines of the Study Group's recommendations. However I do want to emphasize that whether or not a truly meaningful, long-range AAAS program in international science will evolve is yet to be determined. Important to the success of such a program will be the efforts and dedication of Dr. Tinker and I shall watch her progress with apprehensive interest.

Although I believe that much can be done, along the lines I have outlined, with only the small funding of which AAAS should be capable, a more exciting and satisfying program can be sustained if outside funding can be obtained. I stand ready to do all I can to help the officers of AAAS in the arduous task of fund-raising.

With warm regards,

Glenn T. Seaborg

cc: L. Rieser
R. Revelle
W. Bevan
M. Mead
H. Foncannon
D. Phillips
J. Stanford
I. Tinker

GTS:jk

At 4:00 p.m., I went to the Building 70A conference room for the graduate students' reports, over which I presided. Irwin Binder reported on "Heavy Ion Reactions: Krypton on Gold," and Fenton R. McFeely reported on "The Use of Photoelectron Spectroscopy as a Probe of the Magnetic Properties of Metals."

I stopped at our land in Orinda on the way home because Leo Brewer had told me at lunch that there were holes in our fence and horses were trespassing again. I talked to Val Geissler, manager of Grizzly Peak Stables, and he promised to fix the holes in our fence, even though they were not due to him.

Tuesday, March 12, 1974 - Berkeley

Michael Peevey called me at 10:00 a.m. in connection with the nuclear initiative to appear on the November ballot, which was announced in this morning's Chronicle. The California Council for Environmental and Economic Balance wants to get someone to do an economic analysis of what the impact on the state would be if the initiative passed. I recommended that he contact Jack Hollander.

At 10:15 a.m., I drove to Alta Bates Hospital for my planned tour and luncheon as an inaugural session for my service as an Advisory Trustee. I went to the office of Robert L. Montgomery, Executive Vice President, where I met new Advisory Trustees Mark Leland, Bill Leonard, and Guy Catteron.

After a complete tour from Montgomery, we were joined for lunch by Julius Krevans (also a new Advisory Trustee, Dean of the UC Medical School), Stephen L. Davenport (President, Board of Trustees, Alta Bates), and Dr. Roger W. Hoag (President of the Medical Advisory Board).

I had to leave at 1:15 p.m. in order to attend the qualifying examination of Joel Levinson, which lasted from 1:30-3:00 p.m. All members of the committee were present: John Rasmussen (Chairman), Joseph Cerny, Kenneth Street, and Buford Price. Levinson started with a description of his research, but in the course of this had trouble with such fundamentals as the calculation of the height of the potential barrier for the reaction of argon ions with silver, the calculation of the area of a sphere (in connection with an attempt to calculate surface energy), and the fundamentals of the structure of the hydrogen atom. He presented his prepared discussion of "Generalized Shells in Nuclei: Hartree-Fock Calculations for Bubble Nuclei," but, in this too, we had the feeling that Levinson was using words without understanding their meaning and was weak on fundamentals. We decided that he should come back near the end of the Spring Quarter 1974 after having reviewed some of the fundamentals connected with his research work and be prepared to be examined in more depth on his research work with emphasis on the nuclear fundamentals.

I wrote S-A Norland at AB Volvo, indicating that I do not think it would be realistic for me to speak there on future alternative energy sources for automotive vehicles as he suggested because this is not my area of expertise. I mailed to the Bohemian Club my application to have Sol Linowitz as my guest at the summer encampment (copy

attached). Roger Reeve picked up the letter I wrote today in behalf of CUWA to the EBRPD Board of Directors, urging them to lease the east-facing slope of Wildcat Canyon (copy attached).

At 4:30 p.m., I met with Norman Edelstein, who reminded me that he will be away on vacation for the next couple of weeks. We discussed the status of looking for people for the actinide and lanthanide chemistry program.

At 5:10 p.m., I called William C. Dickinson, Solar Project Leader at Livermore, in response to his letter of March 4 and enclosed technical report on a cost effective concept for the thermal conversion of solar energy to electricity. I indicated that I had no particular suggestions, but expected that it would cost more than they had estimated.

Suki and I took a hike to the water tank.

Wednesday, March 13, 1974 - Berkeley - Washington, D.C.

I returned a call to Dr. George W. Corner, Executive Officer of the American Philosophical Society in Philadelphia, at 8:35 a.m. He said that I was nominated to be a member of the Council, but I indicated that my schedule would not permit my attendance at its meetings.

I attended Pimentel's lecture. I sent Stewart Udall a copy of my speech at the World Future Symposium ("1994?"). I talked to Ghiorso, who gave an optimistic report on the use of titanium as a backing material for targets and other aspects of our research program.

Schaefer dropped in to express concern about his status as a faculty member of the Nuclear Chemistry Division; I urged him to meet with our Program Review Committee to go over this question.

I went down to the Metropole Restaurant on Shattuck Avenue and had lunch with Clark Kerr. This was mainly an occasion to bring each other up-to-date and reminisce.

I taught my Chem 1B lab section; this was the last session of the winter quarter and Cindy and I handed out the faculty rating sheets to the students.

Helen met me outside Latimer Hall and drove me to the San Francisco Airport, where I boarded TWA flight No. 68, which left at 3:30 p.m. and arrived at Dulles Airport at 10:55 p.m. I talked en route to Allan Johnson, whom I knew as manager of the AEC Idaho Operations Office. He is now with Parsons Company, an engineering firm in California.

I rode to Harrison Street with Jim Mitchell (a patent attorney living near Reliez Valley Road) and Howard Winterson of Combustion Engineering (a past President of AIF).

March 12, 1974
Date

BOHEMIAN CLUB

APPLICATION FOR GROVE GUEST

NAME OF GUEST IN FULL Sol Myron Linowitz AGE 60
(Please type or print)

BUSINESS ADDRESS Coudert Brothers, 1 Farragut Square South, Washington, D.C. ZIP CODE 20006
(Please type or print)

RESIDENCE ADDRESS 2325 Wyoming Ave., Washington, D.C. ZIP CODE 20008
(Please type or print)

OCCUPATION Attorney; Senior Partner, Coudert Brothers; Chairman, National Urban Coalition

WILL BE ACCOMMODATED AT CAMP Wayside Log

TENTATIVE DATES OF ATTENDANCE July 19-23, 1974

GUEST IS PERSONALLY KNOWN TO THE FOLLOWING MEMBERS OF THE CLUB:

John W. Gardner, Harry Goff, Roger Heyns, Grayson Kirk, Deane Malott, Franklin Murphy, David Packard, Senator Charles Percy, Rudolph Peterson, Glenn Seaborg, Allen Wallis, Herman Wouk

TO WHAT EXTENT IS GUEST POSSESSED OF MUSICAL, ORATORICAL, LITERARY, ARTISTIC, OR HISTRIONIC TALENTS:

Accomplished violinist (rated a prodigy as a child); written poetry and one-act plays; actor and led dance band in college; radio and television moderator.

HAS GUEST ATTENDED PRIOR ENCAMPMENTS? Yes

LIST YEAR OR YEARS OF ATTENDANCE 1972

DOES GUEST HAVE NON-RESIDENT APPLICATION ON FILE? Yes

Signed _____
(Member applying for guest permit) Glenn T. Se

Account Number S-181

CITIZENS FOR URBAN WILDERNESS AREAS
1052 MERCED, BERKELEY, CALIFORNIA 94707

Glenn T. Seaborg
Chairman
Thomas Bowman
V. Chairman
Geraldine Jackson
Treasurer
Roger Reeve
C. Secretary
Karen Davis
R. Secretary

March 12, 1974

Dr. Howard Cogswell, President
Board of Directors
East Bay Regional Park District
11500 Skyline Boulevard
Oakland, California 94619

Dear Dr. Cogswell and Members of the Board:

Citizens for Urban Wilderness Areas (CUWA) understands that the East Bay Regional Park District is proceeding on appraisals of certain parcels of land, including land in Wildcat Canyon, in order to preserve logical boundary considerations for each park and to maintain the integrity of these sites. CUWA applauds this action.

CUWA is particularly concerned with those urban threshold parks we have called urban wilderness areas. One of these areas, easily reached by public transportation but with an unspoiled beauty of great significance, is Wildcat Canyon Park. Therefore, we would urge all possible expansion in the canyon.

The most essential areas to be controlled at present are the east-facing slopes. There are many important considerations in controlling these slopes.

Among these is the instability of such steep slopes and the danger to such slopes of residential development in areas where disturbed soil will seriously affect the present park.

Another danger to Wildcat Canyon Park, if these slopes are not dedicated in large part to park use, would be increased sedimentation in the creek which is one of the major joys of

this lovely area. A further danger is the inability of the Park District to control fire hazards in a critical zone so close to valuable natural areas.

Further, we feel strongly that visual integrity of the canyon would be grossly threatened unless the undeveloped east-facing areas are properly protected.

For these reasons we wish to offer a resolution to mitigate possible further damage to the integrity of Wildcat Canyon Park.

o o o

WHEREAS the east-facing slopes of Wildcat Canyon have significant intrinsic natural values including such rare plants as Western leatherwood (Dirca occidentalis) and provide a home for many of the animals and birds of this park, and

WHEREAS these slopes are geologically unstable and are subject to natural erosion and slippage, and

WHEREAS existing streets and road cuts on the higher slopes already have greatly aggravated erosion, and

WHEREAS there is a danger of increased sedimentation in Wildcat Creek if further major cuts are made, and

WHEREAS the safety of park users also would be jeopardized if there were increased hazards of fire, therefore:

BE IT RESOLVED that the Board of the East Bay Regional Park District directs the Staff to work with the City of Richmond in order that the designation of the east-facing

slopes of Wildcat Canyon, up to the presently developed areas, be reaffirmed in the Richmond General Plan as park and open space. Further, that the Staff be directed to negotiate with owners of lands not presently scheduled for purchase appraisal, in those areas designated on the Richmond General Plan as open space and park as of February 14, 1974, for lease agreements with the East Bay Regional Park District for operation and management of those lands. This will provide an expansion of Wildcat Canyon Park in accordance with that section of the Master Plan which delineates working with property owners in areas adjacent to park lands to assure compatible use of these lands.

o o o

CUWA asks this Board to consider immediate passage of this proposed resolution to assure the integrity of Wildcat Canyon Park.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

Thursday, March 14, 1974 - Washington, D.C.

A driver, Lonnie Cook (a computer analyst), picked me up and drove me to the headquarters of American Enterprise Institute (1150 17th Street) where I went to the 12th floor. Here I attended the first meeting of the National Energy Project Advisory Council (minutes attached). Present were William J. Baroody (President, AEI), Melvin R. Laird (Senior Counsellor for National and International Affairs, Reader's Digest), Edward Mitchell (Professor of Economics, University of Michigan), Thomas F. Johnson (Director of Research, AEI), Robert J. Pranger (Director of Foreign and Defense Policy Studies, AEI), Dan Larkins (Staff Economist, AEI), Marvin Kosters (Resident Scholar, AEI), Jack Buttram (AEI Public Relations, Wagner and Baroody), Lucy Benson (President, League of Women Voters), Ruth Clusen (Vice President, LWV), Robert Cahn (Christian Science Monitor--on leave), Nat Goldfinger (Director of Research, AFL/CIO), Paul R. Ignatius (President, Air Transport Association), Robert Loftness (Electric Power Research Institute--representing Dr. Chauncey Starr), Mike McCormack (US House of Representatives, Washington State), Roger Colloff (Administrative Assistant representing Walter Mondale, US Senate, Minnesota), John Nassikas (Chairman, Federal Power Commission), Edgar B. Speer (Chairman, United States Steel), James L. Buckley (US Senate, New York), and Philip Ruppe (US House of Representatives, Michigan).

After the meeting, we went to a nearby room for pre-luncheon drinks. I talked to McCormack and tried to convince him that ERDA is worth supporting; he believes that it is too restricted in scope and there should, instead, be a Cabinet-level Department of Energy or Department of Science and Energy. If ERDA is created he would rather have it report to Bill Simon and the Federal Energy Administration (to insure good policy direction) and not to Roy Ash (which the present plan, in effect, would do because of the dominant role of OMB). McCormack said that the days of the JCAE are numbered and that energy matters will be increasingly in the domain of his House Committee.

After lunch, I took a walk downtown, then took a taxi to Harrison Street, where I joined Jane in a cup of tea. She told me her curriculum at American University consists of attendance there one day a week for a course on religion and for examinations in her mathematics course (algebra), which is a home study course (in which she is having trouble). The rest of her work is at the Laboratory of Clinical Psychopharmacology at the National Institute of Mental Health (in the William White Building of Saint Elizabeth's Hospital) where she is working with Dr. Farouk Karoum; he is studying the mechanism of sleep and she is learning some of the lab techniques for which she receives credit at American University. She showed me her good recommendations from her superiors at the Psychiatric Institute. I read the stack of material on the 40 STS winners sent by Science Service, then had dinner with Pete and Jane. (The Nuclear Chemistry Division Program Committee met today; Olivia Austria's notes are attached.)

Friday, March 15, 1974 - Washington, D.C.

I was picked up by Glenn Stadklev and rode with him to GEOMET headquarters. Here I attended, beginning at 10:30 a.m., the meeting of the Board of Directors. George Milly, Richard Allen, Charles

AEI National Energy Project Advisory Council

Minutes of First Meeting of March 14, 1974

The meeting opened at approximately 10:15 a.m. with a welcoming statement by the National Energy Project's Chairman, Melvin R. Laird. Three short presentations followed: Dr. Dan Larkins, staff economist for AEI, on the current energy situation; Dr. Robert J. Pranger, director of foreign and defense policy studies for AEI, on the origins of the energy project; and Dr. Edward Mitchell, project director for the National Energy Project and professor of economics at the University of Michigan, on his initial impressions of the project. Discussion among those advisory council members present then followed.

It was hoped that the time-frame in which publications would appear might be more speedy than the schedule of the Ford Foundation's Energy Policy Project. Assurances were given that National Energy Project publications would come out regularly as the project progresses. A question was raised about what "special funding" meant in terms of this project, referring to earlier materials describing financial support. In reply, it was pointed out that American Enterprise Institute would allocate a minimum of $1 million from its current foundation funds for the next two years--at $500,000 per year--and that this money would be put back into the AEI general fund from additional money raised from private foundations. This explains the statement at the press conference of 21 February 1974, announcing this project, that all funds would come from private foundation sources and not from corporate support.

Regarding specific issues in energy policy the following observations were made by various members of the advisory council. It was noted that one area that needs clarification is the technical prospect of securing oil and gas from other sources than now used. Do we want to build up a national capacity for such oil and gas, and if so, how? Whether we like it or not, we're on an oil economy for the near future, it was observed. And we're not clear, from a national point of view, as to where we are going.

It was asked whether there was any way of speeding up our nuclear power program. In response to this query, it was noted that there are ways of speeding up the nuclear power program, but we must keep all energy sources in perspective; there's a tendency to wish our way toward solutions rather than to be realistic about future sources. Two aspects of the nuclear program stand out, it was stated: first, there's the matter of public information; and second, there's the action program of recommendations. Some of the profoundest of energy problems are interrelated ones--material, manpower and so on. Thinking to date has been too narrow, without realizing long-term implications. One participant added that not many new sources of energy will really be open until 1985, and then not very much. An observation was added that there is lots of coal in the ground as a source of energy.

It was made clear that any study of this kind ought to measure impact of energy shortfalls on the national economy and national objectives. Too many studies neglect the impact of constraints on getting supply, e.g., environmental constraints. Also, the implications of an electric economy should be studied.

The issue of reliable information was raised. For example, on the subjects of allocation and possible rationing, one must have a pretty reliable picture of the problem before one can take a sound position. It was hoped that the National Energy Project's television work might catalog basic facts and most urgent energy problems, and then get this information into the nation's blood supply. Priorities should be established for moving such information to the public.

It was asked whether the Advisory Council for this project would make recommendations as a group. In reply it was stated that there would be no recommendations bearing the Council's approval. Individual authors could well make recommendations with standard disclaimers that such views are not necessarily those of Council members. While a wide range of "pro" and "con" views would be presented in the various papers and television presentations, individual authors will be able to take their own positions as independent persons. Work will be contracted on an individual author basis under honoraria from the project. In turn, the Advisory Council's role will largely be relative to the project's general operations. Mr. Laird would like to send the Council the project's material from time to time for suggestions and criticisms. He would also like to call on the Council, and hopes the reverse will take place as well. In the end, however, individual authors will take sole responsibility for their work.

It was pointed out that it is important not to load words in the current energy situation, words such as "needs." Talk mostly seems to center on the supply side of the energy discussion with much less about the demand side. Do we accept all the growth projections now being made? Are they givens? What about lifestyles? Also, very little public debate has taken place on nuclear power, environmental safety and the possibility of world blackmail. It was noted that the Ford Foundation Energy Policy Project is looking at alternative lifestyles. An observation was made that we too often do not concentrate on conservation at point of consumption, e.g., the aluminum industry. Secondary and tertiary recovery are important. Either conservation or imports are the only two options for the near future, one participant observed.

Regarding general public attitudes, it was noted that several hurdles will have to be crossed before dispassionate analysis of the energy situation can take place. These hurdles are: (a) it isn't true; (b) if true, let's kick someone around, the scapegoat syndrome; and (c) fantasies. Only after we've gone through all these responses can we come to some correct public treatment of our energy problems. For example, only then can we discuss the world oil situation in dispassionate terms. It was asked whether the public might ever come to some of the more realistic approaches voiced at the Advisory Council meeting today. In response, it was observed that once price begins to make its impact (rising prices), a number of changes in attitudes will take place.

The meeting was adjourned at approximately 12:15 by Mr. Laird. A list of Council members, representatives and observers attending the 14 March meeting is attached.

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20 March 1974: Nuclear Chemistry Divisi

MINUTES OF PROGRAM COMMITTEE MEETING 14 MARCH 1974

A. B. Harvey introduced Olivia Austria to the committee.

B. Mid-year Review. BGH announced that $120K new funds are available for use in FY 75.

C. Budget FY 76, FY 76: Considerable discussion took place concerning the budgets for the next two years. The following recommendations were made: 1) The Review Committee must review and approve 189s for new projects before the forms are submitted 2) The Laboratory's administrative process for "splitting" funds should include discussion and consultation with involved divisions before final decisions are made. Members of the Committee were reminded to submit their 189s. Next year a schedule will be planned in order to allow for more preparation time to meet 189 deadlines.

D. Progress in finding environmental/geochemist: Search Committee Chairman Poskanzer reported that 28 names have been received for consideration. Two persons have been invited for interviews: Solomon from IIT; Natusch from University of Illinois. There is a possibility that one or two other persons will be selected for interview. While there is preference to select a senior person, junior persons are being given serious review. More emphasis is in environmental chemistry and air pollution rather than in the area of geochemistry. It is still undecided as to which division the position will be assigned.

E. Postdoctoral recruiting: This agenda item will be discussed at one of the future meetings.

F. Equipment Pool: M. Michel described the newly implemented procedures and policies to meet AEC requirements for equipment pool and other equipment matters. He will prepare a descriptive statement for general distribution.

G. Committee on Tenure, Personnel Policies: B. Harvey announced the creation of a committee to study these questions. A. Poskanzer is Chairman; J. Rasmussen and D. Hendrie are other members. A. Poskanzer stated that the committee will draft a policy proposal for the Program Committee's consideration. The Committee is working on problems related to the following questions: 1) Should there be a type of term appointment above the postdoctoral level which would allow for the possibility (or the intention) for promotion to permanent staff status? (A ladder series or rank) 2) What is the degree of tenure of "permanent" scientific staff? 3) Should there be differing staff categories? 4) Should there be a second category of continuing staff for the duration or lifetime of a program or project? It was mentioned that Physics is conducting a similar study of these types of questions and that it is anticipated that a lab-wide policy related to these matters will soon be established. The committee welcomes suggestions or recommendations.

H. Progress in finding an actinide chemist: Dr. Templeton reported that several names have been submitted to the committee for consideration and that a few persons have applied so far. Discussion took place about the level of the appointment: Should it be at the junior or senior level? More positive reaction was given to appoint someone at the junior level (either on a temporary or permanent basis) since regular evaluation would be required. If the appointment were a joint one with the campus, there might be problems of advancement which would develop from the person's lack in one part of his appointment and success in the other part. There are few senior persons who have expressed interest in the position. The committee will continue to leave the matter open until more applications are received.

I. Announcements: IAEA-Vienna - Available service on radioactive nuclides for intercomparison purposes. Planning for Topical Conference on Problems of Vibrational Nuclei; G. Alaga is the organizer.

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Judkins, Robert Campbell, and Robert Trevisani were present. We followed the agenda (copy attached). The management has decided to consolidate its losses (about $2 million) in the 1973 balance sheet; having done this, GEOMET is now operating at a small profit and will have tax benefits over the next five years.

Milly described a capillary device for determination of the rate of blood coagulation, developed in GEOMET's Pomona Laboratory, for use by the Damon Corporation; GEOMET will manufacture one million of these at one dollar apiece. Negotiations are well along with Texas Gulf Sulphur (and Gemex Associates) to drill on and develop the Wyoming property; this may be well along by this summer. Negotiations with New Court Securities are well along to finance the application of the radon uranium exploration method to look for uranium ores (over a four-year period). New Court would like to involve a U.S. uranium mining company; United Nuclear and Gulf Mineral are prospects.

We had a sandwich lunch at the meeting table in the conference room. Judkins described the negotiations to sell Sitelines, Inc., to Guardian Industries. Discussing corporate financing, he said it will probably be necessary to raise about $200,000 by selling GEOMET stock to private investors at a rate of $4-5 a share.

We adjourned at 1:30 p.m. I met Jack Swift, elevated to a position of officer in GEOMET today--he worked for David Lilienthal from 1958-1970.

I rode with Ed McEvoy, who works in the health department of GEOMET, to the Shoreham Hotel. I went to the Heritage Room to preside over the meeting of the Board of Trustees of Science Service (minutes attached). Present were Gerald F. Tape, Allen V. Astin, Joseph W. Berg, Jr., O. W. Riegel, Julius Duscha, John Troan, Milton Harris, and Aaron Rosenthal (of the Financial Advisory Council).

After the meeting, at 6:00 p.m., I went down to the Ambassador Room and began to interview the 40 Science Talent Search winners on an individual basis. I interviewed ten of them, then accompanied them up to the Tudor Room where we had a buffet dinner. After dinner, I interviewed 20 more winners, then went up to Dave Axelrod's suite to confer with the judges--David Axelrod, Alan de Silva, James Hummel, Russell Johnson, Brigid Leventhal, Philip G. Stein, and Stuart Hauser. We made a preliminary choice of the ten scholarship winners and two alternates.

Saturday, March 16, 1974 - Washington, D.C.

Pete and Jane drove me to the Shoreham Hotel. I went to the Ambassador Room and completed my interviews of the STS winners. I then joined the judges in Axelrod's suite and we completed our final choices of the ten scholarships winners and two alternates as follows: (1) Eric Steven Lander, (2) Frank Thomson Leighton, (3) Linda Kathryn Bockenstedt, (4) Emmett Evanoff, (5) Richard Alan Dargan, (6) John Conlin MacGuire, (7) Edward Harrison Frank, (8) Carl Taswell, (9) Jordin T. Kare, (10) Linda Carol Rabinowitz, and alternates Stuart Alan Haber and Ilan Mendel Kroo.

GEOMET, INCORPORATED

BOARD OF DIRECTORS MEETING

March 15, 1974

AGENDA

1. Call to order

2. Election of Chairman of Board and Officers
   a. Appointment of Executive Committee

3. Financial Status - Treasurer's Report

4. Operational Plans and Activities

5. Corporate Actions:
   a. Guardian Industries re Sitelines, Inc.
   b. Texas Gulf Sulphur re Gemex Associates
   c. Damon Corporation re Office of Experimental Development
   d. Corporate financing

6. Corporate Office Housekeeping Actions
   a. Compensation of Officers
   b. Stock Options
   c. Borrowings and Loans
   d. Stock Transactions
   e. Other

MINUTES

MEETING OF THE BOARD OF TRUSTEES OF SCIENCE SERVICE

Friday, March 15, 1974, 4:00 p.m.

Pursuant to call, the meeting convened at 5:00 p.m., with President Seaborg in the Chair. The Recorder listed the following Trustees present: Allen V. Astin, Joseph W. Berg, Jr., Julius Duscha, Milton Harris, O. W. Riegel, Glenn T. Seaborg, Gerald Tape, and John Troan. Edward G. Sherburne, Jr., Director; and Dorothy Schriver, Assistant Director were also present. Aaron Rosenthal, member of the Financial Advisory Committee was also present.

Dr. Seaborg presented the agenda, and asked for approval of the minutes of the November 30, 1973 meeting of the Board. A motion to approve the minutes was made, seconded, and carried.

Mr. Sherburne presented a financial report on Science Service, giving the estimated year-end figures for 73-74 and a preliminary budget for 74-75. He reported that he anticipated an excess of between $30,000 and $40,000 for 73-74, and that this was the first excess since 65-66 when it was $353. He also reported that the preliminary budget for 74-75 showed an excess of about $30,000.

Dr. Harris stated that the Financial Advisory Committee was pleased with the progress made, but warned that Science Service still needed to be cautious regarding increased expenses.

Dr. Harris reported, however, that he felt a cost-of-living salary increase for the staff was appropriate in the next few months. After discussion, motion was made, seconded, and carried to allocate up to $20,000 for a 4% across-the-board salary increase plus a limited number of discretionary raises effective June 1, 1974.

Dr. Seaborg pointed out that the Board had long been cognizant of the need to increase the general level of salaries at Science Service, but because of financial stringency, this had not been possible to do as often as the Board would have liked. Now that the financial situation is improved, the Board was able to vote the increase prior to the normal December consideration.

Mr. Sherburne reported that Dorothy Schriver and he had met with the Board of the Westinghouse Educational Foundation on February 22, concerning continued support of the Science Talent Search, and that the meeting had been quite successful. They also met with George Wilcox, Vice Chairman of the Westinghouse Electric Corporation, in the afternoon, and that meeting also went well. Mr. Sherburne stated that he felt that there should be no problem concerning continued support for the Science Talent Search, and expected that a formal decision would be made at the April meeting of the Westinghouse Educational Foundation.

Mr. Sherburne stated that several possible changes were being studied in regard to the Science Talent Search. One of the most important is the possibility of changing the contest from the senior to the junior year. Mr. Sherburne said that while Mrs. Schriver and he had been initially enthusiastic, they now felt that the change would hurt more than it would help. The Board discussed the possibility at some length, and was unanimous in its feeling that a change to the junior year would be a mistake. It also discussed the possibility of having the Science Talent Search for both juniors and seniors, but there was no consensus in favor of or against.

The Board also discussed the possibility of holding the Science Talent Search in cities other than Washington. Here again the opinion was divided, and the Board requested that the staff study the matter in more detail.

The Board also considered the suggestion that a method be worked out to honor one or more outstanding science teachers who have been successful in encouraging young people in extracurricular research. Such teachers might be brought to the Awards Banquet each year for recognition. The Board agreed that this was a good idea, and should be done if the funds can be made available.

Dr. Berg reported that the Science Youth Activities Advisory Committee had met twice, principally to study the THINGS of science program. He stated that the Committee would meet again in May, and would study a wide range of alternatives possible for the program. An effort is being made to get teacher evaluation of a number of THINGS units, and the results will be available some time in the late fall.

Mr. Sherburne stated that he had talked to a representative of the Newspaper Enterprise Association concerning the Board's feeling that in any new contract, NEA should not have exclusive newspaper rights to whatever it purchased. He said that NEA felt that anything they used would not be wanted by any other newspaper, and so the question of rights did not really matter. After discussion, the Board indicated that it would like to see the contract renewed for just one year, with the exclusivity clause requested by NEA, to see if any problems arose. It also requested Mr. Sherburne to ask NEA for a credit line (NEA - Science News) similar to those which NEA gives other organizations whose material it uses.

Mr. Sherburne raised the question of appointing a Nominating Committee to recommend officers for the coming year. After discussion, it was decided that this was not necessary, and a motion to continue the present officers was moved, seconded and carried.

The date for the next meeting of the Board was tentatively set for April 24, 1974 at 4:00 p.m. at the Science Service office building. Mr. Sherburne was requested to poll the members to be sure that a quorum would be present.

Recorder
E. G. Sherburne, Jr.

Axelrod drove me home where I watched on TV the NCAA Eastern Regional final, North Carolina State vs. Pittsburgh; the former won, 100-72. I then watched the Midwestern Regional final which Marquette won over Michigan, 72-70. I had dinner with Jane and Pete.

Sunday, March 17, 1974 - Washington, D.C.

I went for a hike in Rock Creek Park with Stan and Renee Schneider, Ted and Charlotte Litowitz (he is a Professor of Physics at Catholic University), Bob McFarren, and Louise Behr. When I returned home at 4:00 p.m., I found a special delivery package of mail from Sheila which I opened and read.

Monday, March 18, 1974 - Washington, D.C.

I took a taxi to the University Club to attend the luncheon meeting of the Board of Directors of the World Future Society. Present were Rowan A. Wakefield, who served as chairman, Arnold Barach, Orville Freeman, Sol Linowitz, Barbara Hubbard, Carl H. Madden, Michael Michaelis, Ed Cornish, and Peter Zuckerman.

Toward the end of the lunch, Wakefield started the meeting with Cornish giving his President's Report, summarizing with charts the Characteristics of WFS and the World Needs for Coping with the Megacrisis. He said that WFS should decide whether to move toward "Professionalism" which so many scientific societies are doing; the consensus was that WFS should not do this. We also discussed affiliation or cooperation with AAAS, the Club of Rome, the Council on Foundations, and Nelson Rockefeller's "Commission on Critical Choices for America."

After the Board meeting adjourned at 2:30 p.m., Sol Linowitz and I talked about a number of matters:

(1) An acquaintance of his claims to have discovered an electrocatalyst of great value; Sol gave me a two-page description of this (copy attached) and I said I will evaluate this and get back in touch with him.

(2) Bill Simon and George Schulz think highly of the Occidental oil shale recovery process and are ready to back it on the following terms: (a) The U.S. government will finance a plant (costing tens of millions of dollars) that will produce, on government land, 25,000 barrels of oil per day with the understanding that after the government has recovered its investment, Occidental and the government will share profits 50-50. (b) If this is successful, the government and Occidental will share equally the $1 billion cost of building a one-million-barrel-a-day plant and will share the profits equally. (c) Occidental will allow the licensing of their process to other private companies. Sol asked if I and someone I might designate would be willing to look further into the process, perhaps fly to the site. I said I would discuss it with Jack Hollander.

(3) Henry Kissinger is still interested in my serving on a US-Latin American science committee and will get in touch.

March 14, 1974

In the quest for high yield chemical and chemical/-electric reactions, heterogeneous catalysts are the subject of intense industrial investigations. The use of catalytic material is important not only for chemical reactions, but for their potential impact on:

- Pollution control
- Solar panels
- Fuel cells
- Thermal electric devices

to illustrate a few.

An electrocatalyst state of matter has been discovered that can demonstrate dramatic effects and leads one to the conclusion that a super catalyst can be made.

For example, in order to avoid galvanic corrosion, a catalyst of platinum was prepared using the new process. Platinum was also chosen because of all the catalytic materials known, platinum is among the most stable and any increase in catalytic activity could easily be measured against Raney platinum, solid platinum or comparable platinum surfaces.

To check out the effect, the following test was made:

An electrode of activated platinum was prepared using a surface area of 20 $cm.^2$ It was placed in a research vessel for the purpose of electro-oxidation of methanol. The tests were carried out at room temperature in 30% H_2SO_4 (by weight) using methanol at a concentration of 7% by volume.

The electrode was allowed to come to equilibrium and then the methanol added. The change in open circuit potential was dramatic, going from +0.75 volts vs. SCE (saturated colomel electrode) to -0.056 volts vs. SCE, instantly. This latter potential is essentially the reversible theoretical potential for methanol oxidation.

The discovery of activity at room temperature is very significant. As far as can be determined, no work on electro-oxidation of methanol at room temperature has ever been reported.

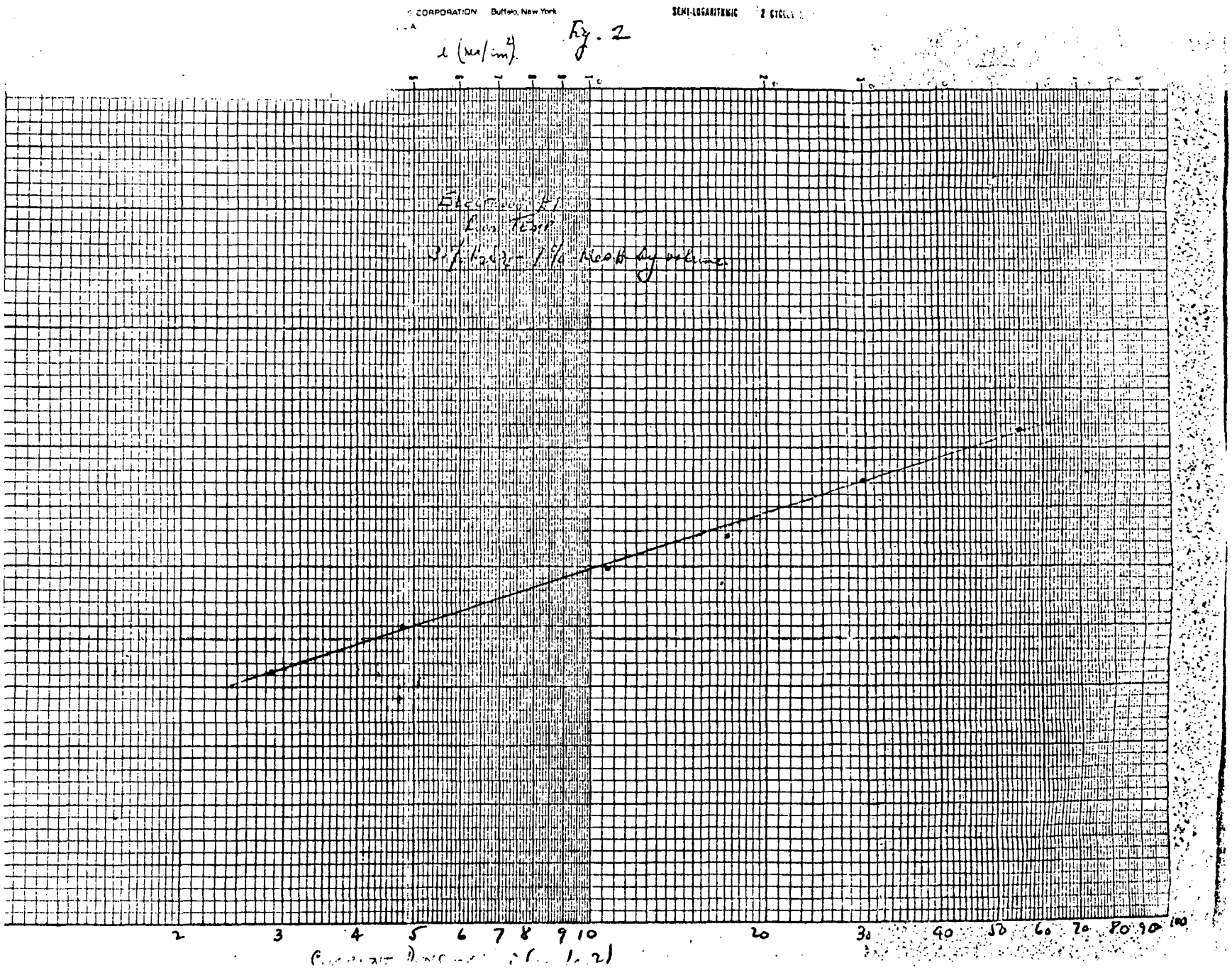
A resistance load was then placed on the circuit. A moseley 1.35 x-y recorder was then hooked up to monitor the electrical output. (See figure attached.)

Although the electrode was crudely made, the data fall on a good straight line on a Tafel plot.

When these results were compared to an electrode made from Raney platinum, the room temperature reactions did not occur.

The conclusion is that the new material is an unusually active catalyst and could be extremely valuable.

Under suitable secrecy agreements, electrodes could be made for independent laboratory verification of the described results.


CORPORATION Buffalo, New York
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Monday, March 18, 1974 (con't)

At Harrison Street, I changed into formal clothes and Pete drove me to the Shoreham Hotel (he then changed and picked up Jane and they arrived just as dinner was being served). I went to the reception preceding the STS banquet. Here I met many friends and many of the STS winners. Betsy McFadden and I discussed Travels in the New World. Paul McDaniel explained to me that he is resigning from his position with Argonne Associated Universities primarily because of his diabetic problem; he told me that Argonne Associated Universities plans to suggest to AEC that the tripartite arrangement for operating Argonne National Laboratory be terminated because it is too cumbersome. I complimented Congressman John Anderson on his forthright position on the Watergate affair during his national TV appearance yesterday; he said he has received some criticism from his Republican colleagues for this--he fears that the status of AEC and JCAE is seriously diminishing. David Leighton (father of STS winner Tom Leighton and chief assistant to Admiral Rickover) emphasized how much he and Rickover appreciated my support during my AEC Chairmanship. I was interviewed by Larry Marian of the Oak Ridger.

We proceeded across the hall to the Regency Room. Here I sat at the head table with Dixy Lee Ray, Reverend Edmund G. Ryan (Executive Vice President for Educational Affairs, Georgetown University), Ted Sherburne, Dorothy Schriver, John Simpson, and STS judges Axelrod, de Silva, Hauser, Johnson, Leventhal, and Stein. Sherburne introduced Simpson, Carl Taswell (for the STS winners) and me to make a few remarks; I then introduced Dixy Lee Ray whose talk received a standing ovation.

I sat next to Dixy during the dinner. We talked about the present status of the AEC and the uncertainty in everyone's mind due to the uncertainty about ERDA. Due to Watergate she has difficulties getting decisions out of the White House, advantageous in some respects because it increases her independence and disadvantageous in other respects because it means necessary decisions are not forthcoming; she has seen President Nixon only two times. The absence of an Office of Science and Technology hampers her operations. She is disturbed about the way Bill Simon makes important decisions on energy policy without having the facts. She feels the present AEC Commissioners are not qualified to be members of the proposed regulatory agency, the Nuclear Energy Commission, and is particularly disturbed at the behavior of Commissioner Kreigsman, whom she feels is trying to emulate Jim Ramey by building a power base within the AEC staff. She said that Admiral Rickover backed her in the ousting of Milton Shaw from his position as Director of the AEC Reactor Division. She is somewhat disdainful of the actions of some of the anti-nuclear power activists such as Ralph Nader, Ernest Sternglass and John Gofman. She said environmentalists in Pittsburgh are trying to block operation of Rickover's Light Water Breeder Reactor.

I also talked to John Simpson, who is quite elated about the progress of nuclear power. Westinghouse has a large number of orders from France. He doesn't think their time schedules will be much bothered by the lack of materials and isn't much disturbed by Ralph Nader's anti-nuclear crusade.

After Dixy's speech, Axelrod introduced the ten STS winners and two alternates in reverse order. Their pictures were projected on the large screen as they came up front to the stage. After this Dixy Lee Ray, John Simpson and I went across to a nearby room to participate in a photographic session with the STS winners.

The STS winners then went to a party at the Schrivers. Pete, Jane and I, with Esther Washington, the Schneiders and Blooms, attended a party given by Westinghouse in suite B120. Here we met many friends, including Senator and Mrs. Albert Gore.

Tuesday, March 19, 1974 - Washington, D.C. - Berkeley

I said goodbye to Jane after breakfast and Pete drove me to Dulles Airport. I talked with Pete about his law school work and summer plans; he is considering looking for work in a law firm or at the Psychiatric Institute, but has made no attempt to find work yet and may be too busy to do so. He will also consider going to summer school if he needs to.

I boarded TWA flight No. 67, which took off at 9:15 a.m. and arrived in San Francisco at noon. Helen met me and drove me to Berkeley in the Bonneville, which she left with me and went home via BART.

I went to lunch outside the cafeteria with Ritter and his roommate Chuck Haley. I also saw Norris, who told me they had a gold-krypton bombardment last Friday that didn't turn out so well due to chemical separation problems. They are also having problems with the Ge-Li gamma ray detector which affects much of their work in January and February.

I received a letter from Speaker of the Assembly Bob Moretti, thanking me for my participation in the Assembly Symposium on Energy Resources and Technologies on March 5. I received a call at 3:00 p.m. from David Green, a law student who asked some questions pertaining to a debate he is to be in on the energy crisis.

I met in my office, at 4:00 p.m., with Irvine J. Solomon to discuss the position in the Division for which we have him under consideration (environmental chemist). He is quite interested, despite his rather good position at IIT Research Institute, because of the strong intellectual atmosphere of LBL, the Berkeley campus, and the San Francisco Bay Area. He is personally interested in research on the characterization of PAN and on the synthesis of chemicals from coal. I took him down to see our actinide chemistry apparatus.

Joe Katz called me from Irvine at 4:30 p.m. He is on a short sabbatical leave. We arranged to meet in Los Angeles at the time of the ACS meeting on April 2.

Suki and I took a hike to the water tank. Senator James Buckley of New York suggested at a press conference today in the Senate Caucus Room that President Nixon resign as an act of statemanship; this is a large blow to Nixon's chances of resisting impeachment.

Wednesday, March 20, 1974 - Berkeley

Lew Keller called from Oak Ridge at 8:30 a.m. The evaluation committee for the TRU program, under the chairmanship of Jim Weir (Director of the ORNL Metals and Ceramic Division), has asked him to summarize worldwide effort on the transuranium elements in terms of manpower and money. The purpose is to justify the $6.8 million budget for the operation of HFIR and TRU over a projected 5-10-year period. I estimated the SuperHILAC budget to be about $1 million and the actinide chemistry program to be $400,000. I then helped him estimate the foreign programs.

Michael Peevey called me at 9:45 a.m. to ask if I would be willing to collaborate with Werner Hirsch of UCLA in planning a conference on the energy problem, to be sponsored by the CCEEB. I expressed interest but said my time is limited.

Joyce Burr called at 10:55 a.m. to tell me that, at their meeting yesterday, the EBRPD Board of Directors empowered the staff to proceed with exploring possibilities to secure the Villa Mira Vista land as open space.

I called Jack Hollander at noon to discuss several items. I asked for his evaluation of Birdsall's proposal of a new interdisciplinary graduate group. He said he is on the committee but that he and Sessler have a wait-and-see posture since it is not clear how this organized research unit would involve our LBL program's collaboration with the campus. I indicated that I would endorse it, but circumspectly. I asked for his assessment of Irvine Solomon and Jack responded that, while Solomon is a good physical, organic chemist, he is not sure that he has the overall leadership drive that we want.

At 12:15 p.m., I drove to the Claremont Hotel, met Helen, and we went to the Garden Room where we sat at the head table of the luncheon of the College Women's Club, along with Ruth Iodice, Sylvia McLaughlin, Dee Scalapino, Marian Stanley, Mary Jefferds, and Lucile Wester. Mary Jefferds told me that the EBRPD Board had just approved the acquisition of 1,000 more acres for Las Trampas Regional Park.

At 2:00 p.m., we went to the Horizon Room, where several hundred people assembled. Here, after an introduction by Ruth Iodice, I gave my talk on the energy problem, illustrated with 24 slides. It was very well-received and was followed by a number of questions. On the way out I met many of the members of the audience, including Alice Evans, a cousin of Earl Hyde's father.

A. A. Rolander (President of General Atomic Company in San Diego) called me at 3:25 p.m. as a follow-up to E. K. G. Toxopeus's letter, inquiring about my interest in working with them in an advisory or consulting capacity. I described my policy to date about such inquiries--that is, to steer clear of strictly nuclear businesses so as not to trade on my past role in the AEC. I indicated that I now had to review whether enough time had elapsed and, if so, whether this is the right first connection for me. We will explore it further.

I called Melvin Calvin at 3:55 p.m. to discuss with him the claim of Linowitz's client that he had found a platinum catalyst for the electro-oxidation of methanol at room temperature, which he claimed had never been reported, and its application to pollution control, solar panels, fuel cells, and thermo electric devices. Calvin said the oxidation of methanol in a fuel cell would be important. The oxidation of methane in the fuel cell would be more important because it would utilize 75% of the energy rather than 35% as in combustion. We agreed that the application of the platinum catalyst to solar panels and thermal electric devices was not clear. Calvin will check whether the electro-oxidation of methanol at room temperature has never been reported as claimed and let me know.

David Vieira met with me at 4:15 p.m. We agreed that his qualifying examination would be held the week of April 29. He has talked to Robert Ely of the Physics Department, who has agreed to serve as the outside member of his qualifying exam committee, and this has been approved by the Chemistry Department. He will talk at the Graduate Research Conference on April 11 on his research work, and I will approve the abstract when he comes in within a week. For his qualifying exam topic, he is considering "Molecular Structure Effects on Atomic and Nuclear Capture of Mesons: A Paper by L. I. Ponomarov of Dubna, published in Annual Review of Nuclear Science, 23, 1973." I suggested that he consider the paper by T. D. Lee, "Abnormal Nuclear States and Vacuum Excitations," and loaned him a copy of this reprint. He will consider these two possibilities and others and let me know his choice as soon as possible.

At 5:00 p.m., I met with Diana Lee to discuss the details of her transfer to my group (the SHEIKS) effective next week.

Suki and I took our water tank hike.

Thursday, March 21, 1974 - Berkeley

I called Leo Yaffe at McGill University in Montreal as soon as I arrived in the office, to get his evaluation of Robert Holub, a candidate for my postdoctoral opening. He regards Holub as one of the best students he has ever had and suggested he be made an offer.

Melvin Calvin called at 8:45 a.m. with additional information for use in my report to Linowitz. At 9:05 a.m., I talked, respectively, with Len Nugent, Bob Penneman and Jack Ryan about our meeting with Joe Katz while we are in Los Angeles for the ACS meeting. We agreed to meet in my room at the Hilton on the morning of April 2.

I received an acknowledgement from Norbert Beyrard of my memorandum of January 28. I sent to L. P. Fisher in Iron River, Michigan my "affidavit of heirship" in connection with Edith Ericson's estate.

From 9:30 a.m. to noon, I attended an ad hoc meeting of the SHEIKS, TAVERNS and others in the conference room of the HILAC Building. Those present were Ghiorso, Kratz, Norris, Binder, Carol Alonso, Jose Alonso, Nurmia, Nitschke, Raunemaa, Otto, Lee, Hulet, Lougheed, and Wolfgang Ribbe.

Thursday, March 21, 1974 (con't)

Ghiorso described a proposed Kr^{86} and Gd^{160} experiment to make Pb^{212} and Ar^{34}. We discussed the target problem and the impurities problem. Kratz described the results of the recent long Kr^{84} on U bombardment. This yielded no spontaneous fission events in any of the relevant chemical fractions (SHE, lead and volatile fractions). The limit of cross sections was less than 8 x 10^{-36} cm^2 for an assumed 100-day half-life (calculated on the basis of one event). Otto described his experiments evaporating SHE fractions (in 0.1 MHBr) directly on gold detectors.

Ghiorso brought us up-to-date on the operation of the SuperHILAC and the work on the ion source for the Ca^{48} beam. We have several grams of Pu^{244} allocated to us for target material. The total (half of the U.S. supply) availability of Cm^{248}, nationwide, is about 30 mg. Nitschke reported on his work on the gas cooling of targets. Ghiorso also discussed recent aerosol work for recoil transport, including the use of ethylene (which is good but unfortunately polymerizes in the heavy ion beam).

The SHEIKS and TAVERNS came to my office for a bag-lunch meeting at noon. Present were Kratz, Norris, Otto, Binder, Lee, Nurmia, Hulet, and Lougheed. We discussed the problem with the gamma peak shape and decided to replace the pre-amplifier in an effort to get rid of the side bumps.

We discussed the bombardments scheduled for tomorrow: (1) U plus Kr to measure distribution of yttrium and gold isotopes, (2) Pb + Kr to look for Bi^{212} and Po^{212}, (3) Gd + Kr to look for Pb^{212}, Bi^{212} and Po^{212}, and (4) Au + Kr to make a complete chemical separation to look for products. Nurmia reported on plans to bombard Dy^{156} (enriched to 20%) with O^{18} to look for light tungsten alpha emitters.

Jack Ryan called me from Battelle at 1:55 p.m. to discuss further the arrangements by which he can come on as a co-author of our revision of Chemistry of the Actinide Elements.

I returned a call to Werner Hirsch at UCLA at 2:15 p.m. He asked for my general reaction to the CCEEB's sponsoring a conference on short- and long-term resources. I told him that I had suggested to Peevey that it be broadened to include metals, food and water. We discussed his other possible advisors.

Arthur Norberg called at 2:30 p.m. to discuss my participation in the seminar sponsored by the Bancroft Library on May 3-4 on "Physics and World War II." I agreed to serve as the master of ceremonies for the program on May 3.

I called Dick Pehl of the Electronics Group at 2:35 p.m. to exhort him to give more effort and attention to solving the problems that the SHEIKS are having with the shape of the gamma ray peaks that come out of their Ge-Li crystal and attendant electronic equipment.

At 3:00 p.m., I called Jack Hollander for suggestions of speakers for the CCEEB symposium. He said that the LLL group did do an

analysis of Hammer's project; he will try to get a copy of the report for me--he understands it is not so favorable.

I accepted Sheldon Kaufman's invitation to deliver an invited paper at the symposium on "Nuclear Chemistry at the New Accelerators" at the ACS meeting in Atlantic City in September.

At 4:30 p.m., I dropped by to see Kratz, Norris, Otto, and Binder. My call to Pehl had had an obvious effect; both Pehl and Goulding had been by to see them.

Al Ruffo returned my call at 5:15 p.m. I indicated that we probably would not use a season ticket to the 49ers' games this year. However, he offered to send me the season list of games as soon as it is out, so that I can select the individual games that we would like to attend. I replied that this would be ideal.

Suki and I hiked to the water tank. Eric came home from Davis for the between-quarters period:

Friday, March 22, 1974 - Berkeley - Oakland

I called Clarence Richardson at the Division of Physical Research at AEC in Washington at 8:35 a.m. and then Elliot Pierce to inquire about the status of the draft 189 forms I sent them. They haven't studied them yet.

I called John Unik at Argonne at 8:50 a.m. for information on what they are finding in the sample we sent them. He told me that they have seen Am^{241}, Cm^{240}, Cm^{242}, Cf^{246}, and Cf^{248}. He thinks the plutoniums may still be shrouded in the chemistry somewhere.

I wrote Mac McCool in response to his letter inviting me to participate in his environmental planning group at Multi Systems Associates in San Diego; I declined, but said I would like to get in touch with him when I am down there next. Lucile Arnon wrote me about her interest in CUWA; we will invite her to the next meeting. I sent Jol Liljenzin a thank-you letter for the reprint of the cloth printing he sent Helen and me. I sent Stan Schneider the draft of my talk for the World Future Society Energy Forum.

I attended the meeting of the SuperHILAC Research Progress Group in the conference room of the HILAC Building from 10:30 a.m. to noon. I reported on the yield of actinides from Kr plus U determined by LASL and ANL and the discrepancy in yield that has developed. Carol Alonso reported on the use of the reaction $Gd^{160} + Kr^{86} \rightarrow Ar^{34} + Pb^{212}$ to estimate the possibility for $Cm^{248} + Kr^{86} \rightarrow Ar^{34} + 114^{300}$. By comparison with the known yield of other reactions, she deduces that the cross section for the formation (via the compound nucleus path) of Pb^{212} is 10^{-36} cm^2, which is too small to measure. Another possibility is a transfer reaction involving the transfer of a large chunk of the Kr^{86} projectile. Rasmussen described his work with Ribbe on the irradiation of Ta^{181} and Au^{197} with Ar^{40}. They measure the angular distributions of Ar^{41}, Cl^{34}, S^{38}.

After lunch, Edelstein came by to see me. He wants a more independent status in his research program and doesn't want David to do his work in the actinide chemistry group; I disagreed with the latter.

At 2:30 p.m., Pat Somerville came in. Now a physics major at MIT, finishing this spring, I met him when I spoke at the International Science Fair in Baltimore five years ago. He has been accepted for graduate work in the Physics Department at Berkeley but will do his research work in the LBL Nuclear Chemistry Division.

At 3:00 p.m., I met with Attila Pavlath to discuss my attitude toward professionalism in connection with my running for President of the ACS. He has read the section on this in my platform statement and said that it didn't go far enough to satisfy the ardent advocates of professionalism. I said I will make no commitment to either side, will be my own man if elected. Pavlath said that he will undoubtedly have to come out publicly in favor of my opponent (but probably won't wage a direct campaign against me). I assured him that such an action on his part would not lead to a prejudice against his views on my part. He emphasized that the main purpose of this meeting was to acquaint me with his views and the general situation which I shall face. The meeting was generally friendly, and we shook hands as he left.

Helen came by in the station wagon (we left the Bonneville for David to use). We drove to Jack London Square in Oakland to attend a farewell reception for Mr. and Mrs. Robert Thorne, who are leaving on Sunday for Washington where he will start his new assignment as Deputy General Manager of the AEC and Coordinator of the AEC National Laboratories.

Suki and I took our hike to the water tank. Eric, who had his right index finger broken in a basketball game last night, joined us for dinner.

Saturday, March 23, 1974 - Lafayette

We watched the NCAA semi-final basketball games--Marquette beat Jacksonville, 64-51, and North Carolina beat UCLA, 80-77--and the NIT semi-final--Purdue beat Jacksonville, 78-63. In the afternoon, Suki and I took our reservoir hike.

Steve called from Davis. He has been accepted to work on a volunteer job teaching retarded children in an elementary school in Sacramento. He is moving into an apartment with Brent. Dave arrived from Berkeley to spend the quarter break with us.

Sunday, March 24, 1974 - Lafayette

Purdue beat Utah, 87-81, in the NIT final game. Dave, Eric and I took a hike in Briones Regional Park. This gave me a good chance to talk with them. Dave has written to a large number of schools inquiring about admissions to graduate school for Ph.D. He will take his oral and written exams for his Master's next quarter. Eric has done quite well at Davis this last quarter.

Monday, March 25, 1974 - Lafayette

Today is a University holiday. I read Chemistry 1C material.

Tuesday, March 26, 1974 - Berkeley

I called Walter Haubach in the AEC Division of Physical Research at 8:40 a.m., as Elliot Pierce had suggested, to inquire about our 189 forms. In regard to the Edelstein-Streitwieser proposal (New Synthetic Methods in Actinide Chemistry), he told me that Steinfeld and Lagow at MIT are proposing to do about the same thing. I noted that we would hope that it could be attached here to the highly radioactive elements, and he indicated that this would be a strong advantage for us. After some discussion, he entertained the possibility of Lagow's going up to uranium (Steinfeld would do the spectroscopy) and our working with the transuranium elements on up. Haubach told me that we came in too high to fit their budget, particularly in the equipment area where they fared worst.

Edelstein came in to say that he has changed his mind--that he now thinks that David should work with the cooperation of the actinide chemistry group. Sam Markowitz dropped in at 9:10 a.m., having just returned from his sabbatical in Jerusalem. He said that, in spite of the war, he was able to get work initiated at the Weizmann Institute and the tandem into operation.

Phil Horwitz called from Argonne at 9:50 a.m. to suggest that the ANL group come to Berkeley on May 7-9. I then called Darleane Hoffman at LASL and she will tentatively plan on those dates.

Sam Markowitz dropped in again at 11:15 a.m. after a talk with Harvey to indicate that he is unhappy to find that his work is not rated higher by the Nuclear Chemistry Division's Review Committee. He hopes to meet with them and prove them wrong. He seems to accept the transfer of Diana Lee to my work. I then talked with Harvey and we discussed the possibility of Markowitz merging his research program with mine in some fashion.

At 11:30 a.m., I went by to see Kratz, Norris, Binder, and Otto in their lab. They had a bombardment of gadolinium with krypton on Friday and made a chemical separation to look for lead-212 via the daughter Po-212 (they found a few counts per minute). They also bombarded lead with krypton to establish the effect of lead impurity on the gadolinium bombardment. Otto is also looking at the gold isotopes produced in the lead bombardment.

I went by to see Andrew Sessler in his office at noon. The Outside Review Committee of AEC people and outside scientists reviewed the matter last week and will reinforce the recommendation of the Townes Committee to seek Born's resignation. We then joined the Townes Committee--Townes, Thimann, Weisskopf, Ginzton, Hackerman, and Ticho--for lunch in the cafeteria. They are meeting all day today and tomorrow (agenda attached, with Sessler memo on meeting).

At 3:00 p.m., I returned a call to Bernard Saunders, who is interested in working as a consultant with me to complete some of my

Agenda for Meeting of the Townes Committee

Tuesday, March 26 (Meeting in Bldg. 50A, Room 4133B)

9:00 - 9:30 a.m.	Executive Session
9:30 - 11:00	Andrew M. Sessler and Earl K. Hyde
11:00 - 12:00	A. Bassham, Laboratory of Chemical Biodynamics
12:00 - 1:00	Luncheon at LBL lower-level cafeteria with LBL Associate Directors
1:00 - 2:00	J.L. Born, Biology & Medicine Division
2:00 - 3:30	J. Hollander, Energy & Environment Division
3:30 - 4:30	L. Brewer, V. Zackay, Inorganic Materials Research Division
5:30 - 6:00	Executive Session (in Bldg, 62, Room 255)

Wednesday, March 27 (Meeting in Bldg. 50A, Room 4133B)

8:30 - 9:30	E. Lofgren, Accelerator Division
9:30 - 11:00	R. Birge, Physics Division
11:00 - 12:30	G. Seaborg, B. Harvey, Nuclear Chemistry Division
12:30 - 2:00	Executive Session (Sandwiches brought in for lunch)

700 Sci Ed & A Ctr

LAWRENCE BERKELEY LABORATORY 94b
Room: 4133 Bldg.: 50A Ext.: 5231

March 18, 1974

Memorandum

TO: A. Bassham, R. Birge, J. Born, L. Brewer, M. Calvin, H. Fidler, W. Hartsough, B. Harvey, J. Hollander, E. Lofgren, G. Pappas, G. Seaborg, V. Zackay.

FROM: Andrew M. Sessler

SUBJECT: Visit of the Townes Committee on Tuesday and Wednesday, March 26 and 27.

For this meeting of the Townes Committee, Charlie Townes has suggested that the Committee try to gain an up-to-date overview of the present status and future possibilities of the scientific programs of the Laboratory. He is interested not so much in details of programs as he is in major questions such as, which general class of activities is on the increase, which is on the decrease, which programs are in need of nurturing and support, and which are in need of new direction and/or talent. It seems as if this overview can best be accomplished by having discussions between the Committee and the Associate Director for each scientific division. During the meeting, the Associate Director might spend the first third summarizing the present activities, and the second third discussing his views of the future; thus leaving the final third for discussion and comment. In exceptional cases, the Associate Director might want to bring one or two members of the Division with him, but we feel the purpose which the Committee wishes to achieve can best be accomplished by a conversational atmosphere rather than one associated with formal presentations. An agenda is enclosed.

I hope that all of you can join the Townes Committee for a no-host luncheon on Tuesday, March 26 (either bag lunch or through the cafeteria line). The lower level of the cafeteria has been reserved from 12:00 to 1:00.

The members of the Committee are: Professor James R. Arnold, Dr. Edward L. Ginzton, Dr. Norman Hackerman, Professor Roger H. Hildebrand, Professor Kenneth V. Thimann, Dr. Harold K. Ticho, Professor Victor K. Weisskopf, and Professor Charles Townes, Chairman.

Andrew M. Sessler
Director

AMS/ec

Enclosure (1)

historical writings. I said I would have to wait until we know what our budget is and get in touch with him then.

I received an extraordinary letter from Stewart Udall (copy attached), prompted by his reading my "1994?" speech. I submitted my application for a Committee on Research Grant through the Department of Chemistry for 1974-75 (copy attached). I responded to a nice letter from Mario Bancora of the AEC of Argentina and to letters from Garth Hull and Russell Train in connection with the AAAS Meeting.

I called Gary Higgins of LLL at 3:25 p.m. to discuss Armand Hammer's in situ process for recovering oil from oil shale. He said he tried to send the LLL report to me last week but was stopped because of conversations going on in the UC Legal Department--they are worried about our evaluating a commercial process and releasing the report. He expects that it will be released in a matter of days. Higgins think that Hammer's process is straightforward--it has a lot of possibility of becoming a commercial venture but that some modifications would be required.

I asked him about the yield. He said that Occidental Petroleum reports between 80% and 90%. That is consistent with the LLL retort experiments conducted with the Bureau of Mines in Laramie; the yields there have ranged from 60% to 90% and he believes the losses could be reduced. He found Hammer's statements to be overly enthusiastic and experimentally unsupportable--but the process itself warrants enthusiasm. He told me that the AEC was about as enthusiastic towards Hammer's process as they were to other such proposals.

At 6:45 p.m., I met Helen at the Berkeley BART station and we drove to the Marriott Inn at the Berkeley Marina. Here we attended a reception and dinner of the American Crystallographic Association. We sat at the table with Dr. and Mrs. Edward Lingafelter (President of ACA), Professor Andre Guinier (University of Paris), David and Lilo Templeton (he is local chairman), Adolph Pabst, Henderson Cole, Mr. and Mrs. Melvin H. Mueller (ACA Secretary), Mr. and Mrs. Gordon Smith (Program Chairman), Robert Burbank, Ray Young (Past President), and C. M. Caughlin.

After dinner, Lingafelter introduced me and I gave my talk, "Science in China," illustrated with 66 slides. After the program, my old friend Al. E. Smith came up to say hello. He worked with Bob Fowler, Ernest Gibson and me in our little room in the old Radiation Lab during 1934-35, leaving upon receiving his Master's. He has worked in crystallography in the intervening years at Shell Development Company and is now retired.

<u>Wednesday, March 27, 1974</u> - Berkeley

I called Gregory Choppin in Florida at 8:50 a.m. for his evaluation of Al Zeller in connection with my search for a postdoctorate. He said that, though he needs some maturing, we might not do better than him.

At 11:30 a.m., Harvey and I met with the Townes Committee. Harvey made a presentation of the work of the Nuclear Chemistry

MAR 26 REC'D

95a

OVERVIEW

NEW ADDRESS:

Suite 301
6400 Goldsboro Road
Bethesda, Maryland 20034

Telephone: 301/229-1152

March 21, 1974

ISS 3/26/74

The Honorable Glenn T. Seaborg
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

Dear Glenn:

As I knew it would be, the paper you delivered at the AAAS meeting in San Francisco was most provocative. (Glenn, I have probably never told you this, but during my cabinet days I had myself put on the list to receive all of your speeches -- and I believe I read almost every one of them. Like you, I am essentially a "hoper," and I have always admired not only your personal qualities, but the way you express your belief in man's capacity to solve his problems if only he would be rational and be statesmanlike in his politics.)

However, I am deeply troubled these days. One of the reasons I have been unusually outspoken in recent months is that I have been forced to admit that all of us were much too optimistic about solutions in the 1950's and 1960's. I am now convinced this was the big flaw in our approach to the energy-resources-ecology triangle. Our secular religion was technological optimism -- and our faith was stronger than our works. I am far more impressed today with the limits of things, and the limits of our power to manipulate our environment, than I was a few years ago. I am particularly disturbed with those I call the superoptimists (people like your colleague Al Weinberg and the giddy cornucopean Herman Kahn) who periodically reassure everyone that the joyride is just beginning and there are no problems we can't "handle." Such men do much to confuse and mislead the people, in my opinion. I conceive my own candor as an antidote to their soothing syrup.

As I detect a note of fresh skepticism in your own writing, I am anxious to compare notes with you concerning any changes which may have taken place in your own outlook. A few weeks ago I wrote a long article for The Washington Post which was an attempt to get at the root causes of the energy crisis. As part of my diatribe, I took a haymaker swing at the atomic scientists -- as you will note. Perhaps I was unfair. I will

be interested in your reaction to this article. The point of view expressed in the Harrison Brown quote was gospel in the early 1960's. I remember Roger Revelle -- my science advisor mentor -- expressing this judgment about the future outlook. Looking back I can understand the euphoria -- but was it really ever justified?

Glenn, I am not only distressed with scientists who are, to use your words, "prone to the blue skies approach," but I wonder if there is any effort underway (it would take a mea culpa, of course) to reinstate the old-fashioned concept of conservation? Your speech, to be sure, had that flavor -- but are we giving sufficient drama and stress to the urgent need for old remedies as our petroleum supplies are disappearing for all time? I have recently gone back and reread some of the reports turned out by the National Academy of Sciences during the Kennedy years, and I find the doctrine that technology had preempted conservation espoused by nearly all of the leading scientists then.

Of course, I am even more distressed with the economists and their "iron laws" of supply and demand. Do you realize that the conventional economist does not accept the fact that there are limits of anything? Or that their "science" does not take cognizance of the circumstance that certain resources are finite and nonrenewable? It shocks me to try to grasp the fact that simple concepts of thrift and conservation are not taken into account in modern economics. Yet, "the marketplace" is making our disastrous policies -- as it has been for years now. Today the law of supply and demand is "operating" because politicians like Nixon believe our lavish way of life is sacrosanct: of course, the President is a desperate man, but he wants the big energy carnival to continue so the people will be happy and have everything they want. What a tragic way to make a "national energy policy."

On the global front, Glenn, I have lost my optimism and am now as gloomy as Malthus. Rev. Malthus caught hold of a simple truth 200 years ago, and he was right. There are limits to growth -- and unless these limits are respected ultimately great tragedies will occur. The technological optimists have been having the last laugh on Malthus, but maybe the road is about to take a turn. Those resource "experts" who believe "technology made an ass out of Malthus" may have to eat crow one day soon, for the time is near when the Malthusian concept will have its hour to make asses out of the technological optimists. In all candor, I see no hope for India and the other sick countries. They are doing nothing significant to cope with their biggest problems. There is little we can do that we have not done to help them help themselves. It makes me flinch to say it, but our food reserves are now sold for cash on the barrelhead, and the starving millions will have to go through the ecological wringer.

There is one final topic I want to discuss with you, and this brings me to the presentation which you and your colleagues made to the California legislature. It seemed to me the tenor of this presentation, again, is one of general optimism. The presentation seemed to focus far too much on the need to fulfill future demands, and to only pay lip service to the need to slacken gluttonous, wasteful consumption, Conservation, as usual, is presented as an afterthought -- and not as a paramount priority. The big engines of consumption are running wild. Aren't we unwittingly acting as gravediggers of the future if we do not impress on the policymakers the need to make a great, rigorous effort now to dampen demand? Does, for example, the chemical industry really need (as they say) more energy by 1980 than we are using today?

One final thing. Although I have had my doubts, I have gone along with the nuclear power program to a substantial extent because of my personal faith in you. Glenn, I am now wavering -- and find myself in a very negative frame of mind where the breeder reactor is concerned. My antennae tell me we are moving into a more violent world where Black September type terrorism will be more prevalent, not less. Do we really want to proliferate breeder reactors and spread them around the earth? If we do it, won't we find some day that the United States -- or one of its cities -- is held hostage by a bomb instead of the Hearst family?

I want your thoughts. Some of us have to talk sense to the American people -- and talk in strident tones, I'm afraid!

Most sincerely,

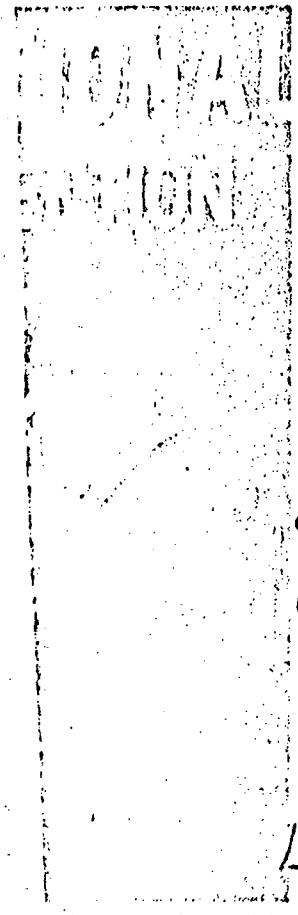
Stewart L. Udall
Chairman of the Board

P.S. Please also take a look at the enclosed clippings. It was a curious coincidence, but these two statements by Maurice Strong and Nixon appeared in the press the same week last November. My guess is that Nixon expresses the current American point of view -- and Strong expresses a world conscience outlook that will become very powerful in the years ahead. Again, this country is inviting trouble.

Enclosures

Epistle

ax Returns



ecchio—The Washington Post

reets Mr. Nixon.

e — and therefore, we get to deal with that lem," the President

. Nixon's speech was first in what is expected a series of appeals be- various forums in be-

half of his energy policies. The President on Sunday announced a nationwide ban on the Sunday sale of gasoline, to go into effect when Congress approves pending emergency legislation.

He also asked for the 50-mile speed limit, a ban on display lighting for businesses and asked homeowners to dispense with outside ornamental lighting.

In his speech yesterday Mr. Nixon spoke again of making the United States self-sufficient in energy by 1980, but he celebrated this nation's heavy energy use.

"There are only 7 per cent of the people of the world living in the United States, and we use 30 per cent of all the energy," he said. "That isn't bad; that is good. That means we are the richest, strongest people in the world, and that we have the highest standard of living in the world. That is why we need so much energy, and may it always be that way."

Mr. Nixon was applauded frequently as he spoke in a crowded second-floor hotel room before signs that said, "Save America's fishing industry" and "A strong inland waterways system means a stronger America."

The President's loudest applause came when he called for a strong Merchant Marine so that the United States need not be "dependent on some other country."

U.N. AIDE DEMANDS ALTERED FUEL USE

Maurice Strong Calls for a 'Low-Energy Life-Syle' to Meet Shortages

Special to The New York Times

UNITED NATIONS, N. Y., Nov. 21 — Maurice F. Strong, the executive director of the United Nations Environment Program, declared today that the energy shortage required the development of a new "low-energy life-style."

Increasing the supplies of oil or other energy sources will not suffice to meet present and future needs, said Mr. Strong, who was a Canadian oil developer before joining the United Nations.

North Americans, the world's "big energy" consumers, may have to change their pattern of consumption radically, he said at a news conference, adding:

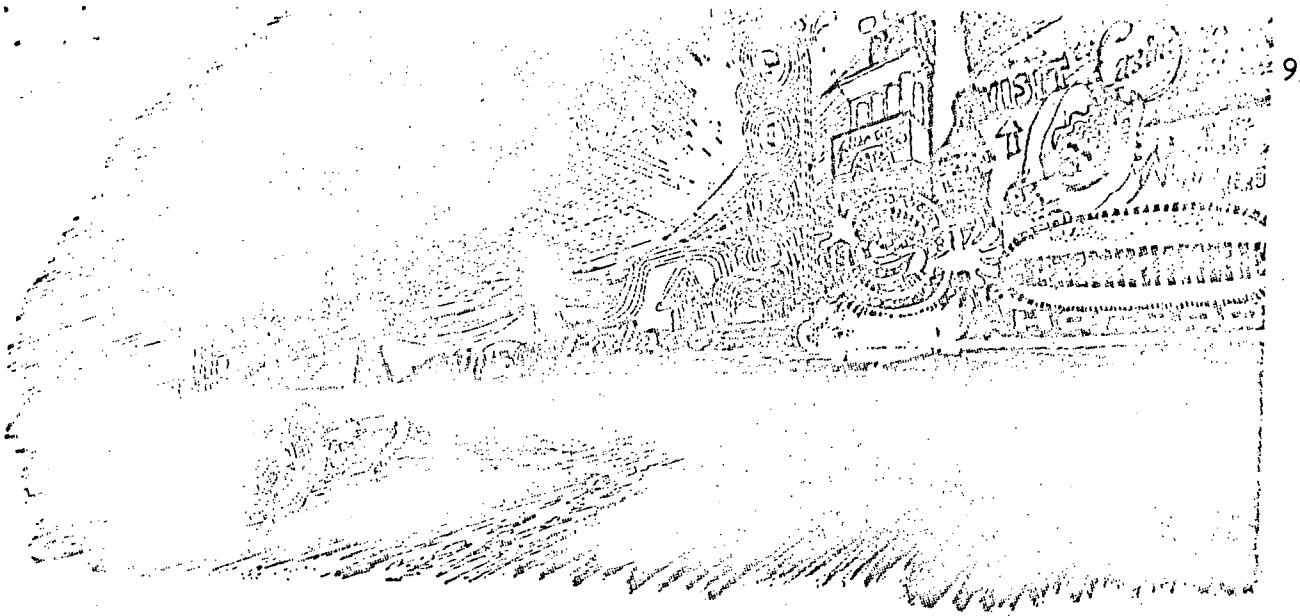
"Two hundred million Americans use more energy for air-conditioning alone than China's population of 700 million for all purposes."

"I believe it is highly questionable whether any country has a permanent right to a disproportionate share of the world's resources," he declared.

As part of the development of a low-energy life-style, he suggested more sparing use of automobiles. As a matter of "equity, justice and human rights," he declared, should not the use of energy for luxury and trivial needs be taxed? Also to be faced, he said, was the question of whether access to energy would be available only to the rich.

He said that the general public and governments had been trying to maintain a business-as-usual attitude during the developing energy shortage and had turned a deaf ear to the warnings of conservationists.

He said that the energy crisis might be beneficial if it served "to alter significantly the pattern in the current use of energy."



By Richard Wilson for Stockholm Conference Fco. © 1973, F

End of an Era

By Stewart L. Udall

The writer, a former Secretary of the Interior, is chairman of the board of Overview, a Washington-based environmental consulting firm.

WHAT OUR historians will call the Petroleum Age is at a climax. U.S. oil production has started its decline, and there will never be any alternate energy sources that are real substitutes for oil and gas.

A nation that bases a vital national policy on self-deception is inviting trouble. Yet this is what we have done as we persuaded ourselves that the sciences that split the atom and "conquered" outer space had "solved" the energy problem. The arrogant optimism that propelled us into the current crisis now threatens our whole future unless we discard one opinions of our recent past and begin to exercise restraint.

We can avoid this long range crisis, but we take a hard look at the misconceptions and national extravagances that have put us in our present predicament. The energy crisis will affect our lives probably for at least two decades and will permanently alter the future. We can cope with it only by ending waste, and by casting aside the self-deception that made us believe we were energy omnipotent. We have built up inordinate appetites for energy, needs we cannot possibly fill in the years ahead.

Oil Company Selfishness

TO BE SURE, the international oil companies deserve most of the criticism they are getting for the crisis. It is their greed and irresponsibility which have made the first phase of the crunch unnecessarily harsh. For all practical purposes, we have allowed them to make and administer national energy policy for the past three decades -- and they have long known the hard facts. Three years ago they helped prepare official reports which accurately forecast a "frightening" energy crisis. They realized that our domestic oil production had peaked, that our consumption was on a runaway upward spiral, and that we were becoming overdependent on volatile Arab oil.

See ENERGY, Page B5

Yet despite these warning signs, the big oilmen ignored their own findings and took no remedial action. In the face of a serious shortage of refinery capacity, they built no refineries for three years. Confronted by militant oil-producing countries that were making the global marketplace more uncertain by the week, they continued with their plan to fill the growing U.S. energy gap with imported oil.

We did not have anything resembling a national energy policy in the 1960s when I was in the government — and even the "Simon program" of recent weeks is little more than a stop-gap improvisation. The government has erred grievously in allowing a small handful of international oil companies to dictate our energy policies.

By definition, multinational companies cannot be counted on to protect the national interest of their "home" country. Companies which produce in one country, refine in a second, and retail in a third necessarily serve many masters: Their responsibilities to their stockholders, to the Arab sheiks, and to the governments of the oil-consuming countries will often take precedence over their concern for American consumers.

It is clear now that the reaction of the big oil companies to the looming shortages was shortsighted because it was selfish. It was no coincidence that when the energy crisis talk first started in 1971 their trade association adopted the slogan, "A nation that runs on oil can't afford to run out!" This was a not-so-subtle way of saying to Congress: "Big shortages will develop soon unless you increase our tax allowance and increase our incentive to produce more oil." As predicted, the shortages did occur and are now striking sledgehammer blows at the economy — and the oil companies are, as usual, in the driver's seat.

Concepts From the 1950s

THE NIXON administration must also accept considerable blame for the short-run crunch. From the beginning, the President has refused to admit that a serious crisis was at hand. Last March, John Ehrlichman expressed the President's disdain when he said, "This will not be the administration to tell people to turn down their thermostats!" And, judging by the opinions he has expressed recently, President Nixon still holds 1950s concepts of our energy troubles. He sees our greedy consumption of one-third of the world's energy as a symbol of American power, a point he vainglariously made last November when he said:

"There are only 7 per cent of the people of the world living in the United States, and we use 30 per cent of all the energy. That isn't bad; that is good. That means we are the richest, strongest people in the world, and that we have the highest standard of living in the world. That is why we need so much energy, and may it always be that way."

The End Of the Free Ride

It is this frame of mind in the country as well that is a major problem today, and it is important that we understand what produced our technological optimism. The search for an answer leads us again to the oil companies, and to the atomic scientists.

Oil men have always been incurable optimists, and it was their rosy outlook — and promotional policies — that led us into our post-World War II petroleum binge. In the early stages, their optimism appeared to be justified. As late as 1954, for example, more than half the world's petroleum was pumped from U.S. wells and used by U.S. consumers, and we were assured in the mid-Fifties that this was only the beginning. Mind-blowing things had happened to give the global oil picture a gusher glow. A few companies had drilled a few shallow wells in the Persian Gulf area, almost doubling the world's known reserves almost overnight, and their geologists were fond of predicting that the big worldwide "oil play" was still in its early innings. It was a combination of these big strikes, bullish forecasts and a world-wide glut of cheap oil in the late Fifties which persuaded the industrialized countries to gear their economies to petroleum and make ambitious plans to double its consumption every 10 or 12 years.

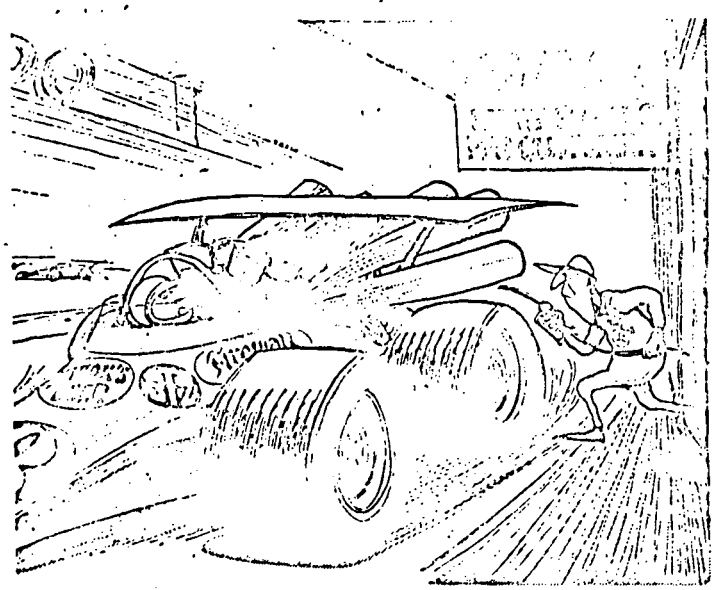
Atomic Euphoria

THIS OIL superoptimism was both confirmed and superseded by the euphoria created by the announcement of the "Atoms for Peace" program by President Eisenhower in 1955. This new scenario of superabundance was written by prestigious nuclear scientists, and it put the seal on the golden optimism of the 1950s. Even if the forecasts of the oilmen were part bragga-doccio, we could still rest easy, for in a few decades the atom would become an inexhaustible source of clean, cheap energy.

Any skepticism was swept aside as we glowed in our new conception of ourselves. If unlimited energy would be available, then the whole world would ultimately enjoy the benefits of the U.S. automobile culture. If vast blocs of low-cost electricity were available, engineers and inventors could plan and build huge megastructures, machines and engineering works that until then, were drawing-board dreams. Relying on the benefits of atomic energy, economists could assume the technology would underwrite U.S.-style industrialization for the undeveloped countries. If energy was to be practically a "free" commodity, businessmen could turn their thoughts to an unlimited array of futuristic goods and services, with the assurance that the ominous shadow of resource depletion would be obliterated for all time by the wonder of self-perpetuating nuclear fires.

One of the more eminent of these technological futurists was RCA's David Sarnoff, a doyen of the industrial establishment. Respected for his enlightened outlook and his pioneering work in electronics, Sarnoff in 1956 overflowed with optimism: By 1960 he envisioned atomic automobiles, personal helicopters, mail service by guided missiles, and a cornucopia of goods and products that would eventually lift the whole world to higher and higher standards of living. He had few second thoughts, and he asserted with evangelistic fervor, "We are merely on the threshold of the technological age." Sarnoff was almost certain that, if nuclear wars and social violence could be avoided, a great chain of progress was inevitable.

This unfaltering faith in technology and the economic growth it would generate was expanded in some of the Rockefeller Panel studies presented in 1958. These bullish reports, prepared



Oliphant in the Denver Post

by such experts as Dean Rusk, Henry Kissinger, and Arthur Burns, were considered unofficial "white papers" on the American future. They counseled the nation that the Cold War could be lost if we did not further accelerate production and exploit the advantages of technology. Parts of these reports were also written in the glowing ink of the golden optimism:

"New technologies, more efficient extraction processes, new uses may open up new worlds. Even now we can discern the outlines of a future in which, through the use of the split atom, our resources of both power and raw materials will be limitless . . . in the 20th Century the unprecedented acceleration of scientific advance promises that we are only on the threshold of a new age of science . . The world may well be on the verge of a major revolution in available energy. Already the proven resources of uranium and thorium, in terms of energy equivalent, are at least 1,000 times the world resources of coal, gas and oil."

The Scientists Join In

NOT SURPRISINGLY the scientists, themselves joined in to write "new threshold" scenarios. In 1957 the noted geochemist, Dr. Harrison Brown, and some of his Caltech colleagues wrote a book on resources and technology for businessmen and gave it the futuristic title of "The Next Hundred Years." The book was written in the restrained prose of a scientific paper, but its long view matched David Sarnoff's tone. The authors foresaw the spread of U.S.-style industrialization to the rest of the world; they used the new broom of big technology to brush Teddy Roosevelt's brand of resource conservation into the ash can of history; and they doubled the ghost of Rev. Malthus and pooh-poohed the fears of a food-population crisis in the next century. Much near-certain confidence that science and engineering could overcome all "technical obstacles." However, it was the advent of low-cost nuclear energy that emboldened the Caltech scientists to make this staggeringly grandiose prediction about the future:

"If we are able in the decades ahead to avoid thermonuclear war, and if the present underdeveloped countries of the world are able to carry out successful industrialization programs, we shall approach the time when the world will be completely industrialized. And as we continue along this path we shall process ores of continually lower grade, until we finally shall sustain ourselves with materials obtained from the rocks of the earth's crust, the gases of the air, and the waters of the seas. By that time the mining industry as such will long since have disappeared and have been replaced by vast, integrated, multipurpose chemical plants supplied by rock, air and sea water from which will flow a multiplicity of products, ranging from fresh water to electric power, liquid fuels, and metals."

This cornucopean hypothesis gained wide acceptance in scientific circles in the Fifties, and it became one of the air cushions of the golden optimism. It supported the idea that the "rising expectations" of the poor countries could be fulfilled — and it also helped salve the conscience of a gluttonous country that was gulping down its own petroleum at a staggering rate and consuming one-third of the world's resources each year.

The Washington Influence

THE LAST FOUR Presidents were at the center of things in Washington in the 1950s when our technological optimism came to full flower, and it inevitably had a significant influence on their big decisions. It was no

ecis of the 1950s:

energy extravaganzas that fit the mold of the new ideology of superabundance.

In his memoirs, President Eisenhower judged the construction of the vast freeways and interchanges of the interstate highway system as the great domestic achievement of his administration. Likewise, the space program was a premier attainment of Presidents Kennedy and Johnson. And when President Nixon genuflected before U.S. technology and greeted the Apollo XII astronauts with the exclamation, "This is the greatest week since the creation of the earth!" he enthroned the machine and expressed the quintessence of our technological optimism.

By giving precedence to expansive projects that celebrated the era of cheap energy, these Presidents openly endorsed two ideologies that were the outgrowth of our technological optimism: (a) the moon-race decision expressed the ideology that we had the wealth and cheap energy and technical skill to do whatever we wanted to do; and (b) the automobilizing of U.S. culture articulated the ideology that the maximum production and consumption of goods was what our economic system was all about.

The assumption that inexhaustible supplies of cheap energy would be available for the indefinite future is obviously at the root of the present energy crisis. In fact, a list of the day-to-day operating assumptions of American society is also a list of the working policies that have created the 1970s crunch. Some of them:

- The more big autos the better.
- It is in the national interest to find and use up our petroleum as fast as possible.
- The consumption of electricity and other forms of energy should be promoted aggressively (i.e., the level of energy use is an index of the strength of our industrial system).
- Virgin nonrenewable resources can be squandered (and the recycling of resources is unnecessary) because new technology will replace them with cheap substitutes once they are used up.
- Rich nations can always buy whatever critical resources they lack from other countries at cheap prices
- The engineering and design professions can act with the assurance that low-cost energy will always be available.

But the great energy joyride is ending. That is the message of the crisis. The script for the 1970s is already 90 per cent written, and it reads, "Shortages —and efforts to combat shortages by conservation practises."

Once or maybe twice each century a peacetime development occurs which changes the course of history and dominates our national life for years. The Great Depression was such an event. The end of the Petroleum Age, in a different way, will be another. And we cannot come to grips with it unless we force ourselves to discard all the old

For Academic year: 1974-75

Name: Glenn T. Seaborg

Title: University Professor

Department: Chemistry

Are you 100% time for 3 quarters: Yes

INDIVIDUAL APPLICATION TO COMMITTEE ON RESEARCH TO BE ATTACHED
DEPARTMENTAL APPLICATION

1. Statement of Research Proposal (use back of sheet if needed):

The basic purpose of the program is a search for superheavy elements by chemical methods among the reaction products in heavy ion-bombarded SuperHILAC (Heavy Ion Linear Accelerator) targets. If these elements could be found, very important conclusions about the continuation of the Periodic System could be deduced from their chemical behavior. In addition, chemical processing of thick targets could turn out to be the only reasonable access to the superheavy elements, as experience in other laboratories tends to show that production cross-sections are extremely small.

The chemical procedures will consist of extraction chromatography and ion exchange chromatography at carefully controlled pH-conditions. The resulting fractions will be checked for unknown alpha-emitting or spontaneous fissioning nuclei using high efficiency and high resolution semiconductor detectors.

As a result of experiments in the past year, further evidence exists that positive identification of superheavy element spontaneous fission events will require additional sensitivity and measurement of the total kinetic energy release in the fission process. Pairs of solid state detectors will be used to increase the present detection efficiency as well as measure the kinetic energy release from spontaneous fission of superheavy elements.

A study of reaction mechanisms leading to production of superheavy elements will be studied in connection with the basic purpose of the project. In addition to alpha and spontaneous fission activities, chemical separation and purification of isotopes with 1 to 2 counts per minute of beta activity will allow half life analysis with low background solid state beta counters.

2. Detailed budget setting forth specific needs:

Mettler analytical balance	$1,295.
Four surface barrier solid state detectors @ $100. each	400.
Two solid state beta detectors @ $400. each (low background high efficiency type)	800.
TOTAL REQUEST	$2,495.

bxc 3/26/74: Norris-Kratz et al.
Roland Otto
Bernard Harvey

3. Brief report of work accomplished the past year on Committee funds:

See the attached description, as submitted on March 8, 1974, to the International Conference on Reactions Between Complex Nuclei (to be held at Nashville, Tennessee, June 10-14, 1974).

4. List of publications or creative work based on the Committee's support during the last two years, OR other publications for the same period.

"Radiochemical Investigation of Reactions of Ar-40 and Kr-84 Ions with U-238 Targets," Abstract attached of paper to be presented at International Conference on Reactions Between Complex Nuclei in June 1974.

5. In order to establish both need and priority we are requesting that you list all extra-mural support for your research program. Explain why more funds are needed from the Committee for this particular project. Sales of works of art made with materials or assistance financed by the Committee on Research should be reported here.

My research is basically supported by the Nuclear Chemistry Division of the Lawrence Berkeley Laboratory. This Division's budget resources have continued in effect to decline, while the demands have increased. It is necessary to obtain all possible assistance in order to maintain the level of research now under way.

Signature Glenn T. Seaborg

Glenn T. Seaborg

Division. I spoke about the program of heavy element synthesis and actinide chemistry. We put on the blackboard, in response to the Committee's request, the following list of new directions for the Division: (1) the synchrotron radiation project at Stanford by Shirley; (2) increased emphasis on actinide chemistry; (3) radiochemistry; (4) strengthen heavy ion physics; (5) proposed program of Yuan T. Lee; (6) laser photochemistry by Bradley Moore; (7) strengthen environmental chemistry; (8) superconductive cyclotron. We said that we are very pleased with the new Laboratory leadership and identified as the outstanding problem the leadership in the Biomedical Division and Donner Laboratory.

I had lunch at my desk. I acknowledged a letter from Alan Nixon, written on behalf of the Committee of Scientific Society of Presidents. I also responded to a letter from Luis Marquez at Bordeaux, who expects to visit LBL (correspondence attached). I submitted an updating of my publications list for the Department of Chemistry's Scientific Papers collection (copy attached).

I checked in on the SHEIKS and Ghiorso's 106 experiment, then returned to my office. Joe Cerny brought in the letters of recommendation for Tyrie Jenkins for a position in the undergraduate student research program in Nuclear Chemistry for juniors this summer. These letters were so laudatory that I decided to offer Ty a position with me this summer even though she is only in the middle of her sophomore year.

I picked up Dave at International House and drove him home with me. He had spent the night at International House, then met today with his advisor, Professor Balamuth, in the Department of Zoology, and others to discuss arrangements for his Master's examinations. He is having difficulty lining up two professors for his oral exams; he isn't getting the best attention from faculty at crucial times.

Helen told me that Ben Orlove had called to tell us he was offered the position as Assistant Professor of Environmental Studies (with an arrangement with the Department of Anthropology to teach there) at Davis--he has decided to accept.

Thursday, March 28, 1974 - Berkeley

I wrote to Stewart Udall (attached) in response to his thoughtful letter. I wrote a letter and memorandum to Sol Linowitz (attached) concerning a possible visit to the Occidental site in Colorado and an evaluation of the claims for an electrocatalyst. I also wrote Anton Schmalz at the World Future Society, suggesting that he invite Udall to participate in the Energy Forum next month. I then wrote Ed Cornish to say my schedule fits in well with the WFS reception in Stockholm on June 14, so he can count on me.

Jack Hollander called at 9:25 a.m. He is impressed with Zoller as a candidate for our environmental chemist position. We discussed my letter to Charles Birdsall about the proposed Energy and Resources Interdisciplinary Program, and, on the basis of this, I will amend my wording to indicate that I hope this will fit within the framework of collaboration with the Laboratory (copy attached).

MAR 26 REC'D

Gradignan, March 19th 1974

96a

FACULTÉ DES SCIENCES
DE L'UNIVERSITÉ DE BORDEAUX

CENTRE D'ÉTUDES NUCLÉAIRES DE BORDEAUX - GRADIGNAN

MÉCANISME DES RÉACTIONS NUCLÉAIRES

LE HAUT-VIGNEAU
33-GRADIGNAN
Tél. Bordeaux (56) 21.56.30 à 33

1523 3/26/74

LM/FK

Professor Glenn T. SEABORG
Lawrence Berkeley Laboratory
University of California
Berkeley - California
U.S.A.

Dear Professor Seaborg,

GREATINGS !

After so many years, allow me to begin with some news relevant to the sbject of this letter.

I have been in France during 15 years. I was in Saclay 7 years and then at a small nuclear center in Bordeaux for 8 years.

I was in Berkeley during the summer 1967 and I worked for six weeks with B. Harvey at the cyclotron. Professor Isadore Perlman arranged that.

One of my students, J.L. Québert, who got a Ph.D. in France, worked for one year with Richard Diamond.

I am writting to you now because I am making a short trip to the U.S.A. in June. This trip is sponsored by the French Ministry of Foreign Affairs. I will attend the Nashville Conference on Complex Nuclei.

After that conference, I would like to go to Berkeley for three or four days to see what is going on there in low energy nuclear physics. I expect to go to the radiation lab from the 17th to the 20th of June.

I will be very grateful if you could arrange for that.

Of course I would like to talk to you and also to the following physicists :

B. Harvey, R. Diamond, Emilio Segre, John Rasmussen.

Sincerely.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740
U.S.A.

March 27, 1974

Dr. Luis Marquez
Mecanisme des Reactions Nucleaires
Centre d'Etudes Nucleaires de Bordeaux
Le Haut-Vigneau
33-Gradignan, France

Dear Luis:

I was glad to hear from you after all these years.

I am delighted to learn that you are coming to visit us at the Lawrence Berkeley Laboratory on June 17-20. Unfortunately, I will be in Europe during those dates, but I have gotten in touch with the others you mentioned.

Bernard Harvey also expects to be out of town during that period.

However, Richard Diamond, Emilio Segre, and John Rasmussen expect to be here during your visit, and each has indicated that he will be glad to see you. Diamond will also be attending the Nashville Conference.

Would you like us to reserve a room for you at the Faculty Club for the nights of Sunday, June 16, through Thursday, June 20?

With best regards,

Cordially,

Glenn

Glenn T. Seaborg

GTS/sms

cc: Bernard Harvey
Richard Diamond
Emilio Segre
John Rasmussen

bcc: LUCIANO MORETTO--Rasmussen has suggested that Marquez might be invited to give a Nuclear Chemistry Seminar on Monday, June 17. Would you like to do this?
EILEEN EILAND--Unless he gives a seminar, is any other paper work required to get him onto the hill?

March 27, 1974

Reprints of Glenn T. Seaborg Publications
1973-74 to date
for

Scientific Papers
Departments of Chemistry
and Chemical Engineering

and Annual Supplement to Bio-Bibliography

1. Medical Uses: Americium-241; Californium-252. Handbook of Experimental Pharmacology (H. C. Hodge, J. N. Stannard, J. B. Hursh, editors), Volume XXXVI. Berlin: Springer-Verlag, 1973, pp. 929-940.

2. Attinidi [The Actinide Elements]. Enciclopedia Della Chimica. Italy: Utet-Sansoni Edizioni Scientifiche, 1973, Vol. II, pp. 199-207.

3. Attinio [Actinium]. Enciclopedia Della Chimica. Italy: Utet-Sansoni Edizioni Scientifiche, 1973, Vol. II, pp. 207-209.

4. Berkelio [Berkelium]. Enciclopedia Della Chimica. Italy: Utet-Sansoni Edizioni Scientifiche, 1973, Vol. II, pp. 403-406.

5. New Technologies: Do They Provide An Answer? Addresses Before A Conference on Energy and Our World: The Coming Crisis. San Francisco: World Affairs Council of Northern California, 1973, pp. 73-101.

6. Science and Man in the Americas...A New World Outlook. Science and Public Affairs, Bulletin of the Atomic Scientists, October 1973, pp. 21-27.

7. Science, Technology and the Quality of Life. Proceedings of the First Philip Morris Science Symposium (Nicholas J. Fina, editor). New York: Philip Morris, Inc., 1973, pp. 18-26.

BOOK TRANSLATION: Man and Atom (1971) published in Russian as Chelovek y Atom (I.G. Pochitalin, translator; B. F. Kuleshova, editor; Introduction by M. D. Millionshikov). Moscow: World, 1973.

March 28, 1974

Mr. Stewart Udall
Chairman of the Board
Overview
Suite 301
6400 Goldsboro Road
Bethesda, Maryland 20034

Dear Stew:

I shall try to reply to your thoughtful letter of March 21, 1974, but I'm afraid that my necessarily somewhat hasty reflections will not do justice to your profound conclusions. I believe that you and I are not, in general, very far apart in our philosophy and our views of the future but are using somewhat different approaches in our attempts to influence the planning for that future. Perhaps my approach is epitomized by Mary Poppins' famous expression, "a spoonful of sugar helps the medicine go down," whereas you would rather dispense with the sugar. Obviously there is no way to determine which is the better approach and it may be good to have strong views along each of the two lines headed, I believe, toward the same objectives. I am often tempted to utilize your approach but restrain myself--it is emotionally more satisfying. And, Stew, please keep it up--the frontal attack is needed, and you do it well.

I'll try to walk through your letter point by point.

We may have been too optimistic about solutions in the 1950s and 1960s and this was bad to the extent that it led us to neglect, as national policy, the resources, environmental, and conservation aspects. However, we must not forget the general social and political atmosphere of the 1950s and 1960s which, in my opinion, would have prevailed in the total absence of optimistic statements by scientists. I believe that it was worthwhile to have the technological possibilities described, just as I believe today that there is an extremely important role for organizations like the World Future Society which is devoted to a study of our technological future with a view toward increasing the

possibility of our gaining control of it. And I can't help injecting here the thought that people today are a lot better off, as the result of science and technology, than our forefathers ever were--this is a thing involving health, longevity, nutrition, education, travel, communications, what I have called "democratization of privilege," and so forth, but I won't do much more than mention this here. Incidentally, I agree with your "giddy cornucopian" characterization of Herman Kahn (to give you some renewed confidence in my overall sense of balance), but you have misjudged Al Weinberg. Weinberg has displayed, for example, a great sense of conscience over nuclear power.

Yes, I believe you have been unfair to the atomic scientists. As a group they have been more socially and politically conscious than any other group of scientists and are probably more responsible than any other class of people for such steps as have been taken, woefully inadequate so far, for the international control of nuclear weapons. I think that if you take Harrison Brown's book in its total context you will find as many things to like as to dislike. His has been a strident voice for population control, conservation, and international cooperation. And although the paragraph you quoted from his book may sound overdrawn, I'm afraid it's true that whatever course we take in the future, our survival will depend on the use of technology to get the most from our dwindling resources, to maintain a clean environment, and to provide the food and water and energy we need. Incidentally, I believe you also misjudge Roger Revelle, one of the world's leading workers for population control and international cooperation.

I am as unhappy as you with the economists and the unrealistic attitude of so many of them towards supply and demand. You will find in my keynote remarks on energy policy to the California State Legislature the following: "We are accustomed to the idea of unlimited growth from our classical theories of economics in which supply always rises to meet demand, but unlike capital which is a construct of man, the natural resources of our earth are finite. In fact, we are going to be faced next with a series of resources crises--a copper crisis, a manganese crisis, and so on--if we do not plan better for the future than we have planned in the past for our future energy needs." The "and so on" is meant to indicate, for example, food crises and water crises, and I'm going to expand on this later next month in a luncheon talk at a World Future Society Forum in Washington, D.C. I'll have more to say on this a couple of paragraphs further on.

To a large extent I share your gloom about the future and the possibility that Malthus may be proven right. But I think that this is not inevitable, that we must work to prevent it without being complacent or overoptimistic about technological miracles. (Too much pessimism, I fear, can cause people to stop trying.) The solution lies in planning (including population limitation), conservation, and beneficent applications of technology worldwide. All three are needed. This has become one of my main concerns recently, one to which I have directed a good deal of energy. I am enclosing a copy of my Retiring President's address (American Association for the Advancement of Science) which addresses this problem ("Science, Technology, and Development: A New World Outlook," published in Science, Vol. 181, July 6, 1973, pp. 13-19). Perhaps you would like to note especially my plea on the last page for the formation of an International Association for the Advancement of Science. We have already made progress in this direction through the formation of a Coordinating Committee for the Associations for the Advancement of Science in the Americas, and at the meeting of the AAAS in San Francisco last month I met with representatives from seven Asian countries to begin steps toward a similar coordination of Asian science. Disaster on the food supply front in many parts of the world is a horrendous but definite possibility, and you may know that Norman Borlaug (with whom I have had many conversations on this subject) is extremely concerned.

The presentation to the California State Legislature was actually more balanced than my keynote remarks would suggest. I am enclosing a copy of the program which, as you will see, gave serious attention to the energy conservation aspect. In addition to Dr. Harte's talk, Dr. Holdren devoted his talk to conservation, societal ethics and the problems posed by nuclear power. I agree very much with you that we cannot make it without stringent conservation measures.

To comment on the breeder reactor in this short account is the most difficult part of my hurried reply to your various concerns. I might begin by commenting on your sentence, "Do we really want to proliferate breeder reactors and spread them around the earth?" Breeder reactors are going to be built in all the large industrial countries of the world, and many smaller ones, whether or not the United States has a breeder reactor program. So we have no control over this. I am very cognizant of the many problems associated with nuclear power (including breeder reactors) and have done much soul searching on this subject; I'm afraid a meaningful discussion of this is beyond the scope of any account of reasonable length that I can include here--perhaps we'll have an opportunity to discuss this in person some time. In summary, I still believe that when all factors are taken

into account nuclear power will generate electricity with less harmful impact on human life (and by quite a factor) than other means of generating electricity, at least for the interim period between now and when fusion and solar energy will be available on an appreciable scale for this purpose, sometime into the twenty-first century. And, incidentally, I still believe that nuclear energy will be used for the large-scale desalting of sea water, an objective that you supported so vigorously during your time as Secretary of Interior.

With respect to your postscript and the enclosed clippings, I must say that I obviously believe Maurice Strong is right. The other statement, which I hadn't seen before, is shocking. And if this expresses the current American point of view, we have much work to do. I, of course, spoke to this in the last paragraph of page 2 of my keynote remarks to the California Legislature and in my Retiring President's address.

I am going to be one of two luncheon speakers (Vice President Ford is the other) at a World Future Society Forum on "Energy: Today's Choices, Tomorrow's Opportunities" in Washington, D.C., at the Hilton Hotel on April 24. I haven't completed my remarks yet, but in draft form my opening sentences appear as follows: "We are here for two days to discuss our national, and international, energy problem. I believe that the year 1973 represents a turning point in our lives--we may never again take energy supply for granted. The energy problem is not like the situation with wheat where one has a poor crop this year or that year. Rather it is a problem that took a long time in coming--even though the point of recognition seemed to come suddenly last year--and it's going to take a long time in going...." I should think you would want to attend or perhaps even participate in this conference. I am enclosing a copy of a tentative program. It is being arranged by Anton B. Schmalz (World Future Society, 4916 St. Elmo Avenue [Bethesda], Washington, D.C. 20014; telephone 301/656-8274), and you may want to get in touch with him for further details.

I wouldn't want anything I've said in this letter to discourage you from talking "in strident tones." I say again--keep it up.

With warm regards,

Glenn T. Seaborg

GTS/ssk
Enclosures

bcc: Jack Hollander w/copy of Udall letter

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

March 28, 1974

The Honorable Sol M. Linowitz
Coudert Brothers
1 Farragut Square South
Washington, D.C. 20006

Dear Sol:

I have looked into the two matters that we discussed in your office on Monday, March 18: (1) a possible visit to the Occidental site in Colorado and (2) an evaluation of the claims for an electrocatalyst. I have tried to reach you by phone without success, so I will give you a brief report by letter.

On the first item, there is the problem of finding someone with the necessary expertise who is completely open-minded. As I indicated in our conversation, Professor Thomas K. Sherwood of the Chemical Engineering Department here at Berkeley, who met with Armand Hammer and Richard Ridley here in my office, feels that the process was misrepresented at that time and that the yield is too low to make it feasible within the next decade. I talked to Jack Hollander, who is the Director of the Laboratory's Energy and Environment Division, and he does not feel that he has enough personal competence in this field to profit from a visit to the site (I have the same feeling about my own expertise or lack thereof).

I talked to Dr. Gary Higgins (a Ph.D. student of mine some 25 years ago) who has been involved with an evaluation of the Occidental in situ process for the Lawrence Livermore Laboratory (LLL). Confidentially he indicated that their report is not unfavorable but suggests some needed additional

research before actual recovery is initiated; the LLL report on the process has been sent to the AEC but cannot be made available to Occidental until certain University of California patent clearances have been obtained.

I asked Higgins for names of possible people who might visit the Colorado site in a consultant capacity in order to make an evaluation, and he suggested the following:

1. Professor Paul A. Witherspoon
   Department of Transportation Engineering
   University of California
   Berkeley, California 94720

   (whom I know personally and hold in very high regard)

2. John Rouse
   Billings, Montana

   (the retired Chief Geologist for Mobil Oil, now a private consultant)

3. Paul Doogan [Dugan or Duggan?]
   Equity Oil Company
   Denver, Colorado

With respect to the second matter we discussed, I am enclosing a separate memorandum.

With warm regards,

Cordially,

Glenn

Glenn T. Seaborg

GTS/sms

Enclosure

LAWRENCE BERKELEY LABORATORY
Room: Bldg.: Ext.:

March 28, 1974

To: Sol M. Linowitz

From: Glenn T. Seaborg GTS

I have looked into the question described in your memorandum of March 14, 1974.

A catalyst that would effect the efficient electro-oxidation of methanol (CH_3OH) at room temperature would be an important discovery. It may be true that "no work on electro-oxidation of methanol at room temperature has ever been reported," but I have found that much work has gone on.

For example, Exxon has a big program and has had such cells operating at room temperature, and this includes a recent catalytic breakthrough (about a month ago). The limitation on their work until this breakthrough has been the catalyst. This work is done under the leadership of Carl Heath in a French subsidiary, ALSTHOM.

Of the four "potential impact" items listed in your memorandum, it is not clear what the electrocatalyst has to do with solar panels or thermal electric devices (more accurately described as thermoelectric devices). The obvious use of a process for electro-oxidation of methanol is in a fuel cell; and this of course has application to pollution control, thus accounting for the other two of the four items.

A fuel cell operating on methanol is important because of the potential large sources of methanol (from the conversion of coal and so forth) and because the direct clean production of electricity in a fuel cell is more efficient than its indirect production through the burning of fuel and can be done in small plants on site.

An even better process would be the oxidation of methane (CH_4), which is natural gas and is also capable of synthesis in large quantities from coal, in a fuel cell. The discovery of a catalyst for this would make it possible to produce electricity directly from methane at a much higher efficiency as compared to its indirect production through the burning of methane.

GTS/sms

March 28, 1974

Professor Charles K. Birdsall
Chairman, Energy and Resources Committee
Room 112, Building T-5
Berkeley Campus

Dear Professor Birdsall:

I have read the paper, "A Proposal for a New Interdisciplinary and Graduate Group: Energy and Resources Group," which accompanied your letter of March 15, 1974.

I would like to express my support for this project. I hope that this would fit within the framework of the continuing cooperation between the Lawrence Berkeley Laboratory Energy and Environment Division and the campus program in this important area. Those in LBL who have the responsibility for this cooperative program will welcome this increased potential for the involvement of both undergraduate and graduate students.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

bcc: Jack Hollander

I attended the luncheon meeting of the actinide chemistry group. Present were Streitwieser, Peacock, Edelstein, Starks, Ritter, Nugent, McLaughlin, and Parsons. Starks reported on his unsuccessful attempts to synthesize $PaCl_5$, Peacock on attempts to synthesize $NpOF_5$, and Streitwieser on the production of PhN=NPh from $PhNO_2$ plus $U(COT)_2$.

George Kilian called me at 2:00 p.m. in connection with the FY75 and FY76 budgets that he is working up for Bernie Harvey. He suggested that we expand the FY75 equipment request, which now is very modest, on the Heavy Ion Radiochemistry program: adding $10,000 to the listed $20,000 figure for upgrading equipment plus $20,000 to replace or buy the Hewlett-Packard pulse analyzer upon Kratz's return to GSI. He will write up in the 189 form the justification for this.

Mike Nitschke called at 2:10 p.m. to ask where he might get information about a "710 Program" conducted by General Electric in about 1963-65 on helium for gas-cooled reactors. I suggested he call Karl Cohen at GE in Sunnyvale.

At 4:30 p.m., William Zoller of the University of Maryland dropped in with Arthur Poskanzer to discuss his possible candidacy for head of the environmental chemistry program. My impression is that he is a very good man; he will decide whether to send his application before the end of next week.

Friday, March 29, 1974 - Berkeley

Kenneth Heard (SAN security officer) came in and talked with me from 9:00-9:25 a.m. about my visit to the Institute of Nuclear Physics in Shanghai during which I reviewed their work on nuclear batteries. There is a discrepancy between my journal account and that of Alvarez, who saw the same work. Alvarez says they were using ^{238}Pu, whereas I said they were using electrical heating preparatory to using ^{90}Sr. I said I felt very confident that my version was correct because I had questioned them closely due to my particular interest in SNAP devices.

I mentioned to him the sensitive documents that I have stored at Livermore--documents that have no national security implications but are sensitive because of my relations with the personalities involved. I suggested that perhaps these could be brought to Berkeley for me to review in my office. Heard suggested Sheila get in touch with him to identify the material.

I called Dr. Ruth Yaffe at San Jose State at 9:50 a.m. I inquired about the basis on which the Associated Western Universities Program for Honors Undergraduates (her letter attached) operates. She told me that the student applies for a stipend through AWU; this is around $100 a week, less than those that LLL and LBL pay. It is probably too late to get this program started at LBL for this summer; she would like to try setting it up for the summer 1975 program. We decided that I will send her a letter expressing our interest (attached), and she will handle it from there.

George Milly called me at 11:25 a.m. He told me that they had a meeting with New Court Securities on Tuesday. United Nuclear seems disinclined to go along with the GEOMET project. In collaboration

300 Associated Western Universities

97a

San José State University
SAN JOSE, CALIFORNIA 95192

SCHOOL OF SCIENCE

Department of Chemistry (408) 277-2366

March 8, 1974

Dr. Glenn T. Seaborg
University Professor of Chemistry
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

Dear Dr. Seaborg:

First I want to thank you for speaking at our Nuclear Science Open House. You have a remarkable ability to explain technical material so that it is readily understood by the layman. There could not have been any talk more suited to the heterogeneous audience who visited the campus for the Open House. It was excellent.

Second, you asked for additional information about the Associated Western Universities Program for Honors Undergraduates which I have administered in connection with Lawrence Livermore Laboratory. Enclosed is a summary of the program as it currently is operating. It has functioned since 1967 and almost 75 fellowships have been awarded to undergraduates through this program. If a similar program were to be established through Lawrence Berkeley Laboratory, I would need to work closely with a coordinator at Berkeley as I do with Peter C. Stevenson at Livermore. Should such a program be established, I would anticipate two or three students being selected the first year, and a steady state operation of six to eight students at most from SJS. In particular I am interested in providing research opportunities for non-citizens, and also additional opportunities for the student interested in biological sciences. This would complement the Livermore opportunities which are only for citizens, and best for physical scientists.

Again, thank you for participating in our Open House program.

Sincerely,

R. P. Yaffe
Professor of Chemistry

RPY:mp
Enclosure

March 29, 1974

Dr. R. P. Yaffe
Professor of Chemistry
San Jose State University
San Jose, California 95192

Dear Dr. Yaffe:

Thank you for your detailed description of the Associated Western Universities Program for Honors Undergraduates. Students with the characteristics described in your letter should be able to make significant contributions to many of the research programs within the Nuclear Chemistry Division of the Lawrence Berkeley Laboratory.

A level of two or three students the first summer, with perhaps larger numbers in subsequent summers, could easily be incorporated into our research. We likewise could accept students who are not U.S. citizens, although I would not like to restrict our part in such a program to only non-citizens.

Our Division does research in nuclear, chemical and atomic physics and physical, inorganic and analytical chemistry. We can offer research opportunities in these fields but not in the biological sciences. Research in these latter areas is done in the Biology and Medicine Division, the Chemical Biodynamics Laboratory, and the Energy and Environment Division.

I have asked Professor Joseph Cerny of our senior staff to serve as the coordinator, should you feel that the research opportunities within the Nuclear Chemistry Division are consistent with the goals of the program. If you would like to have us participate, would you get directly in touch with him at this same address.

I enjoyed seeing you at your Nuclear Science Open House on March 7. With best regards,

Cordially,

Glenn T. Seaborg

GTS/ssk

cc: Joseph Cerny

bcc: Bernard Harvey
Frank Asaro
Eileen Eiland

Friday, March 29, 1974 (con't)

with New Court, Milly would now like to pursue talks with Texas Gulf and also with Gulf. In this regard, he asked if I would be willing to arrange an introduction to "Gulf Minerals." I said that I would be meeting with a General Atomic official in Los Angeles next Wednesday and that I will call Milly back after I have something to report.

I had a luncheon meeting in my office with Ghiorso, Kratz, Norris, Binder, Lee, and Otto to discuss the results of the recent Gd-Kr bombardment. A small yield of Pb^{212} (via Po^{212}) was observed. We planned tests and experiments to ascertain whether this is due to uranium or thorium impurity in the gadolinium. We also made plans for the bombardment of uranium with xenon ions next week; this would be followed by chemical separations to look for superheavy elements and to determine the general distribution of transmutation products.

At 1:30 p.m., I went up to Building 90 to view some early films (1936-39) taken by Don Cooksey, with Don, Edwin McMillan, Luis Alvarez, Bill Brobeck, Harold Fidler, and James Halverson. They included a complete sequence of Jack Livingood assembling the 27" cyclotron and pictures of the construction of the 60" cyclotron taken at Moore Drydock, Gardner Electric, outside and inside of Crocker Laboratory. The scenes included views of Cooksey, McMillan, Brobeck, Art Snell, Ernie Lyman, Bob Wilson, Joe Hamilton, Wally Reynolds, Ernest Lawrence, Martin Kamen, and others. I learned that the magnet outside the Lawrence Hall of Science is the magnet of the 37" cyclotron which was built up from the 27" cyclotron.

I was reminded that the Japanese, on the basis of collaborative work at Berkeley, copied one of the early cyclotrons (they believe it may have been the 27" cyclotron) even to the point of drilling holes in the periphery of the magnet and plugging them as had been done at Berkeley--the holes were drilled at Ernest Lawrence's suggestion to try to shape the magnetic field and when this was unsuccessful, were plugged with iron. The Japanese also built a 60" cyclotron at the same time as the one at Berkeley was being built, modeled after the Berkeley machine--this is the machine that the Allies dumped into the Pacific Ocean after the war.

Werner Hirsch called me at 2:45 p.m. upon my return to my office. We discussed the topics and participants in the CCEEB resources symposium. I responded to a letter from Francois David, discussing his latest reprint (attached).

Michael Peevey (Executive Director of the CCEEB) called me at 4:10 p.m. to ask if I would be willing to have my name appear on the letterhead as a supporter of "People for Proposition 2," which is the Clean Water Bond Act of 1974 to be voted on statewide in June. Pat Brown, Jack Henning, Harold Dartmouth, the Wildlife Federation, and others will appear on the list. I agreed and indicated that he could also list me as a supporter of Proposition 1, for which Lane is chairman of the supporters' group.

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

March 29, 1974

Dr. Francois David
Division de Radiochimie
Institut de Physique Nucleaire
Universite de Paris XI
Centre d'Orsay
91406 Orsay, France

Dear Dr. David:

I was pleased to receive your reprint "Potentiels d'oxydoreduction et structure electronique des elements 4f et 5f," which I have read with interest. I wouldn't place thorium in a special category--chemically it resembles Ce(IV) as much as it does Hf(IV). The question of whether this heavy transition series be called a 5f or an actinide series is, I think, a matter of semantics. I believe you agree with me that it is a continuous transition series, and this is what is most important. Perhaps we can discuss this further when you come to Berkeley.

Have you heard yet any word about your fellowship or about the status of Kamal Samhoun? I plan to visit Paris the week of June 17 so perhaps at that time we can discuss further your proposed research program so that we can make advance provisions for any special equipment and so forth.

Looking forward to seeing you in June.

Cordially,

Glenn T. Seaborg

GTS/ssk

xc: Norman Edelstein
Glenn Seaborg

Saturday, March 30, 1974 - Lafayette

In the afternoon, Eric, Suki and I took a hike around the rim trail at Lafayette Reservoir. Sheila brought me some letters to sign and papers for my forthcoming trip to Los Angeles; she worked at the office today. Steve arrived from Davis tonight.

Sunday, March 31, 1974 - Lafayette

I drove to a rendezvous point for a hike sponsored by the Contra Costa Park Council. The other participants were Barbara Bowers, Donald Baren, R. R. Whetstone, Edith, Frank and Paul Valle-Riestra, Sue and Bob Watson, Al Burton, Bill and Barbara Smith, Kay Madin, Leon Hunter, and Joseph Hirsch. We proceeded in three cars to the end of Norris Canyon Road and hiked the old road to the top of Wiedemann Peak (about 1850 feet).

Steve spent the day moving furniture in our station wagon to his and Brent's apartment in Davis. He returned at 6:45 p.m. with Terry Bartlett (roommate of Brent's girl friend--she is from Santa Barbara, just finished at Davis, majored in international relations). They had a bite to eat with us, then drove back to Davis with another load of things in Steve's car.

Monday, April 1, 1974 - Berkeley - Los Angeles

At 8:30 a.m., I met with David Natusch, along with Arthur Poskanzer, to investigate his interest in accepting the post as head of the energy and environment program. I had a good impression of him.

At 9:00 a.m., I attended George Pimentel's opening Chemistry 1C lecture in PSL and was surprised to hear him announce that I will serve as Section Leader of Lab Section 2.

I received a nice letter from Bill Bevan, in which he wrote that the 1974 AAAS Annual Meeting was the best they have had since he has been on the staff. I also received a letter from Devendra Lal, who informed me that efforts are being made to set up a AAAS-type organization in India. Jack Hollander sent me a copy of his letter to Robert H. Burke in the California Assembly, commenting on Burke's letter to Moretti as requested (correspondence attached).

During my office hour in Latimer Hall, I was called by Pat Somerville, who wanted to learn the details of his compensation if he works in the Nuclear Chemistry Division and about the work he might be doing with me. I also received a call from Stephen Kahne of the University of Minnesota, whose father-in-law is my Polish exile friend, Paul Novatsky, inviting me to speak at an energy symposium in Michigan on November 21. I declined due to my heavy schedule.

I had lunch with the Chemistry Department faculty, then met for the first time with my Chem 1C lab section in Room L of Latimer Hall. David E. Wemmer, whom I first met at Davis as one of Dave's Hammarskjold friends, is my teaching assistant. We handed out enrollment cards, checked out lockers, etc. In my role as Section Leader, I

ROBERT H. BURKE
MEMBER

California Legislature

70th ASSEMBLY DISTRICT

COMMITTEES
Rules
Education
Elections and Reapportionment
Transportation

March 5, 1974

Honorable Robert Moretti
Speaker, State Assembly
State Capitol
Sacramento, California

Dear Bob:

You are to be congratulated for having presented the "Symposium on Energy Resources and Technologies." The subject was, of course, very timely and the participants were among the most knowledgeable world wide in their fields.

Certainly, legislative decisions must be based on input from a wide variety of viewpoints. Unfortunately we seldom have the opportunity to hear firsthand, truly expert testimony such as that presented today, and too often the only witnesses we hear from in committees have little but uninformed opinion to offer.

Today's presentations provided a much needed balance for a proper perspective of the role of state government in meeting the energy needs of our State. It left no doubt in my mind that regulation of energy sources and supplies by government must not be allowed to direct either the technologists or the free market in their efforts to adjust to changing conditions. Government's role, in this instance, should unquestionably be restricted to encouraging both the technologists and the free market to develop, produce and offer needed energy supplies. Left unhampered, they can and will find the way to most efficiently meet the energy requirements in our State.

Again, I wish to express my appreciation for your role in preparing today's program. The members who attended will certainly be better equipped to fulfill their obligations to California's citizens as a result of this symposium.

Sincerely,

ROBERT H. BURKE

RHB:kh

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

25 March 1974

Hon. Robert H. Burke
70th Assembly District
17732 Beach Blvd.
Huntington Beach, California 92647

Dear Assemblyman Burke:

Thank you very much for your letter of 11 March and for your kind words regarding the recent "Symposium on Energy Resources and Technologies". It is gratifying to learn that you found the presentation of value.

I am pleased to comment on the third paragraph of your letter to Bob Moretti. I believe that there is a proper role both for government and for the free market in providing the energy resources that we require. I agree with your view that the role of government should not be to direct the technologists in their efforts to develop new energy sources; government's role, rather, should be to support them in this mission. The development of new technologies such as fusion, solar and geothermal energy is a very expensive undertaking, with payoff uncertain and, at best, long in coming. We cannot expect private capital to be attracted toward such R and D in the amounts required, and on the time scale required, given these uncertainties. Thus, it is vital that government invest as heavily as possible in the kinds of research that were described at the symposium (most of which is funded currently by AEC or NSF); if such investment is not forthcoming, the work simply will not be done.

The role of the private sector should be, as it has been with nuclear energy, to work hand-in-hand with government in making certain that the government-sponsored R and D work is directed toward practical objectives that will fit into our "free market" system, and to pick up the developments at that point where commercial viability appears reasonably likely, and pursue them efficiently through the production stage.

I have discussed your letter with Drs. Seaborg and Witherspoon, and they have asked me to convey to you that their views on this question are essentially as I have expressed here.

I wish to express my appreciation for your interest in the symposium, and for this opportunity to exchange views on this important topic. Please contact me if there is anything further I can do to be of assistance to you.

Sincerely yours,

Jack M. Hollander

Director
Energy and Environment Division

JMH/rl

Blind cc:
✓Dr. Seaborg
Dr. Witherspoon

visited Rooms M, A, B, and C in Latimer and 124 Lewis to check on progress. Shortly before 3:00 p.m., Helen came in on BART and drove me to the Oakland Airport.

I boarded PSA flight No. 440, which left at 4:40 p.m. and arrived at Los Angeles International Airport at 5:15 p.m. I took a taxi to the Hilton Hotel and checked in. I walked to the Regency Hotel, where I attended the reception and banquet in honor of the 1974 ACS Award recipients. I talked with Rod Hader, Robert Cairns, Bob Gould, Glen Gordon, Art Adamson, Milt Harris, Alan Nixon, Attila Pavlath, John Willard, Conard Fernelius, Elliot Pierce, Herman Mark, and Nicholas W. Tschoegl (Professor of Chemical Engineering, Cal Tech).

After dinner, I met Henry Hill; an ACS photographer took a picture of us shaking hands. I stayed for the program through Paul Flory's talk (he is this year's recipient of the Priestley medal). ACS President Bernard Friedman presided and Irving Tannenbaum, Chairman, Southern California Section, gave some welcoming remarks.

Tuesday, April 2, 1974 - Los Angeles

I had breakfast in the coffee house of the Hilton Hotel with Joe Katz, Len Nugent, Bob Penneman, and Jack Ryan and we continued the discussion in my suite after breakfast. We discussed plans for the revision of Chemistry of the Actinide Elements, including the division of labor. Katz made notes (attached). All five of us signed a revised contract with our publisher, Chapman and Hill (England), setting as the new date for submission of the complete manuscript, June 30, 1975.

I walked to the Convention Center where I picked up a program at ACS Registration Headquarters. I met my UCLA classmate, Willis Battles, who is working as a chemist at Atlantic Richfield in Redondo Beach.

After lunch, I walked to the Biltmore Hotel, where I attended the Nuclear Applications Award Symposium sponsored by the Division of Nuclear Chemistry and Technology. I heard the talks by: Larry E. Glendenin, "Nuclear Fission: Reminiscence and Recent Research;" Darleane Hoffman, "Prompt Neutron Emission in Low-Energy Fission;" Nat Ballou, "Independent and Cumulative Fission Yields for Several Fission Systems;" and Ray Nix, "Present Status of Nuclear Fission Theory."

In between talks, I talked to Steve Lawroski, Glen Gordon, Gregory Choppin, Art Wahl, Darleane Hoffman, Paul G. Nahin, John Willard, Larry Glendenin, Nat Ballou, Ray Nix, Ellis Steinberg, Roland Otto, Sam Markowitz, Joe Peterson, and Leo Yaffe.

I had a bite to eat in the coffee house, then went to the Pacific Ballroom in the Hilton to attend the ACS mixer. I met Harold Helgeson (of the Berkeley Department of Geology, chairman of our LBL search committee for a geochemist), Tom Ban (a metallurgist-chemist engineer), and Jesse Cleveland (who told me about a new way of producing plutonium nitride from sodium reduction of plutonium iodide in liquid ammonia).

"Chemistry of The Actinide Elements" Meeting

Los Angeles, California

April 2, 1974

Present: G. T. Seaborg, J. J. Katz, R. A. Penneman, L. J. Nugent, and J. L. Ryan

The meeting convened at the Los Angeles Statler Hilton at 8:30 A.M.

The general aspects of the preparation of the revised edition of "The Chemistry of The Actinide Elements" were discussed and several decisions were taken:

1. L. J. Nugent will stay in Berkeley until December, 1974, and J. L. Ryan will start writing April 15, 1974.

2. J. L. Ryan will undertake preparation of the chapters on U, Np, Pu and Am.

3. L. J. Nugent believes he will finish the Pa and Th chapters by December 1974.

4. Typing will be done primarily by Wanda Smith at Berkeley.

5. References will be set-up in accordance with IUPAC rules.

6. Standard IUPAC abbreviations will be used. L. J. Nugent will compile such a list and will distribute a note on abbreviations, references and nomenclature. He will also issue a new standard chapter structure.

7. It appears that we may want to secure John Conway's collaboration in place of K. Vander Sluis for Part II. G. T. Seaborg will explore this.

8. Schedule. It was agreed that the target date for completion will be June, 1975. L. J. Nugent and J. L. Ryan will set up a detailed schedule for their chapters within the generally agreed over-all deadline.

JK

Wednesday, April 3, 1974 - Los Angeles

I had breakfast in my suite, then walked to the Biltmore to attend the continuation of the Nuclear Applications Award Symposium. First I heard Kurt Wolfsberg, who spoke on "Fractional Cumulative Yields of Some Krypton and Xenon Nuclides from Fission-Spectrum Neutron Induced Fission of ^{235}U and ^{238}U," then B. R. Erdal on "Independent Yields of ^{133m}Xe, ^{133g}Xe, ^{135m}Xe, and ^{135g}Xe from Fission." Then R. A. Meyer, S. C. Bourret and J. H. Landrum spoke on "Production and Measurement of Short-Lived Xe Precursor Activities Utilizing Mini-Computer Control."

At 10:00 a.m., I walked by the Biltmore Bowl, where the ACS Council was meeting. I met Herman Bloch, Chairman of the Board of Directors, who informed me that Anna Harrison of Mount Holyoke College and I had just been chosen as the nominees for President-elect.

I met Jeanette and Ray in front the hotel and they drove me to our house on San Antonio Avenue in South Gate, where I conferred with our tenants, Mr. and Mrs. William Denning. They seemed to be in fine health and the house and yard were in good shape. He has painted almost all of the interior and has planted vegetables and flowers throughout the yard. Our field next door was in good shape; Jeanette and Ray cut it last week.

We stopped for lunch on the way back, then I rejoined the Symposium. I heard the talks on "The Yrast Line of ^{24}Mg at High Excitation Energy" by E. T. Chulick, "Experimental Tests of the Independence Postulate in the Bohr Theory of Compound Nucleus Decay" by Sam Markowitz, and "Calculation of Nuclear Level and State Densities for ^{56}Fe, ^{59}Co, ^{60}Ni, ^{62}Ni, ^{63}Cu and ^{65}Cu" by G. P Ford. I talked to Vic Viola and Ellis Steinberg.

From 4:00-5:00 p.m., I met with John Landis in my suite. We discussed the terms of my consultantship with General Atomic and agreed on an annual retainer of $10,000 for five days work. I told Landis about GEOMET and he will look into cooperation with them.

I met Bob Scott, Chairman of the UCLA Chemistry Department, and rode with him to UCLA to attend the Chemistry Department reception and dinner at the Faculty Center. I sat at a table with Professor and Mrs. Francis Blacet, Dean and Mrs. Kenneth Trueblood, James Lu Valle, Willis Battles, and Dick Pertel (of ITT). I also talked to Mr. and Mrs. Marvin Gold, Jim McCullough, Calvin Love, George Campbell, Jr. (who worked with Coryell at the wartime Met-Lab), Cyril Slansky, Donald Cram, and Bill McMillan.

Today the weather was beautiful all day--much like I used to enjoy here as a boy. Hank Aaron tied Babe Ruth's record today, 714 home runs, in the opening game of the Atlanta Braves against the Cincinnati Reds.

Thursday, April 4, 1974 - Los Angeles - Berkeley - San Francisco

I breakfasted in the coffee shop, then took a taxi to the Airport and boarded PSA flight No. 143, which left at 9:00 a.m. and arrived at

Thursday, April 4, 1974 (con't)

Oakland Airport at 9:50 a.m. Helen met and drove me to LBL. I acknowledged the report of the Family Activities Committee for the AAAS Annual Meeting sent by Sara Lofgren.

At noon, I went down to the campus and met Helen at Pauley Ballroom. We met a large number of friends and went through the reception line, consisting of President and Mrs. Hitch, Chancellor Bowker, Barbara Tuchman, and Regent and Mrs. Dean Watkins. I sat at a table with the Sesslers and Brother Mel Anderson, President of St. Mary's College. Following lunch, President Hitch introduced the Chancellors of the campuses who were present and Regents William E. Forbes, Elinor Heller, William B. Keene, John Lawrence, David McDaniel, Joseph A. Moore, Jr., Wilson Riles, and Regents-Designate George H. Link and Edward A. Morris. Hitch announced that Mark Christensen has been appointed Chancellor of the Santa Cruz campus effective July 1, 1974, upon the retirement of Dean McHenry.

After lunch, I looked up John Lawrence and talked to him about his stand opposing the actions of Director Sessler in handling the Donner Laboratory and the Biology and Medicine Program situation, including the requested resignation of James Born as Director. I suggested to John that his action on this was improper and that he should desist, but my comments fell on deaf ears. He claimed that the request for Born's resignation is totally politically motivated and tied to the animosity of the campus toward LBL. He said that the standing orders of the Regents placed in them the authority for the approval of the Director of Donner Lab; I indicated that, if this is true, it should be changed because this situation is no different from that of the Directors of other units of LBL. He claimed that he had been with the University longer than I and had its interest at heart as his primary motivation; I pointed out that he was in error--that I had been with the University longer than he and also was speaking totally from the standpoint of the interests of the University and the Laboratory. I told him that I thought he was doing himself a great deal of harm in his present stand and losing the respect of many people, including all the Associate Directors of LBL. He said this didn't bother him because he knew he was right and that he has talked to people who confirm his belief that the quality of the work of Donner Lab is better than the biomedical work at ANL and BNL. I told him that I was convinced that the quality was not up to that we want at LBL and the University of California.

I then went to the Green Room of Zellerbach Hall and donned my academic robes together with others in the official party. We marched in the procession for the Charter Day Exercises (106th Charter Anniversary for the University), which began at 2:30 p.m. and followed the program attached.

Historian Barbara W. Tuchman delivered the Annual Charter Day Address, "How Will History Judge Us?" Although her speculations seemed somewhat gloomy, this was perhaps one of the most provocative Charter Day addresses we have heard in some time (newspaper account attached). Afterward, Chancellor Bowker awarded to Mrs. Tuchman the Berkeley Citation--the highest honor which the Berkeley campus can

PROGRAM

Presiding: Dr. Charles J. Hitch, *President of the University*

Entry of Classes

Hail to California Fanfare — *Charles C. Cushing*, '28
Lights Out
(Our Sturdy Golden Bear) — *E. E. McCoy*
Big C — *N. L. McLaren*, '14
H. P. Williams, '14

Academic Procession

Jubilant Fanfare No. 1 — *Sir Arthur Bliss* (b. 1891)
Festal March — *Charles Wakefield Cadman* (1881–1946)
Solemn Fanfare No. 1 — *Sir Arthur Bliss* (b. 1891)
Pomp and Circumstance March No. 4, Op. 39 — *Edward Elgar* (1857–1934)

The University of California Concert Band
James Berdahl, Conductor

National Anthem

Invocation

The Reverend D. Clifford Crummey, *Minister of the United Trinity Methodist Church of Berkeley*

Greetings from the Visiting Campuses

Dr. Daniel G. Aldrich, Jr., *Chancellor at Irvine*

Greetings from the Students of all the Campuses

Mr. Lee Altschuler, *Chairman, University of California Student Body Presidents' Council*

Remarks

Dr. Albert H. Bowker, *Chancellor at Berkeley*

Remarks

Dr. Charles J. Hitch, *President of the University*

Elise and Walter A. Haas International Award

Dr. Choh-Ming Li, *Vice-Chancellor, the Chinese University of Hong Kong*

Annual Charter Day Address

Barbara W. Tuchman, *Historian*

Awarding of the Berkeley Citation

Chancellor Bowker

University Hymn

"St. Anne" *William Croft* (1678–1727)

O God, our help in ages past,
Our hope for years to come,
Our shelter from the stormy blast,
And our eternal home!
Before the hills in order stood,
Or earth received her frame,
From everlasting Thou art God
To endless years the same.

Benediction

The Reverend Dr. Crummey

Exit Music

March from the Suite in E Flat — *Gustav Holst* (1874–1934)

Chimes

Frank Pilling, *Chimesmaster*

UC Charter Day

How We Look To a Historian

By Donovan Bess

Pulitzer prize-winning historian Barbara W. Tuchman drew laughter and applause yesterday from a Charter Day audience at the University of California when she compared the corruption of 14th Century Europe with 20th Century United States.

Both were terrible centuries, she said.

"The people of the 14th were as conscious as we are that human conduct was wrecking society," she said.

Mrs. Tuchman won two Pulitzer prizes, one for "The Guns of August" and the other for "Stilwell and the American Experience in China, 1911-45."

Talking about the "corruption and lying" of the Nixon Administration, Mrs. Tuchman said:

"The 14th Century was struggling and suffering without advancing, waiting for a spiritual renewal that did not come, and tormented by a general unrest, in the world of Henri Pirenne 'amounting almost to mental confusion.'

"Among its rulers it had no great men. Pirenne adds, but only 'personalities of the second class.' Nor were rulers always notable for high ethical standards. They lied then, too."

That caused laughter and applause among the capacity audience of 2000 people who jammed Zellerbach Auditorium for the pomp and circumstance associated with the university's 106th birthday.

Mrs. Tuchman said a Pope discovered that King Edward of England, while ostensibly dealing with the King of France, was secretly negotiating behind his back with France's treacherous vassal, the King of Navarre.

"Rebuked by the Pope, Edward denied the charge in writing on his 'oath as a king' although the tape of his treaty with Navarre exists."

[illegible] ments," she said with a mischievous expression.

She said that in the 14th century "the system stopped working. This happens with institutions, hitherto taken for granted, either fail or betray us. Marriage, the hometown, the presidency, [illegible] premise of obedience to rules crumble under our feet."

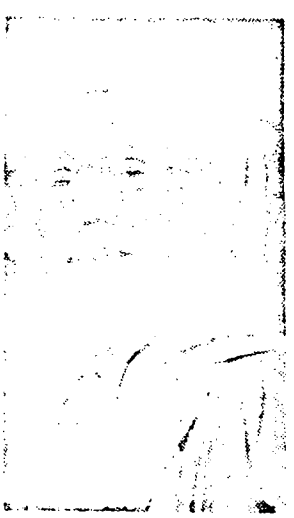
Mrs. Tuchman said:

"The 14th century had its sorcerers, we have multiple conspiracies, mysterious flying objects and a 'sinister force' oozing in and out of the White House files."

She did not confine her remarks to Republican targets — she alluded directly to the political stance of Hubert Humphrey.

In her comparison with the 14th Century, she said, "We too have men who look rosily on life, some sincerely, some fatuously, like the one who could talk about the 'politics of joy' during the anger and shame of 1968."

The title of her speech was "How Will History Judge Us?" She concluded by admitting she couldn't answer that question. But she did make a suggestion that amounted almost to a prophecy of doom.



BARBARA TUCHMAN
Politicians her targets

The oldest UC alumnus there yesterday was H

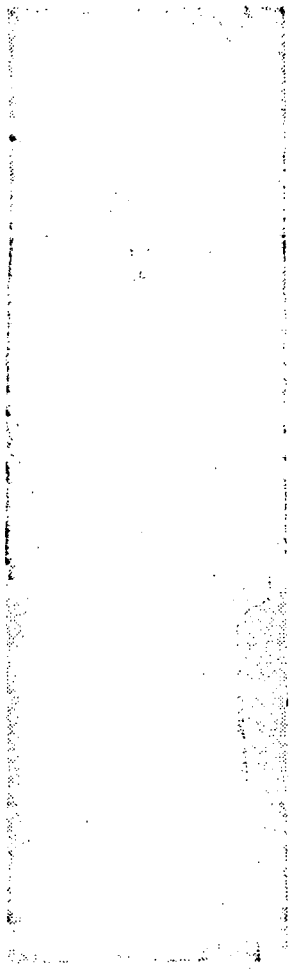
New Head of The Mechanic's Institute Named

San Francisco attorney David J. McDaniel has been elected president of the Mechanics' Institute, thus becoming an ex-officio but voting regent of the University of California, it was announced yesterday.

McDaniel, 60, is senior general attorney for U.S. Steel Corp's western division. He replaces San Francisco industrialist Joseph A. Moore Jr., who was appointed recently by Governor Ronald Reagan to fill a vacant regular seat on the board.

A native of Portland, McDaniel attended public schools in San Francisco, received his bachelor's degree from Stanford and his law degree from Harvard. He is married to the former Martha Katherine Eyre and lives in San Francisco.

The Mechanics' Institute seat on the Board of Regents was granted in recognition of the assistance the institute rendered in founding the university 105 years ago.



Harold Bradley, 95

foundations, the Old Testament and to the strange prolonged wandering of the people of the Exodus in the Wilderness," she said.

"Why did they take 40 years to cover a distance of 150 miles? The answer is that they were a generation unfit to enter the Promised Land. They had to die out: it was their children who arrived."

The oldest alumnus in Berkeley yesterday was Harold C. Bradley, 95, a survivor of the class of 1900.

He headed a colorful, cap-and-gown procession that included the chancellors of nine UC campuses, some of the members of the Board of Regents, faculty, alumni and guests.

At a banquet in the Sheraton Palace Hotel last night, State Senator George Moscone (Dem-S.F.) presented former state Supreme Court Justice Roger Traynor with

New Head Of UC at Santa Cruz

Mark N. Christensen, vice chancellor of the University of California's Berkeley campus, was named chancellor of the university's Santa Cruz campus yesterday.

The appointment, effective July 1, was announced by Chairman Dean A. Watkins and President Charles Hitch after a special meeting of the Board of Regents on the Berkeley campus.

Christensen, a professor of geology and geophysics, succeeds Dean E. McHenry, who has been chancellor since the campus opened in 1961. McHenry anounced last October he would retire at the end of June.

Christensen, 43, has been a member of the Berkeley faculty since 1959. In 1962, he won a distinguished teaching award presented by the university.

In January 1972, he became the vice chancellor at Berkeley, and has since been the principal aide to Chancellor Albert H. Bowker.

He served for two years as chairman of the Berkeley division of the Academic Senate from 1970 to 1972. From 1965 to 1967, he served as assistant dean of the College of Letters and Science.

A native of Green Bay, Wis., he was graduated from the University of Alaska in 1952 and earned his doctorate at Berkeley in 1959. He served in the U.S. Army in 1953-54 and worked as a research geologist in Alaska before he began his faculty career at Berkeley.

He and his wife, the former Helen H. McKee, make their home in Berkeley with their two children, Karen, 4, and Allan, 3.

Hitch said Christensen was chosen after a nationwide search and said he was "delighted we were able to find within the university family the very best choice for chancellor."

UC Accused Of New Stall On Jobs Issue

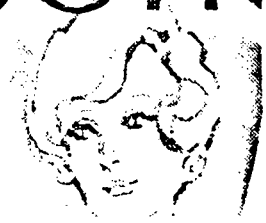
A coalition of student, faculty and employee groups dismissed as a "delaying tactic" yesterday the announced plan of the University of California at Berkeley for an affirmative action policy in hiring.

The university and the Health, Education and Welfare Department announced last week that the university will draw up a definite policy, but no deadline or timetable was set.

"This is only a plan to plan," Don Gillies, chairman of the Affirmative Action Assembly, told a press conference.

"It is another tactic of obdurate delay to the rightful achievement of parity for Third World persons and women," he said.

RANSOH



bestow--commenting that it may not seem very important to her in relation to all of her other awards and prizes but that it is big to us.

After changing to formal clothes at home, Helen and I drove to San Francisco and went to the California Alumni Association Charter Day Banquet at the Sheraton Palace Hotel (program attached). At the reception we talked to George Link, the Hitches, Barbara Tuchman, Roger Traynor (1973 Alumnus of the Year), and Brian Van Camp (a student leader while I was Chancellor). I talked to Regent William Roth; he is angered by John Lawrence's stand and plans to bring it up at the Regents meeting and have a showdown. We sat at a table with Senator and Mrs. Alfred Alquist, Leonard V. Jones, Dr. and Mrs. Harry Heckman, Helen Mineta, and Dr. and Mrs. Don Tocher.

Friday, April 5, 1974 - Berkeley

I met with Hermann Grunder, who brought me up-to-date on progress in debugging the SuperHILAC. We discussed the following subjects: (1) Executive Committee--constructive discussion, want to interact more actively with long-term projection, in particular FY75 line item priorities, and review of operations summary presented; (2) 21-shift operation effective July 1, 1974--with present budget, we will be unable to sustain 21-shift operation throughout FY75 because of badly needed R&D work; (3) xenon debugged and ready for experimenters by the end of May; (4) sputter ion source under construction including power supplies for ^{48}Ca; (5) computer-control architecture project--(a) for real time interaction and closed loops PDP8, because it is an inexpensive computer but programming in machine language; (b) for operator interaction PDP11/45 or Mod-Comp (Fortran); (6) substantial interest in ^{208}Pb for increased nuclear matter density (T. D. Lee's vacuum states) idea--we suggest a vacuum tank liner for the BEVALAC to obtain 10^{-9} TORR; (7) tentative agreement on allocating about 100 8-hour shifts in FY75 to BEVALAC--this includes debugging and experiments; and (8) shutdowns will be April 29-May 13 and June 10-July 1. He left me his Operations Summary for January and February (attached).

I walked up to the SuperHILAC for the regular meeting of the research group. Ghiorso announced that 25 microampere beams of O^{18} have been obtained. Eppley gave an overview of the programming for computer use by the experimental groups and summarized his report, "Study of Present and Future HILAC Computer Needs."

From 11:30 a.m. to noon, I presided over the first half-hour of Program Committee meeting. I presented Allan Zalkin with his 25-year service pin. At noon, I went to the Davis Room of the Faculty Club to attend a meeting of the section leaders for Chem 1C Lab Section II. Present were George Pimentel, Curt Bowers, the Lab Staff Officer, and section leaders Chet O'Konski, Kenneth Sauer, and Ronald Herm. I then walked over to Latimer Hall for the weekly meeting of the Chemistry 1C instructional staff from 1:10-1:40 p.m.

Margaret Yamada came in at 2:30 p.m. for an interview in connection with our opening for a secretary to serve as backup to Sheila (she has interviewed a half-dozen people over the past two weeks). I then discussed it with Sheila and we offered her the position.

Program

GEORGE H. LINK
President, California Alumni Association and Master of Ceremonies

CHARLES J. HITCH
President, University of California

BARBARA W. TUCHMAN
Historian
Charter Day Speaker

DEAN A. WATKINS
Chairman of the Board of Regents, University of California

THE CALIFORNIA MARCHING BAND

ALBERT H. BOWKER
Chancellor at Berkeley

ELISE AND WALTER A. HAAS INTERNATIONAL AWARD
Choh-Ming Li
Vice Chancellor, Chinese University of Hong Kong

"ALUMNUS OF THE YEAR" AWARD
Roger J. Traynor
Former Chief Justice, California Supreme Court

"ALL HAIL BLUE AND GOLD"

DANCING
University of California Band Jazz Ensemble
Jimmy Moore Band

from Grunder 4/5/74

SUPER HILAC OPERATIONS SUMMARY

ACTUAL TIME in hrs

		JAN 1974	FEB 1974
1	SET UP	50	60
2	TUNE-UP	80	68
3	TARGET TIME	172	201
4	RESEARCH SUBTOTAL	302	329
5	MACHINE STUDIES	40	22
6	PRODUCTIVE SUBTOTAL (1) + through (5)	342	351
7	SCHEDULED MAINTENANCE	34	32
8	BREAKDOWNS AND UNSCHED. MAINTENANCE	146	73
9	UNPRODUCTIVE SUBTOTAL	180	105
10	AVAILABLE TIME 15 8hr shifts/week items (6) + (9)	522	456

I met with Arthur Poskanzer, Robert Budnitz and Jack Hollander to make a decision on our environmental chemist. We decided to make an offer to Natusch of $22,000 a year as a staff member at LBL with very little encouragement that he will get a faculty position at Berkeley sometime in the future. If he declines, we will make a similar offer to William Zoller after he has paid us another visit to meet more of our people. We will also invite Kenneth Rahn to visit us to meet our people with the thought of hiring him on a term appointment, in Hollander's Division, if he qualifies.

Suki and I took a hike to the water tank.

Saturday, April 6, 1974 - Lafayette

Allyne Snyder, en route to new job in Okinawa, arrived to visit, as did Ludwig Biermann. Suki and I took our hike around the rim trail at the Reservoir.

Sunday, April 7, 1974 - Lafayette

In the afternoon, Ludwig, Suki and I took a hike around the rim trail, while Helen and Allyne took a little walk on the paved road, at the Reservoir.

Monday, April 8, 1974 - Berkeley

I attended Pimentel's Chem 1C lecture. Bob Main called to say that George Rogosa had told him by phone that for the SuperHILAC the $2.4 million line item has been authorized, but there is no chance to get more than $2.6 million for operating budget.

During my office hour, Peter Sybert dropped in to thank me for my letter of recommendation for his summer job--he got it. I had lunch with the Chem faculty, then taught my lab section from 1:10-2:45 p.m.

Steve White, a graduating senior from the University of California at Santa Barbara, stopped in to see me at 3:15 p.m. He has been admitted to graduate work in the Department of Physics here and wanted to investigate the possibility of working in the Nuclear Chemistry Division. I returned a call to Pat Somerville, answering the questions he called with recently.

I sent additional corrections to Betsy McFadden for the Travels in the New World manuscript, based on the work that Jane is now doing on the material.

I dropped by to see Kratz, Norris and Otto. They are expecting another bombardment of gadolinium with Kr^{86} ions tonight, to be followed by chemistry tomorrow to again look for Pb^{212}.

Helen drove Allyne to Travis Air Force Base at Fairfield to catch her plane to Okinawa. On the way, she dropped Ludwig Biermann off at the Birge Hall where he visited with Professor John Reynolds. I picked him up on the way home. Suki and I took our water tank hike in the rain. Hank Aaron hit his 715th home run today, breaking Babe Ruth's record.

Tuesday, April 9, 1974 - Berkeley

At 10:50 a.m., I went by to see Stanley Thompson to discuss the possible transfer of Malcolm Fowler to my SHEIKS group as a postdoctorate. Stan has the problem that he wants to keep Babinet for another year and his budget doesn't permit him to do so without reducing by one his postdocs. Since Art Wahl had recommended Fowler highly, and since Stan and Moretto also think highly of him, I decided that he might be the best candidate for the postdoctoral that I am seeking. This has the additional advantage that it would make possible increased cooperation between my SHEIKS and the Thompson-Moretto group. Stan and I agreed that the transfer would be mutually beneficial, so I then talked to Malcolm Fowler, described the situation to him, and learned that he would like to accept my offer. He will not start to work with me until August in order to finish what he has under way with Thompson-Moretto. He will, however, have time to get acquainted with what Kratz and Norris are doing before their departure in June.

Stan came in to talk to me at 11:45 a.m. about his plans after retirement five years from now. He would like to be assured of lab facilities here in the Nuclear Chemistry Division to carry on a modest program largely by himself, and I said I thought this would be quite feasible.

I mailed to Richard Stileman at Chapman and Hall the contract for the revision of Chemistry of the Actinide Elements. I sent Pat Somerville the information he requested (attached). I autographed 134 offprints of my scientific articles for a collection being prepared at John Howell Books in San Francisco. I replied encouragingly to a note I received from John Connolly with an offer to help me in my ACS candidacy. I wrote Art Wahl to report on our successful arrangement with Malcolm Fowler.

Suki and I took our water tank hike. Helen drove Ludwig Biermann to the S. F. Airport to catch a plane to New York, where Peter and Jody will meet him.

Wednesday, April 10, 1974 - Berkeley

I attended Pimentel's Chem 1C lecture, then held my office hour (inaugurating a second one each week) from 10:10-11:00 a.m. Bill Jenkins called from Wilmington to discuss Ty's program this summer.

I called Gregory Choppin in Florida at 11:15 a.m. to tell him that I had not forgotten about Al Zeller but that our budget restrictions have necessitated my shifting a postdoc from another LBL group to the vacancy in my group. Zeller would have been my first choice. Choppin will tell Zeller, who is first alternate for a job at the Naval Laboratory in Washington.

I received from Gerhart Friedlander his report of the Visiting Committee for the Nuclear Chemistry Division (attached).

I discussed with Ghiorso, Kratz and Norris the priorities for bombardments for the Kratz-Norris program for the remaining time they

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

9 April 1974

Mr. L. Pat Somerville
5260 Baker House
362 Memorial Drive
Cambridge, Massachusetts 02139

Dear Pat:

This will reaffirm the comments I made in our telephone conversation yesterday. The Research Assistant rate in the Nuclear Chemistry Division is $395 per month for 12 months. In addition, we can pay you the equivalent of your non-resident tuition ($500 per quarter) for two of the three quarters of your first year. This will give you an annual rate of $5740 less non-resident tuition of $1500, or $4240 ($353 per month). The non-resident tuition is charged in addition to the regular registration fees which are currently $232.50 per quarter.

I am enclosing a summary of research at the SuperHILAC in which I am particularly interested.

With best regards,

Cordially,

Glenn T. Seaborg

GTS/eee

Enclosure

RESEARCH PROGRAM AT SUPERHILAC OF INTEREST TO G. T. SEABORG

The general areas of current and planned research are (1) superheavy element (SHE) search, (2) transuranium element (106, 107) search, (3) compound nucleus formation studies, (4) computer simulations of nuclear collisions, (5) chemical studies of the transuranium elements using gas chromatography, (6) chemical studies of superheavy elements, and (7) identification of heavy ion reactions with the help of chemical identifications.

1. The recent results of the Russian group, which indicate a very small upper limit for the cross section for the reaction

$$^{76}\mathrm{Ge} + {}^{232}\mathrm{Th} \rightarrow \left[{}^{308}122\right] \rightarrow \mathrm{SHE}$$

have led to a closer theoretical look at the mechanisms of compound nucleus formation. It has been pointed out by W. Swiatecki that unless two colliding nuclei can fuse to within the saddle shape before losing their forward momentum, the strong Coulomb repulsion will cause them to fission before compound nucleus formation has taken place. Since it is much easier to reach the saddle shape with small projectiles on heavy targets than with a medium-mass target-projectile combination, it has been proposed to search for compound nuclei from the reaction

$$^{48}\mathrm{Ca} + {}^{244}\mathrm{Pu} \rightarrow \left[{}^{292}114\right] \rightarrow \mathrm{SHE}\ .$$

An extensive series of calibration experiments is planned for "SASSY," an apparatus that has been constructed particularly for direct observation of recoiling superheavy reaction products. At the same time, the feasibility of making secondary neutron-rich beams that would enhance the probability of compound nucleus formation is being explored.

2. An immediate effort has been started to search for elements 106 and 107 by utilizing a sophisticated genetic link detection technique. A proposed reaction and detection sequence is, for instance:

$$^{249}\mathrm{Cf}(^{18}\mathrm{O},4n)^{263}106 \xrightarrow{\alpha} {}^{259}104 \xrightarrow[(3s)]{\alpha} {}^{255}\mathrm{No} \xrightarrow[(3.2m)]{\alpha} {}^{251}\mathrm{Fm}\ .$$

The apparatus being assembled for these experiments consists of a multi-arm-and-detector shuttle-system in conjunction with a He gas jet.

A study is in progress relative to the possibility of thermally volatilizing compounds containing elements 106 and 107 from a thick target.

3. In the past year there has developed a realization that the physics involved in compound nucleus formation from very heavy targets and projectiles is markedly different from that involved in previous experiments using relatively light beams. One reason for the difference is that the heavier nuclei behave much more like macroscopic droplets, and such bulk properties as nuclear viscosity and elasticity become important during the fusion process. These properties can be studied indirectly by determining the compound nucleus cross sections of very heavy ions as a function of bombarding energy and projectile and target species. For example, magicity is reflected by very high moduli of elasticity; thus a set of complementary experiments that explore compound nucleus formation from magic and non-magic heavy beams and targets will be used as a tuneup exercise for SASSY. These experiments hopefully will yield some information concerning the effects of the magicity of the ^{48}Ca beam that is planned for the superheavy element search.

4. Since the bulk flow properties of nuclear matter have become very important in determining the probability of compound nucleus formation, a computer study is in progress which simulates the head-on collision and subsequent fusion of two charged viscous nuclear liquid drops. Since the differential equations governing viscous fluid flow are not analytically solvable, this involves a complicated hydrodynamic finite-difference code. The program, when completed, should yield a great deal of new information about the classical dynamics of such collisions, including the following: (1) free surface shape and energy, (2) free-flow internal velocity field, rotational or irrotational, (3) kinetic energy profile, (4) Coulomb energy, (5) free-flow moment of inertia, rotational or irrotational, (6) electric moments, (7) viscosity dependence of all of above, (8) energy dependence of all of above, (9) spin angular momentum dependence of all of above, and (10) the elasticity dependence of all of the above.

5. For gas phase chemical studies of the transuranium elements we intend to develop gas chromatography methods similar to those used by the Dubna chemists but suitably modified to permit the detection of alpha emitting nuclides.

6. Electronic effects which are negligible in the low atomic number elements should become very important in the SHE, e.g., relativistic effects, and these may produce unexpected chemical behavior. The chemical properties of many elements up to 121 have been predicted in sufficient detail that they can be used in the design of experiments.

7. A powerful tool for investigations of heavy ion reactions is chemical separation, and identification through their radiations, of the products of such bombardments. For example, in the bombardment of uranium with argon ions the yields of some 140 isotopes distributed among 60 elements have been determined by using this technique. The broad distribution of products seems to be composed of three components: (1) nucleon transfer products, (2) a broad distribution of fission products presumably from a "fusion-fission" mechanism, and (3) a narrower distribution of more neutron-rich fissioning products presumably from fissioning nuclei near ^{238}U. This technique will be extended to many target elements and a wide range of heavy ions.

4/9/74

Report of the 1974 Visiting Committee to the LBL Nuclear Chemistry Division

The first meeting of the Visiting Committee for the Nuclear Chemistry Division of the Lawrence Berkeley Laboratory took place on February 21 and 22, 1974. All six of the Committee members were present for the entire meeting. An agenda for the meeting, prepared by Dr. Bernard Harvey and approximately adhered to is appended. During the executive session on Friday morning the committee had the benefit of a discussion with Dr. Andrew Sessler, Director, and Dr. Earl K. Hyde, Deputy Director of LBL and we are appreciative of this opportunity.

The committee was generally very well impressed with the quality and scope of the scientific research being carried out in the Division. In a two-day visit it was, of course, impossible to obtain even an overview of the entire scientific program, and we trust that areas we did not get a chance to review will be covered in future meetings.

In the first part of this report we address some administrative and policy questions that arose during our discussions and deliberations, part II consists of some specific comments on those research programs which were reviewed for the committee, and in part III we note a few recommendations for the future operations of the committee.

I. Administrative and Policy Matters

Both the Laboratory's and the Division's management have recently undergone important changes, and the visiting committee was gratified to learn that the new leadership appears to tackle various long-standing problems vigorously and effectively. Within the Division Dr. Bernard Harvey has obviously made a very good start as the new Deputy Division Director and we wish to commend him for his intelligent attitudes and forthright approaches.

We are particularly pleased that an internal review committee has been established within the Division to review the research programs of the various groups and to make recommendations to the Division leadership regarding research priorities and the distribution of research support. This committee consisting of Drs. Diamond, Cerny, and Shirley is evidently taking a thorough

and tough-minded look at the strengths and weaknesses of the Division and is making sound and realistic recommendations on how to get the best science done within available budgets. We hope that their advice is taken most seriously.

One of the most troublesome points that came to our attention is the lack of a uniform, clearly spelled out, let alone written, personnel policy for the scientific staff and we were pleased to learn that the new Laboratory management is well aware of the need to remedy this deficiency. The formation of a staff policy is in our view a matter of highest priority. Particularly disturbing is the total absence, at least in the Nuclear Chemistry Division, of young scientists in any category between postdoctoral Research Associates and permanent staff members. We strongly feel that provisions must be made for junior staff appointments with specified terms and for mandatory reviews of people on such appointments before long-term commitments are made to them. The long-term health of the Division will depend on the recruitment of first-class people in the under-35 age group, and some orderly system for selecting and reviewing such people is most important. In this connection we applaud as an excellent first step the newly established hiring procedure for the Nuclear Chemistry Division.

We have noted that, in the Nuclear Chemistry Division, only those staff members who are also on the University faculty can supervise the thesis research of graduate students. We hope that unjustified disparities in the support level for different research groups that might arise from this policy are avoided through appropriate assignment of other supporting manpower.

In the course of our meetings we heard about a number of new recruiting efforts for new staff members that are either underway or planned for the near future. We comment on several of these in part II. We are hardly in a position, on the basis of our brief visit, to make authoritative statements on the relative priorities of staff additions in different fields. However, we do wish to stress how important it is to consider the effect that each of these recruiting efforts will have on the complexion of the staff and research program ten or twenty years hence.

II. Research Programs

The following comments on the programs of the various research groups are based both on the presentations made to the entire committee and on

information and impressions gained by committee members in individual contacts. However, we confine ourselves largely to those programs reviewed in plenary sessions. The order is approximately that of the presentations.

1. Superhilac Operation, Outside User Program, New-Element Searches

It was gratifying to find that the superhilac had achieved fairly reliable operation with krypton beams and that a number of groups have made efficient use of the machine over the past few months. We were told that a decision has been made to proceed in the very near future to operation with xenon beams. This is a sound decision provided the switch-over can be made fairly expeditiously. We hope that the superhilac program will be carefully watched and evaluated with regard to overall research effectiveness.

We heard relatively little about the outside users' program and it is perhaps too early in its operation for a meaningful review. The committee would very much like to go into this aspect of the superhilac rather thoroughly next year, since it is our understanding that this machine and its adjunct, the Bevalac, will be the major national heavy-ion facilities for the next few years. At this point we merely wish to emphasize two points: (1) our view that providing strong support for and interfacing with the outside user groups should be a matter of high priority within the Division; (2) the observation that a machine does not truly become a national facility until all research proposals for its use, from in-house and outside, are subject to the same review and approval procedures.

Ghiorso's plans for further exploration of ways to prepare superheavy elements, as targets, beams, and equipment become available, certainly seem worth pursuing, even though he himself does not attach a high probability of success to them. On the other hand, at least some of us have doubts about the amount of effort that is justified in the very difficult search for elements 106 and 107.

Seaborg's efforts, in collaboration with groups from several other laboratories, for the development of a chemical separation scheme for reasonably long-lived superheavy-element species appear quite worthwhile even if such superheavies are never found. The techniques developed have already borne fruit in providing a relatively easy way to obtain and interpret mass-yield data for such systems as U + Ar and U + Kr.

2. Coulomb Excitation and Reaction Spectroscopy

R. M. Diamond and F. S. Stephens reported on their heavy ion research program which has been carried out over the past years principally at the Hilac. Recently, during the conversion to the superhilac the work has been slowed down and some of it transferred to the 88" cyclotron. This is a small group but their output has been impressive and they have contributed significantly to basic knowledge on the collective properties of nuclei and other areas. The exploration and development of a new coupling scheme for rotational nuclei is an excellent example of the probing type of research of this group. Overall, the research has been outstanding and very well adapted to the capabilities of the facilities at Berkeley. The investigators have made full use of those techniques and methods which are ideally suited both to the accelerators and to the problems at hand. The committee recognizes that in the future this particular group may find the use of the Berkeley facilities more restricted than in the past owing to the increased use of the superhilac by other groups at Berkeley and by users' groups. It is earnestly hoped that the operation of the superhilac can be made as efficient as possible in order to maximize its use by the increased number of interested people.

3. 88 Inch Cyclotron Programs

The committee heard reviews of the research program at the 88" cyclotron given by D. J. Clark (operation and development), J. Cerny (exotic nuclei), D. K. Scott (heavy ions) and H. E. Conzett (polarized beams). The cyclotron is efficiently operated with a nice balance between operation and development. The program dealing with exotic nuclei has evolved from the earlier program devoted to studying nuclear levels of high isospin states in nuclei. In both these areas the Berkeley laboratory has been and continues to be in the forefront of progress. It is indeed gratifying that the laboratory is maintaining its leadership in these areas. The committee would anticipate that support for this work would continue undiminished and that the research will continue to evolve in new and fruitful directions. In somewhat similar fashion earlier excellent work on inelastic alpha scattering has led to a full scale program in heavy ion physics, which is now one of the "hottest" areas of nuclear physics. In order to develop further and to maintain a strong position in this research it will certainly be necessary to sustain a maximum effort. This the laboratory appears committed to doing. Because of the partial loss of a leader of this group to administration (B. Harvey) the committee strongly supports the addition of a vigorous young member to

this group. Although there is some indication that this person may be at hand, nevertheless, the committee recommends that a careful search be carried out to find the best person for this position, as there are presently many excellent candidates in this field. Experimental heavy ion physics is a rapidly changing field of investigation with many new phenomena coming to light, and many directions opening up, some fruitful and some leading to dead ends. It is hoped that the strongest possible interface be maintained with the theory group to aid in selecting the most promising lines of investigation.

The polarization facility adds an exciting dimension to the program of the laboratory. It provides a nearly unique tool in an energy range very appropriate to direct reaction studies, although it will now receive some competition from other laboratories such as Oak Ridge and Texas A&M. The work reported on the spin-spin interaction was an excellent example of the important problems which are accessible with the polarized beam facility. The committee would suggest that this program should not be squeezed too much by the active programs discussed above. It is felt that the full potential of this facility has not yet been realized.

4. Theory

The theoretical group through the years has made outstanding contributions to nuclear theory particularly in the areas of macroscopic properties, the structure of heavy deformed nuclei, and nuclear reactions. In view of the small number of permanent members of the theoretical group (2-2/3) the vigor of this program owes much to the policy which has brought many senior visitors and young postdocs to the laboratory on short term appointments. We applaud the Division for maintaining this policy and trust that this policy will continue to receive adequate support.

At the same time we feel that the size of the permanent cadre is not commensurate with the responsibilities which a National Laboratory must shoulder and that attempts should be made to broaden the activities of the group by adding a senior theoretician in an area not currently emphasized, such as shell model spectroscopy.

We sympathize with the theoreticians' complaint that they find themselves too scattered among various buildings of the Division and hope that ways will be found to bring them together in a central location.

5. Beam Foil Spectroscopy

M. C. Michel reported on the program in beam foil spectroscopy. The interest has been in improving the resolution in the method and in making lifetime measurements of the excited atomic states. Particular emphasis is now being given to the atomic alignment which occurs in the beam-foil excitation process. This is indeed one of the exciting phenomena in beam foil spectroscopy. We encourage this group to continue to seek out and pursue such interesting areas to which they can make special contributions, rather than attempt to compete in the more popular areas of the research. The committee anticipates hearing next year of the program on atomic physics carried out at the Superhilac.

6. Radiation Chemistry

The work of Garrison's group has been principally directed at the study of the γ-radiolysis of simple amino acids and polypeptides in aqueous solution and the solid state. Distinctly different behavior has been established for the hydrated and unhydrated electrons in aqueous solution. Free radical attack by OH formed from the γ radiolysis of water is observed. In the solid, electrons formed by γ ionization induce free radical reactions. The work is of high quality and pertinent to AEC basic research on radiation chemistry of biological materials. The committee was pleased to learn that future directions of the program will take advantage of the positive ion beams at the 88" cyclotron. The manpower level of the program appears commensurate with the program objectives. Any reduction in size would seriously impact on the productivity of the program.

7. Hyperfine Interactions and Photoelectron Spectroscopy

Both of Shirley's programs are vigorous and in the forefront of nuclear science and chemical physics.

The hyperfine interaction program utilizes the capability of the Laboratory in nuclear orientation in the millidegree range. Anisotropy of β and γ rays emitted in nuclear decay chains is studied, and spins and magnetic moments are derived. NMR absorption is combined to give magnetic moments of individual states.

An extensive program of perturbed angular correlation in γ-ray decay is being used to measure quadrupole interactions in metals and insulating solids.

The photoelectron spectroscopy program includes the study of core and valence electrons using x-ray and u.v. sources. Metals, semiconductors, antiferromagnetic materials, hydrides, and aromatic compounds are all being studied with great success. One example, of many, is the correlation found between 1s binding energies of carbon and fluorine in a series of fluorobenzenes with the charge distribution in the molecule and the chemical reactivity.

The quality, productivity and breadth of this program is indicative of what can be produced by an imaginative scientist with drive when there is a long term support to permit the design and construction of sophisticated instrumentation at the forefront and its use by a highly competent and motivated group of postdoctorals and students. It is hoped that the success of this program will lead to some proliferation of this approach, where warranted, to other individuals and programs both at LBL and on the national scene.

8. Environmental Chemistry

The program of the recently established Energy and Environment Division was reviewed for the Committee by J. M. Hollander. A review of that program is outside the purview of this Committee. However, the Committee was informed that the Nuclear Chemistry Division is searching for a new staff member in the field of environmental chemistry. In view of the existence of the new Division, the Visiting Committee discussed at length whether the appointment should be to the Energy & Environment Division or to the Nuclear Chemistry Division and could see pros and cons to either arrangement. Since one role of the person appointed would be to link existing LBL capability with important environmental research problems, appointment to a division other than the E&ED may facilitate this linking role. For a chemist, the NCD seems to be an appropriate division. However, a case can also be made for a demonstration of vigorous support now for the E&ED by making such a major appointment to that division with additional arrangements to facilitate his strong interaction with the NCD and other divisions. The time available to the Visiting Committee during its meeting was insufficient to permit an in-depth study of this organizational matter.

In its recruiting effort, the NCD must decide in which specialized area of environmental science its new staff member should work. Whether the appointment is in the area of air resources, water pollution, waste management, impact of terrestrial or marine mining, or food supply optimization could make a great difference to the E&ED environmental analysis and assessment programs over the next several years. Moreover, the appointment should be made only after carefully considering the existing LBL scientists whom the Laboratory hopes to link with the new environmental program. In the short time of the Visiting Committee Meeting it was possible to gain some first impressions, but the matter should be studied much more carefully before an appointment is made.

If the Laboratory chooses to start with specialization in the field of air resources, it may expect considerable early success, and for this reason an appointment in air pollution chemistry may be a good one. LBL already has an important program for the development of x-ray fluorescence analysis instruments and their application to air pollution research; the names of Goulding, Jaklevic, and Giauque are well-known nationally for this work. LBL has also the best work nationally in application of ESCA to air pollution particulate matter, with the name of Novakov being prominent. Asaro's neutron activation analysis facility appears to be the best in the country for rapid analysis of large numbers of samples for high precision trace element determinations, and its application to air pollution seems to be a natural. At the present time most of this capability for chemical analysis is used in a service function to programs whose leadership lies outside LBL, but, with stronger leadership within LBL in the environmental scientific direction of this work, the Laboratory could soon become recognized as being the largest and most comprehensive center for the study of the sources and transport of atmospheric particulate matter through measurements of elemental composition.

The strong physical chemical orientation of the NCD, as opposed to biochemical, may lend itself to readier adaptation to atmospheric research than to some areas of water or solid earth environmental research which demand biological, oceanographic, or civil engineering orientation. Moreover, there are underway major national research programs, e.g. the EPA Regional Air Pollution Study of St. Louis and the California Air Resources Board Clean Air Program, in which the LBL could expand its role. The EPA now recognizes

the value of nuclear methods of elemental analysis and would probably be sympathetic to LBL nuclear scientists devoting more attention to air quality research. An area which is still neglected, largely owing to the inadequacy of older analytical methods, is the interaction of pollution aerosols with the human respiratory tract, but highly sensitive nuclear methods now make it possible to study this directly. The LBL may be able to make a unique contribution in relating air pollution to public health by using some of its present nuclear capability for this purpose. For these reasons, the NCD may wish to recruit a person in air resources research for its senior environmental chemist.

9. Nuclear Fission Group

This group under Thompson and Moretto is experimentally and theoretically one of the strongest fission groups anywhere. With the excellent equipment, techniques, and accelerators the group has been strong in the measurement of the detailed properties of fission (neutron and gamma emission from individual fragments, non binary fission) and in the determination of fission barriers through the measurement of very low cross sections. The group is also interested in the search for superheavies both in nature and in accelerator induced reactions. In all this superb experimental work they have had theoretical support, particularly in the liquid drop model, that is the envy of the world. Moretto too has done some excellent theoretical work, particularly in the application of the statistical theory to level densities, and more recently on the influence of superfluidity on barrier penetration. This of course is all to the good, but it does raise the possibility of the group becoming too "theoretical". If that were to happen, it would be a crying waste of the experimental facilities that are the LBL's raison d'être.

III. Future Visiting Committee Operation

Since the present Visiting Committee was appointed by the Director of the Nuclear Chemistry Division, this report is, of course, addressed to him. The Committee feels, however, that in the future it would be somewhat more logical for this and other LBL visiting committees to report to the Director of the Laboratory. Likewise we suggest that future appointments to the Committee be made by the Laboratory Director, who may of course wish to solicit recommendations from the Nuclear Chemistry Division.

We note that the Committee Chairman found his session with the internal review committee of the Division very instructive and we suggest that it might be profitable in the future if the entire Visiting Committee had the benefit of a session with the internal committee.

Finally we respectfully suggest that at next year's meeting the formal program of presentations might well be scheduled a little more loosely to allow for more time for discussion and questions after each talk.

In closing we wish to express our appreciation for the amenities and hospitality which we enjoyed during our visit.

G. Friedlander

G. Friedlander, Chairman
J. Bigeleisen
J. S. Blair
S. S. Hanna
J. C. D. Milton
J. W. Winchester

will be here. We decided they will concentrate on the U plus Kr and Au plus Kr bombardments and let Nurmia, Otto, Williams, et al. carry on the Gd plus Kr bombardments. I also talked to Diana Lee about an experiment she might do--excitation functions of U plus Kr to measure yields of Au isotopes, etc.

After lunch at my desk, I taught my Chem 1C lab section from 1:10-2:45 p.m. I then walked over to Cory Hall to hear Professor Melvyn Branch, Department of Mechanical Engineering, speak on "Alternative Fuels for Automobiles" as part of the Energy and Resources Seminar.

At 4:00 p.m. in the LBL cafeteria, we had a surprise party for Elmer Kelly for his 30 years of service in the Lab. About 40 people were present, including Mrs. Kelly (Hermann Grunder's sister). I gave a little talk and presented him with his pin.

I sent to HEW my reference on David Starks for his application for a Public Health Service Research Fellowship (attached).

Thursday, April 11, 1974 - Berkeley

I participated in the qualifying examination of Leonard Y-T Ho (Cerny's student) with Kenneth Street, Chairman, Luciano Moretto, Selig Kaplan (Nuclear Engineering Department), and Ronald Herm. We started at 9:40 a.m. and asked Ho to begin by describing his research program. He did poorly in answering questions and was unable to tell us without much prompting what the kinetic energy of an accelerated charged particle is at the end of its range. He also did poorly on the calculations and definitions connected with his research. We asked him to leave at 11:30 a.m. and discussed his performance, deciding not to pass him, with no further examination to be permitted.

I returned a call to Werner Z. Hirsch (Economics Department, UCLA) at noon. He told me that the CCEEB Executive Committee met on Monday and wants to proceed with a one-day program on resources next October. The committee has asked that Hirsch and I serve as the Co-Chairmen. I indicated the I could do this, but only on the basis that I could give but minimal time, such as we have been doing so far on the telephone.

I attended the bag-lunch meeting of the Actinide Chemistry group. Halstead reported on structure determinations, by x-ray diffraction, on $U(Cp)_4$. Ritter reported on his synthesis of crystals of Cs_2NaYCl_6, $LaCl_3$, $LiYF_4$, and $RbNaYF_6$ to act as hosts for actinides for laser use. Dennis Fujita, who is just starting work with Edelstein on a part-time basis, described his plans to make magnetic susceptibility measurements on actinide metals--Am, Cm, Bk, Cf. (He received his Ph.D. with Cunningham four years ago, is now teaching.) Edelstein described the plans for this program.

From 1:00-2:00 p.m., I attended a meeting of the Nuclear Chemistry Division Program committee in my office. Present were Harvey, Poskanzer, Cerny, Templeton, Thompson, Hendrie, Grunder, Edelstein, Rasmussen, Diamond, Glendenning, and Austria. Harvey gave a summary of the budget situation for FY75; we are in trouble here. We voted

INSTRUCTIONS: Please complete immediately and mail BOTH copies to the Public Health Service in the envelope provided. Failure to do so may result in deferral of the application. PLEASE FILL IN BY TYPEWRITER.

FORM APPROVED
BUDGET BUREAU NO. 68-R0288

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

REFERENCE REPORT ON FELLOWSHIP APPLICANT

A Privileged Communication

NAME OF APPLICANT (Last, first, middle): Starks, David Fred

TYPE OF FELLOWSHIP REQUESTED (Predoctoral, Postdoctoral, or Special): Postdoctoral

PROPOSED SPONSORING INSTITUTION: University of California, San Diego

FELLOWSHIP NUMBER (Leave blank): 127-38-8119

NOTE TO RESPONDENT: The above applicant has selected you as a reference relative to his request for a Public Health Service Research Fellowship. Please complete this inquiry in English and mail it promptly to the Public Health Service in the envelope provided. It will be necessary for us to reproduce this inquiry in order that it may be reviewed by a committee of consultants. Therefore, we would appreciate your having the form typed with a black ribbon. Early receipt of the completed evaluation will be of distinct advantage to the applicant. A continuation page may be used if space provided is inadequate.

1. Rate the applicant on the items below by a numerical score of 1 to 5, basing such ratings on the degree of accomplishment you usually expect of individuals at this level (1—outstanding; 2—above average; 3—average; 4—below average; 5—poor; X—insufficient knowledge to rate).

1	A. Originality	1	F. Perseverance in Pursuing Goals
2	B. Accuracy	2	G. Ability to Organize Scientific Data
1	C. Research Ability	1	H. Familiarity with Research Literature
2	D. Scientific Background	1	I. Proficiency in Laboratory Work, if Relevant
2	E. Ability to Exchange Ideas		J. Clinical Proficiency, if Relevant

2. Describe any qualifications and traits you consider of special significance in judging the applicant's fitness for a research career in the sciences related to health (emphasize research aspects). List major academic weaknesses, if any.

I became acquainted with David Starks in connection with his Ph.D. research program, which he did under the direction of Professor Andrew Streitwieser, Jr., as a collaborative effort in our Nuclear Chemistry Division in the Lawrence Berkeley Laboratory. He has been involved in the synthesis and characterization of organometallic compounds of actinide elements, including the compounds of some highly radioactive elements which has made it necessary for him to work in one of our special laboratories.

Starks has exhibited a noteworthy maturity in the conduct of his research. He is quite competent in the techniques of synthesis and characterization of organometallic compounds, a capability which should be quite relevant to the study and attempt to duplicate the function of active sites of metalloenzymes. He has good theoretical understanding of the interpretation of the molecular structures of the compounds with which he has worked.

David Starks strikes me as creative, intelligent, energetic, and a person who plans his work well. He is very personable and I believe that he will get along well in his work with Dr. T. G. Traylor at the University of California, San Diego. I feel that I can recommend him very highly for receipt of an NIH Postdoctoral Fellowship.

3. Indicate dates which you were associated with this applicant: Academic year 1972-73 and 1973-74

Capacity at that time (Teacher, advisor, supervisor, or other): Advisor

SIGNATURE OF RESPONDENT: Glenn T. Seaborg

TYPED NAME OF RESPONDENT: Glenn T. Seaborg

DATE: April 10, 1974

TITLE OF RESPONDENT AND DEPARTMENT (If applicable): University Professor of Chemistry

ADDRESS OF INSTITUTION: Berkeley, California 94720

INSTITUTION: University of California

unanimously that the environmental chemist should be in the Nuclear Chemistry Division (instead of the Energy and Environment Division) and to offer the position to David Natusch.

I attended a meeting of the LBL Scientific Program Council in the Director's Conference Room in Building 50A, from 2:00-3:45 p.m. Present were Andrew Sessler, Earl Hyde, Jack Hollander, Frederick Goulding, Cornelius Tobias, Luis Alvarez, David Jackson, Tom Elioff, George Pappas, Herbert Steiner, James Bassham, and Bill Shanahan. We discussed new staff prospects for LBL and it was decided to offer them salaries required to get them to come even if these are higher than present salaries of comparable people.

Pappas discussed a proposed new overhead policy. This will bring in more money ($3-400,000) from outside work. Sessler then covered a number of news items. Herb Kinney has succeeded in getting some money (perhaps $900,000) in design money for PEP into the AEC Authorization Bill. This should help in the competition between PEP and ISABEL, the Brookhaven project. Sessler stated that the LBL Affirmative Action Plan has been accepted by the University statewide administration. Pappas said a law has been introduced in the state legislature to increase employee benefits, retirements, etc.

I walked down to the campus, enjoying a beautiful day, and went to Lewis Hall to attend the Graduate Research Conference. The first speaker was George E. Zahr (Professor W. H. Miller's student) on "Electronic Transitions in Molecular Collisions"--a good talk. The second was David J. Vieira (Joseph Cerny's student) on "Beta-Delayed Proton Emission Studies of Nickel-53"--another good talk. I completed my evaluation forms on these two presentations (attached).

Friday, April 12, 1974 - Berkeley

At 8:30 a.m., I called George Rogosa at the AEC in Washington and we discussed our budget for FY75 in detail. Arthur Poskanzer distributed a memorandum to members of the Program Committee soliciting their views on the Environmental Chemist position.

I drove down to the Durant Hotel and picked up Emilio Daddario (Director, U.S. Congress Office of Technology Assessment) and his assistant, Buford Macklin. The program for their day at Berkeley is attached. The opening session on Fossils Fuels was chaired by Jack Hollander, who called on Gary Higgins (who spoke on coal, oil shale, and natural gas) and Thomas Sherwood (who discussed coal burning and stack gas technology).

I left the meeting at noon and walked down to campus to have lunch in the Popper Room of the Faculty Club with my fellow Chem 1C Section Leaders--Pimentel, Herm and Sauer. We discussed the forthcoming visit of Chinese laser scientists for which Pimentel is the host and Chem 1C teaching matters. I then went to Latimer Hall to attend a meeting of the Chem 1C instructional staff from 1:10-1:30 p.m.

I rejoined the Daddario group which was just finishing their discussion of Energy Conservation. Next the discussion went to Geothermal Energy with a summary by Roy Austin. Paul Witherspoon

SEMINAR EVALUATION

Student [illegible] Seminar Date April 11 Prelim Committee Member [illegible]

Please briefly describe below your opinion of the major strengths and weaknesses of this seminar presentation. Such subjects as A) organization, B) clarity of expression, C) depth of understanding, D) level of achievement, E) critical awareness, and audience response might be considered.

Seminar was well organized and he gave every evidence of being in command of the situation. He displayed an unusual level of self confidence. He seemed to handle the questions well, except for those from Professor Pimentel where he displayed a lack of understanding of some elementary chemistry.

Please evaluate below the overall performance of this student compared to others at this stage in their careers.

Superior (Excellent) Good Mediocre Poor

Please return completed evaluation form to 419 Latimer

SEMINAR EVALUATION

Student David Vieira Seminar Date April 11 Prelim Committee Member Seabury

Please briefly describe below your opinion of the major strengths and weaknesses of this seminar presentation. Such subjects as A) organization, B) clarity of expression, C) depth of understanding, D) level of achievement, E) critical awareness, and audience response might be considered.

The seminar was well organized with much attention given to making it understandable. He expressed himself clearly, gave every evidence of understanding very well his subject matter. His handling of the questions was good

Please evaluate below the overall performance of this student compared to others at this stage in their careers.

Superior Excellent Good Mediocre Poor

Please return completed evaluation form to 419 Latimer

PROGRAM FOR EMILIO DADDARIO AND BUFORD MACKLIN

at the Lawrence Berkeley Laboratory,
University of California, Berkeley

Friday, April 12, 1974

9:00 a.m. Glenn Seaborg will call for you at your room at the Durant Hotel, and drive you to his office at the Lawrence Berkeley Laboratory.*

After a visit in his office, he will escort you to the Briefing Program in the Building 50B Conference Room (#4205), arranged by Jack M. Hollander.

Attached for your reference is Dr. Hollander's memorandum of 4/9/74 to local participants.

Also attached is a list of participants, indicating their full names and affiliations.

Drs. Sessler, Batzel, Long, Kuh, Simmons, Mr. Duval and Ms. Howell have been invited to participate in the full day's program.

10:00 a.m. to 12:00 noon — FOSSIL FUELS

Participants include Higgins, Sherwood, Novakov, Harte, Winkelstein, Grens, Siri, Budnitz, and Holdren.

(1) Conversion processes--including liquefaction, gasification, shale
(2) Coal utilization.

12:00-1:00 Luncheon, LBL cafeteria, lower level

1:00-1:30 ENERGY CONSERVATION

Participants include Harte, Rosenfeld, Lichtenberg, Holdren.

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* Dr. Seaborg's home telephone number in Lafayette is (415)283-3418. Additional contact if needed is his Administrative Assistant, Mrs. Sheila Saxby (home phone 835-9234). Our office telephone is 642-3272 or 843-2740, ext. 5661.

1:30-2:00 FISSION

Participants include Pigford, Durbin, Budnitz.

2:00-2:45 GEOTHERMAL ENERGY

Participants include Austin, Harte, Budnitz.

2:45-3:30 SOLAR ENERGY

Participants include Calvin, Simmons, Wahlig.

3:30-4:00 ENERGY-RELATED MATERIALS RESEARCH

Brewer will lead the discussion.

4:00-4:30 FUSION

Participants include Fowler and Kunkel.

4:30-5:30 PLANNING, POLICY, AND EDUCATIONAL ASPECTS OF ENERGY-RELATED PROGRAMS

Participants include Birdsall, Buxbaum, Norgaard, Harte and LaPorte.

Ride with Dr. Seaborg to the Faculty Club on the Berkeley campus.

6:00 p.m. Dinner, hosted by Dr. Seaborg, in the Hart Room of the Faculty Club, for a total party of 12.

Dr. Seaborg will return you to the Durant Hotel.

cc: Barbara Bacon
Andrew Sessler
Jack Hollander

sms 4/11/74

Participants

PROGRAM FOR EMILIO DADDARIO AND BUFORD MACKLIN
on Energy-Related Programs

Room 4205, Building 50B
10:00 a.m.
Friday, April 12, 1974

AUSTIN, A. L. (Roy), Group Leader, Geothermal Group, Earth Sciences Division, LLL

BATZEL, Roger E., Director, Lawrence Livermore Laboratory

BIRDSALL, Charles K., Professor of Electrical Engineering and Computer Sciences; Chairman, Energy and Resources Committee, UCB

BREWER, Leo, Professor of Chemistry, UCB; Director, Inorganic Materials Research Division, LBL

BUDNITZ, Robert J., Physicist, Environmental Program, Energy and Environment Division, LBL

BUXBAUM, Richard M., Professor of Law and Director, Earl Warren Legal Institute, UCB

CALVIN, Melvin, University Professor of Chemistry, UCB; Director, Laboratory of Chemical Biodynamics, and Associate Director, LBL

DURBIN, Patricia W., Biochemist, Donner Laboratory, LBL

DUVAL, Richard, Director, Office of Program Coordination and Management--Space and Energy Programs, San Francisco Operations Office, U.S. Atomic Energy Commission

FOWLER, Kenneth, Head, Fusion Program, LLL

GRENS, Edward A., Professor of Chemical Engineering, UCB

HARTE, John, Physicist, Environmental Program, Energy and Environment Division, LBL

HARVEY, Bernard G., Deputy Director, Nuclear Chemistry Division, LBL [at dinner]

LBL = Lawrence Berkeley Laboratory
LLL = Lawrence Livermore Laboratory
UCB = University of California, Berkeley

HIGGINS, Gary H., Head, Energy Research Group, LLL

HOLDREN, John P., Assistant Professor of Energy and Resources, UCB

HOLLANDER, Jack M., Director, Energy and Environment Division, and Associate Director, LBL

HOWELL, Yvonne L., Head, Department of Public Information, LBL

KUH, Ernest S., Dean, College of Engineering; Professor of Electrical Engineering and Computer Sciences, UCB

KUNKEL, Wulf B., Professor of Physics, UCB; Head, Fusion Program, LBL

LA PORTE, Todd R., Associate Professor of Political Science; Associate Director, Institute of Governmental Studies, UCB

LICHTENBERG, Allen J., Professor of Electrical Engineering and Computer Sciences, UCB

LONG, Durward, Vice President--Extended Academic and Public Service Programs, University of California (Statewide)

NORGAARD, Richard, Assistant Professor of Agricultural Economics, UCB; Assistant, Agricultural Economics Experiment Station and Giannini Foundation of Agricultural Economics

NOVAKOV, Tihomir, Physicist, Environmental Program, Energy and Environment Division, LBL

PIGFORD, Thomas H., Professor of Nuclear Engineering, UCB

ROSENFELD, Arthur H., Professor of Physics, UCB; Physicist, Physics Division, LBL

SEABORG, Glenn T., University Professor of Chemistry, UCB; Director, Nuclear Chemistry Division, and Associate Director, LBL

SESSLER, Andrew M., Director, Lawrence Berkeley Laboratory

SHERWOOD, Thomas K., Professor Emeritus, Chemical Engineering, UCB

SIMMONS, Melvin K., Physicist, Energy and Environment Division, LBL

SIRI, William E., Biophysicist, Donner Laboratory, LBL

WAHLIG, Michael, Physicist, Energy and Environment Division, LBL

WINKELSTEIN, Warren, Jr., Dean, School of Public Health; Professor of Epidemiology, UCB

WITHERSPOON, Paul A., Head, Geothermal Program, LBL; Professor of Geological Engineering, UCB

GTS/ssk
4/11/74

followed with an overview of the potential for this energy. Melvin Calvin discussed Solar Energy and Leo Brewer Energy-related Materials Research. I emphasized the problem of money for equipment and everyone present agreed vociferously; the ratio of money for equipment to money for operating is much too small in the AEC labs. Richard Post spoke next on Fusion.

Hollander called on Charles Birdsall who talked about the program of the campus Energy and Resources Group. Todd La Porte described the role of political science in the program and the need for fellowships for graduate students which have been cut back by NSF. Richard Norgaard complained about the lack of support to train Ph.D.'s who are generalists in assessing technical solutions to the energy and other problems. Richard Buxbaum described the problem of training law students in areas with a high technical component.

Others who attended today's meeting (besides those on the list given to Daddario) were Peter Bernard (from the SAN office), Glenn Werth, Earl Hyde, and Lawrence Germain. The session ended at 6:10 p.m. Daddario and Macklin rode with me to the campus where we went to the Hart Room of the Faculty Club for dinner. Also present were Roger Batzel, Charles Birdsall, Bernard Harvey, Ernest Kuh, Todd La Porte, Andrew Sessler, Thomas Sherwood, and Paul Witherspoon.

Daddario, sitting next to me, said he believes that President Nixon will either be removed by impeachment or resign by the end of the summer. I drove Daddario and Macklin to the Durant Hotel where they will spend the night, then visit Stanford tomorrow.

Saturday, April 13, 1974 - Lafayette - Berkeley

Suki and I took a hike in Briones Park. At 6:00 p.m., Helen and I went to the Berkeley home of Horace and Peggy Josephson; he is a visiting lecturer at UC/Berkeley for the Spring Quarter (he retired from the Forest Service in Washington last November). Also present at this reception were their son Richard and his wife Jean (visiting form their home in Portland where he is a practicing lawyer and she a 6th grade teacher), Henry and Jean Vaux, Mrs. George Mehren, Mr. and Mrs. Robert Cockrell, Myron Krueger, Mr. and Mrs. Varden Fuller, Mr. and Mrs. Harry Cumb, Starker and Betty Leopold, Fred and Doris Dickinson (whose son Tom married Roberta Peery, daughter of our longtime neighbors), and Mr. and Mrs. Emanuel Fritz. We returned home a little after 8:00 p.m., found that Dianne was out baby-sitting.

Sunday, April 14, 1974 - Lafayette

I read Chem 1C material, worked in the back yard, and watched the last few holes of the Master's Golf Tournament, which Gary Player won by 2 strokes with a total of 278.

In the evening, I called a number of people to get permission from each of them to cross their land on a hike sponsored by the Contra Costa Park Council on June 1 which I will lead.

Steve called to make arrangements for us to haul some furniture to his apartment when we meet him on Picnic Day next Saturday. He has

decided to take his graduate school examination on June 15, so he will miss his graduation; this should make it possible for Helen to accompany me to Europe in June.

Monday, April 15, 1974 - Berkeley

I attended Pimentel's lecture. I called Stan Schneider in Washington at 10:30 a.m. to say that I will use all of his additions to the draft of my April 24 speech. I also called Robert Siegel, editor of Think Magazine (the IBM house publication), to decline his invitation to write an article on the case for nuclear-powered energy plants.

I held my office hour in 446 Latimer from 11:10 a.m. to noon. Marcie Farber of Dreyfus Third Century Fund called to obtain my approval to put on the stock eligible list a Swedish Company, Astra, that does about $20 million annual business in the United States; they sell products similar to those of Syntex. Wendell A. Williams came in and I worked some problems for him.

I had lunch with the Chem faculty in the Howard Room, then taught my lab section in Room L from 1:10-2:50 p.m. As leader of Section 2, I administered the first quiz of the spring quarter (attached), which I had composed last week.

I had a cup of tea with Earl Hyde; he wanted to discuss ways in which we can aid Taisto Raunemaa to complete some publishable research using the SuperHILAC before he leaves to return to Finland this summer. Joe Cerny told me that he has just received a phone call from Dixy Lee Ray informing him that he will be a recipient of one of the Lawrence Awards this year.

At 4:00 p.m., I attended the tri-weekly graduate student seminar in Building 70A. I introduced Dean Liskow (Schaefer's student) who spoke on "Features of the Potential Energy Surface Calculation for C^+ and H_2," and Richard Schmitt, who spoke on "Complex Particle Emission in the Reaction Nitrogen $_7N^{14}$ + $_{47}Ag^{107,109}$."

Tuesday, April 16, 1974 - Berkeley

I called Rodney Hader (Assistant to the President, ACS) at 8:45 a.m. to inquire about the seriousness with which I should take invitations to speak at local sections in my capacity as a Presidential candidate. He ventured the opinion that it would be good if I could accept them, but could not discern how influential these appearances are on the final balloting. We agreed that my not making a section meeting might be misinterpreted.

At 9:50 a.m., I telephoned Tom Hitchcock in the Supply Administration Department, then Harold Van Tuyl at Battelle, to discuss complications with the Jack Ryan arrangement.

I walked up to the HILAC Building to confer with Ghiorso, Nurmia and Williams about our research; Kratz and Norris are scheduled to get a U plus Kr bombardment tonight, Binder a Au plus Kr bombardment, and Williams and Otto a Th plus Kr bombardment.

Chem 1C Section 2
Quiz, April 15, 1974
30 points OPEN BOOK
30 minutes

Name _____
Locker No. _____
T.A. _____

NOTE: Solubility products may be found on page 119 of Pimentel and Spratley.

1. (10 points) An unknown was prepared by taking one or more of the following solids:

$AgNO_3$ Na_2SO_4 $Cu(NO_3)_2$ $BaCl_2$ K_2S

Treatment with HNO_3 gave a colorless solution and a remaining white solid which dissolved in NH_4OH. Write + for any solid definitely present, - for any definitely absent, and ? for any not determined by the experiment.

2. (10 points) How would you convert:

a. $ZnSO_4$ to $ZnCl_2$

b. $CaCO_3$ to $Ca(OH)_2$

c. CuS to $Cu(OH)_2$

d. NaCl to Na_2SO_4

e. AgCl to Ag_2O

All of these compounds are in solid form.

3. (6 points) A 100 ml. solution of 0.001M Ag^+ and 0.3M H^+ is saturated with H_2S. What is the final concentration of Ag^+? Show your work.

4. (4 points) The solubility of ZnS in water is greater than calculated from the solubility product. How can you account for the apparent discrepancy?

At 12:30 p.m., I had lunch in the South Dining Room of the Faculty Club with George Pimentel and David Ridgway in our capacity as members of the CHEM Study Executive Committee. We reviewed the program of the last year and the budget (Stever letter to Pimentel attached). We agreed to allocate $5,000 to the campus SESAME Program (hopefully, to continue with a grant of $5,000 per year for two additional years), leading to a Ph.D. in science education.

I called Arthur Poskanzer at 2:10 p.m. to say that I signed and sent the letter he had drafted to invite David Natusch to come here as our environmental chemist (attached).

At 2:30 p.m., I met with Taisto Raunemaa. I described to him my conversations with Ghiorso and Nurmia this morning in which we outlined an experiment by which he might identify through gamma ray emission light isotopes of tungsten produced in the bombardment of dysprosium with oxygen ions. (I had Diana Lee drop in and we arranged to use her 30 cu.cm. Ge-Li detection crystal and 1,000 channel pulse analyzer for the detection of the gamma rays.) I called Ghiorso and arranged for the first bombardment to be done this afternoon.

Raunemaa asked whether he might stay an additional four months at $1,000 per month in order to complete the experiment on the detection of volatile tungsten fluoride through its isotopes as a stand-in for the detection of volatile 106 fluoride. He told me that he has three children and a nurse to take care of them, which helps bring his expenses to $1,000 a month. I said I would let him know.

He also discussed with me his design of an experiment to sweep the recoils from the Dy or Cf targets into a fluorinating stream to chemically identify volatile fluorides of tungsten or 106. Raunemaa would like to visit the Chemistry and Physics labs on the campus so that he can survey them to report to the people at Helsinki; Sheila will set this up.

Bernard Harvey distributed his memorandum on administrative changes in the Nuclear Chemistry Division: Gertrude Steel will continue to be responsible for budget matters and those concerning building space changes; George Killian is in charge of equipment pools and inventory; and the two of them will share housekeeping responsibilities. I also received the report on the 1974 AAAS Annual Meeting Exhibits Subcommittee, chaired by Ernest Rook of the California Academy of Sciences.

Eric called at 9:00 p.m. to make plans for our visit to Davis Picnic Day on Saturday. He is struggling with the decision of where to live next year since he is moving out of Hammarskjold House.

Wednesday, April 17, 1974 - Berkeley

I attended Pimentel's lecture, then held my office hour. Peter Chin came in with some questions.

I called Anna Harrison at Mount Holyoke College at 11:30 a.m. to discuss our invitations to speak at local ACS sections in connection with our candidacies for the Presidency. Neither of us wants to

To Dave Ralgus

APR 17 1972

110a

NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

OFFICE OF THE DIRECTOR

APR 14 1972

Re: NSF G-12226

Dr. George C. Pimentel
Department of Chemistry
University of California
Berkeley, California 94720

Dear Dr. Pimentel:

Thank you for your letter of March 6, 1972 which brings to my attention the remarkable accomplishments of the CHEM Study Project in promoting the Foundation's objectives in science education. You and your colleagues are to be congratulated on this fine piece of work and thanked for your years of dedicated service.

I agree with you that, in view of the rapid decline in royalty income derived from the CHEM Study materials, the time has come to relieve the University of California from further obligation to report and remit this income. I am glad, therefore, to authorize the University to retain all such income received after December 31, 1972 and apply it to the costs of administration of the properties and to research or education in the sciences. Accordingly, I am requesting the Grants and Contracts Office to prepare the necessary papers to terminate the Foundation's interests in the CHEM Study materials as of December 31, 1972. This will have the effect of leaving complete control of these materials in the hands of the University.

Sincerely yours,

/s/ H. Guyford Stever

H. Guyford Stever
Director

~~200 Natusch, Prof. David~~
~~701 Environmental Chemist~~
CHRON.

110b

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

April 16, 1974

Professor David Natusch
Department of Chemistry
University of Illinois
Urbana, Illinois 61801

Dear Professor Natusch:

To confirm yesterday's telephone call to you from Arthur Poskanzer, I would like to offer you a Senior staff position in the Nuclear Chemistry Division of the Lawrence Berkeley Laboratory. The salary would be $22,000 per year. Jack Hollander says that you also will be given a joint appointment in the Energy and Environment Division.

You can bring your graduate students with you who have finished their course work and have permission from Illinois. Some partial support for students could be made available. Enclosed for your information are the Laboratory's procedures on outside consulting.

The exact size and composition of your group would be difficult to state at the moment, but it is expected that it will be drawn from this list: Bob Giauque, Ray Clem, Al Hebert, Amos Newton, Al Sciamanna, and, part-time, Ralph McLaughlin, Bobby Garrett, and Lilly Goda. The total annual support for these people at present is about $300,000. In addition, it is expected that you will collaborate with Frank Asaro on NAA, the people in the Energy and Environment and Instrumentation Divisions involved in air pollution (Novakov, Goulding, etc.), and people on campus. Of course, most of these interactions would have to be worked out after your arrival here. It is not expected that you will have to search for large amounts of outside funding in the first few years. The red tape involved in AEC funding is minimal, and we are confident that with a strong program here our AEC support will increase.

Although the four faculty members who interviewed you when you were here were favorably impressed with your qualifications for an academic appointment, it appears

that it would be a difficult procedure to convince the campus Chemistry Department to hire any Environmental Chemist at this time. It is something that can be worked on, but would take time, and no promises can be made.

If any further questions come up, please feel free to call me, or Art Poskanzer, or Jack Hollander. We would also be happy to have you visit us again for a few days. Please bring your wife with you, although of course we would only be able to pay your own travel expenses. It would be best to arrange such a visit as soon as possible because we would like to have a decision from you as soon as possible.

I would like to express my strong personal desire that you will decide to cast your lot with us.

With warm regards,

Cordially,

Glenn T. Seaborg

GTS/my

Enclosure

cc: Jack Hollander
Arthur Poskanzer
Robert Budnitz
Bernard Harvey
Andrew Sessler
Earl Hyde

bcc: Eileen Eiland

Wednesday, April 17, 1974 (con't)

engage in any kind of confrontation or fencing matches. I told her about Emerson Venable's petition to be a candidate, and we agreed that we should attempt to see that either she or I is present where he is making appearances. Anna would like our appearances to be in the form of three-way panels--her, me, and a local section member--to discuss the problems and opportunities of the ACS. I indicated that I like the idea of our dividing the appearances between us. We will stay in touch on this.

I called Sydney Gaarder at AEC in Washington at 11:50 a.m. to learn if he thought he could come out to Berkeley for a year to work on the Section C-1 history. He is fairly pessimistic about the possibility, but he might try the idea out on his supervisor, Sam McDowell.

I went by our counting area in Building 70 and found that Otto and Williams had finished the chemical separations and were looking for the alpha particles in the lead (Pb^{212} and daughter Po^{212}), Ra, etc. fractions; this experiment is for the purpose of determining the effect of Th impurity on the experiment Gd plus Kr to produce Pb^{212} plus Ar^{34}. Kratz, Norris and Binder had also finished extracting gold and yttrium from the uranium target bombarded early this morning. I saw Taisto Raunemaa and told him that we have decided to put him on the payroll for September through December, 1974 at $1,000 per month.

After lunching at my desk, I taught my Chem 1C lab section from 1:10-3:00 p.m. At 3:35 p.m., I returned a call from Tom Feldman at the UCLA Foundation. I explained that my relationship with Joseph Kaplan was in no way professional. As an undergraduate in chemistry at UCLA, I asked him for advice on where to go to graduate school, but did no work with him and took no courses from him. I expressed the hope that Feldman could amend his remarks in some way, however, because I would like to help Kaplan.

I called Walter Hartsough at 3:45 p.m. in response to his memo of March 29, asking for my comments on the proposal by James Liverman (Assistant General Manager for Biomedical and Environmental Research and Safety Programs at the AEC) for an International Symposium on the Transuranium Nuclides. I said it looks like a good idea to me; there is an increasing amount of focus on the actinide elements in nuclear power. I noted that the environmentalists are becoming more insistent on serious attention to the waste disposal problem, and I think it should be focused on.

I received from Frank Asaro the report of the Nuclear Chemistry Affirmative Action Program in FY74 (attached). His programs are highly useful and productive in relation to the low budget with which he operates. On the basis of his recommendations, I sent letters of invitation to participate in our seven-week summer program (for faculty from predominantly minority colleges) to Frederick Bacon (Morehouse College), Kenneth Scherkoske (Kentucky State University, Frankfort), James D. Beck (Virginia State College, Petersburg), Ray Floyd Wilson (Texas Southern University), and Margaret Tolbert (Tuskegee Institute). I sent regret letters to the other applicants.

701 Affirmative Action

LAWRENCE BERKELEY LABORATORY
Room: 103 Bldg.: 70 Ext.: 5433

111a

SDS 4/17/74

April 15, 1974

TO: Dr. Glenn T. Seaborg

Our Nuclear Chemistry Affirmative Action Program has been going very well in fiscal 1974. As part of the overall goal of increasing the representation of ethnic minority groups and women in science, particularly at the more advanced levels, we have programs whose participants range from university faculty to underprivileged high school students. The following is a resumé of Nuclear Chemistry's affirmative action activities so far in fiscal 1974 and the projected program and expenditures for fiscal 1974 and 1975. We have $10,000 of special funds for fiscal 1974 and anticipate at least $10,000 in fiscal 1975.

College Faculty Summer Program

In December you sent letters to some 60 colleges and universities with large enrollments of ethnic minority students informing them of four projected 10 week summer research appointments for faculty members. We have received in response 19 applications (two from women) from 14 institutions in 10 states, primarily in the South. The Nuclear Chemistry Affirmative Action Committee has reviewed these applications and picked the four candidates who would probably make the greatest gain from a research experience here and could pass it on to their students. The recommended applicants are:

GTS approve?

1. Margaret Ellen Mayo Tolbert (Ph.D. 1973, Brown University), who is an Assistant Professor of Chemistry at Tuskegee Institute in Alabama. She would work with Dave Templeton and Allan Zalkin on x-ray crystallography for 10 weeks from June 3 to August 9.

2. James Donald Beck (Ph.D. 1969, University of Delaware), who is an Associate Professor of Chemistry at Virginia State College in Petersburg, Virginia. Beck would work with Tet Hadeishi and Ralph McLaughlin on environmentally-related research for 10 weeks from June 3 to August 9.

3. Ray Floyd Wilson (Ph.D. 1953, University of Texas at Austin, J.D. 1971, Texas Southern University), who is a Professor of Chemistry at Texas Southern University. Wilson would work with Norman Edelstein on organometallic chemistry for six weeks starting July 6.

4. Kenneth David Scherkoske (Ph.D. 1964, University of Toledo), who is an Assistant Professor of Physics at Kentucky State University in Frankfort, Kentucky. Scherkoske would work for eight weeks starting June 3 in a research or development project at the 88-inch Clyclotron.

Dr. Glenn T. Seaborg
April 15, 1974
Page two

The total estimated cost in fiscal 1974 is $4065. The total estimated cost in fiscal 1975 is $6805.

The Committee feels the appointment of Fred Bacon (Ph.D. 1972, U.C. Berkeley) for a seven week position in Dave Shirley's group starting July 8 has considerable merit. It would enhance Bacon's prestige (which is good for the Black image as well as for Bacon), and he could probably do constructive work for Dave in the short appointment. The Committee thinks the other appointments are more desireable, but that Bacon should be appointed if the Nuclear Chemistry Division can fund the necessary $2220 out of its operating budget in fiscal 1975.

College Undergraduate Employment Program

This is a program to hire undergraduate students who are female or members of ethnic minority groups into programs where they can actively contribute to research projects. The students work half-time and receive $265 per month. There are four such students now working in Nuclear Chemistry. Terrance Ishida is working for Norman Glendenning, Edwina Young (a Black girl) is working for Ken Street, Raul Peña (a Mexican-American) is also working for Ken Street and Stanley Bell (a Black young man) is working in your group helping Kratz and Norris. This program has worked quite well with the students doing very constructive work. In two instances the students became careless in reporting to their supervisors. A frank discussion about their responsibilities and the importance of their work seems to have taken care of the problems.

Three of the students are paid from the special funds and one, Raul Peña, is paid from operating funds with a reduced overhead. The Committee suggests that we continue the program for the remainder of the calendar year. The costs for the fiscal 1974 program will be $4305.

The costs of the program for three students from July through December in fiscal 1975 would be $4770. These costs do not include Peña as he is funded by the operating budget.

Midyear Review

The Committee suggests we request additional funds for our affirmative action projects at the midyear review. To fund our summer faculty program for the summer of 1975 in the month of June we would need $8130 for six people. To fund four undergraduate students for the first half of calendar 1975, we would need $6360. The total we suggest requesting is $15,000 for the last half of fiscal 1975.

Summer Program for Bright College Juniors

This is a training program which falls under the purview of the special funds we receive. The Committee suggests that this program be funded during the month of June up to a maximum of ∿$1600 from the special funds. The Committee also suggests that the Nuclear Chemistry Division contribute a matching amount to the Nuclear Chemistry Affirmative Action Budget in the months of July and August. I have checked with the budget office, Joe Cerny, and Bernie Harvey and everyone is agreeable.

Post-Doctoral Appointments

A very talented young lady (Ph.D., Brandeis) with considerable ability in applying nuclear techniques to archaeology was in dire need of a job because of a change in her personal status (i.e. she was separated from her husband). She was employed at the full salary rate for her position but only on a part-time basis because of the limited funds available. The Nuclear Chemistry and the central laboratory administrations bent over backwards so that the young lady could realize the maximum salary from the limited funds available and charged no overhead at all on her salary.

The Nuclear Chemistry Division appointed a special committee to find ways of increasing the number of post-docs who are women or ethnic minority members. The Committee recommended specific procedures to insure that minority colleges and unversities knew of our post-doc positions and to encourage women and ethnic minority members to apply. Already one woman has been accepted for a full-year appointment as a result of this program.

Special Summer College Undergraduates

This program was sponsored by the Training Department last summer. Nuclear Chemistry took on four students for short full-time appointments in research groups. Michael Word worked for Stretch Conzett, Charles Mora worked for Ken Street, Edward Perrett worked in electronics for Richard LaPierre, and David Talley worked for me.

Two of the students, Mora and Word, worked out quite well with warm praises from their supervisors. One student, Talley, did his work but was very uncommunicative in spite of numerous and varied efforts. One student, Perrett, had not been briefed properly on the work expected from him and was overloaded with classes. This can be a good program for us, but in the future Nuclear Chemistry personnel should have an opportunity to interview the applicants before selection.

Underprivileged High School Students

This was a short summer program for high school students, primarily Black or Chicano, who came from depressed economic backgrounds. It was sponsored by the Training Department. The Nuclear Chemistry Division took on four students last summer. Three of the students Robert Manning, Morris Jones and Steve Whitley worked at the Hilac under Frank Grobelch's supervision and one, Davelo Lujan, worked for Kratz. The supervisors felt this program worked out very well. There were certainly adjustments which the students had to make, but the supervisors were very sensitive to the needs of the students and overcame any initial problems.

The cooperation of the Nuclear Chemistry staff has been splendid in making the affirmative action program move. As an example, one of the Black high school students initially in the summer program at the Hilac was rather impressive in his ability. In looking over his records it was found that his parents' income was slightly too large for him to continue in the program, and he (and his twin brother) would have to be dropped. A senior staff member at the Hilac cut through all of the red tape so that the young man could participate in one of the related programs -- then he did the same thing for the young man's twin brother who had been working in another division.

I have turned in a 189 form for affirmative action activity for fiscal 1975 and 1976 requesting $31,150 each year for Priority I projects and an additional $62,490 each year for Priority II projects.

Frank
Frank Asaro

FA:FM

Thursday, April 18, 1974 - Berkeley

Dave called to invite me to have a birthday luncheon with him today, but I had to decline because of a scheduled meeting.

Sam Wyly called me at 11:00 a.m. to report on some recent progress in their financing of DATRAN. Walter Haefner has agreed to make an additional $10 million investment. Haefner has been collatorized by the Wyly Corporation and now has agreed to surrender his collateral so that Wyly can make it available to a banking group headed by the First National Bank of Boston. The First National Bank of Boston has agreed to supply $50 million credit to be used by DATRAN; the first half is collaterized by other Wyly Corporation assets, and the second half would stand on DATRAN's own assets and credit. They have verbal agreements only at this time and are going into the negotiating process, which Sam estimates will take 40-50 days to get hammered out. It will then have to be voted on by the Wyly Corporation's public shareholders since they will be mortgaging all of the other assets of the Wyly Corporation in order to finance DATRAN. The total process, therefore, will take three or four months.

I called Sam Markowitz to invite him to attend the lunch meeting today of our radiochemistry group as a prelude to cooperative work between our two groups; he accepted. He expressed his willingness to be collaborative in sharing equipment and information while emphasizing the need to be independent. I agreed with the necessity of maintaining independence and told him we would not have joint publications. It is a matter of working more efficiently and keeping more informed. We agreed that Diana Lee would be a good liaison. He told me that his proposal on BEVALAC use will be ready in May.

I had the biweekly luncheon meeting of the SHEIKS, TAVERNS, etc. in my office. Present were Ghiorso, Lee, Norris, Nurmia, Fowler, Raunemaa, Williams, Binder, Otto, and Markowitz. Otto reported on his and Kim's work on the Th plus Kr bombardment; Norris reported that the isolation of Au and Y isotopes from their U plus Kr bombardment was successful and they are making gamma ray yield measurements. Raunemaa reported that he is measuring the gamma rays from light tungsten isotopes produced from gadolinium plus oxygen.

I called Chet O'Konski at 2:45 p.m. to ask if he and George Jura would handle my section responsibilities in Chem 1C while I am out of town next Monday and Wednesday. He will be glad to.

David Vieira came in at 2:50 p.m. He proposed that the topic for his graduate qualifying exam presentation on April 30 be a consideration of the missing solar neutrino, and I agreed. I told him that, since I will be gone next week, I will assume that his abstract is satisfactory and he can go ahead and distribute it to the members of the committee.

At 4:00 p.m., I walked down to attend the Graduate Research Conference. Gordon Halstead (Raymond's student) spoke on "Synthetic and Structural Studies of Actinide Organometallic Complexes" and Peter Connell (Johnston's student) spoke on "Molecular Modulation and the Photolysis of N_2O_5."

Friday, April 19, 1974 - Berkeley - San Francisco

I called Jack Hollander at 9:30 a.m. for his opinion about the proposal from Ralph Greif and A. K. Oppenheim of April 9 for a Center for Energy Research on the Berkeley campus. Jack indicated that this is mainly Ernest Kuh's idea; however, his Assistant Dean, Rich Sherman, had not even seen the proposal when Jack last talked with him. He said that Birdsall is not enthusiastic about it, Sessler is concerned about it, and Brewer estimates that it would not go very far on the campus. Jack said that he suggested a more aggressive approach--that is, one which would make the LBL Energy and Environment Division the Center--at yesterday's meeting of the Associate Directors. His suggestion received a mixed reaction; Harvey and Lofgren opposed it, while Sessler and Brewer seemed more amenable. There is concern about the campus control of such a program here. Jack indicated that Andy feels that we will need to be in a very strong position in relation to ERDA; if LBL can tap the strength of the campus without losing control, it would be in a strong position in the country (he cited the geothermal program as an example). On the basis of our discussion, I dictated my response to Grief and Oppenheim.

I attended the biweekly SuperHILAC Research Progress Meeting from 10:30 a.m. to noon. Ghiorso reported on the successful acceleration of xenon ions and described the recent installation of a beam wobbler. Diamond reported on a run with uranium and 600 Mev Xe^{132} ions to look for coulomb excitation of nuclear levels through the observation of gamma rays; they found no energy levels above nuclear spin equal 20. Carol Alonso showed an old film on water flow (analogous to nuclear matter) and a recent film of a vibrating nucleus--both produced by the computer. Hans Gutbrod, now back at GSI but here for an experiment of the GROLL group, gave a report on the UNILAC. Some leaky tanks have put the schedule back ten months; now a preliminary (6 Mev per nucleon) beam isn't expected before the middle of next year.

I had lunch outside the cafeteria with Kratz and Norris; we discussed plans for writing up their work for publication. I received a nice birthday card and a beautiful red rose from the girls in the office. At 3:30 p.m., the office staged a surprise party for me under the guise of an appointment with Earl Hyde. Lemon meringue pie was served. The gift was a gift certificate for 62 atoms of element 106 (named Redskinium, symbol Rs), deliverable on June 6, 1974. At 5:30 p.m., we all said goodbye to Bernie Harvey, who is leaving on Sunday for his five-week visit overseas.

Helen, who had come in for the party, drove Sheila and me to the Four Seasons Restaurant in San Francisco. We went up to the dining room on the third floor to attend the University Night dinner of the Chinese Chapter of the California Alumni Association (program attached). There were 520 people present. Helen and I sat at a table with Mr. and Mrs. George Q. Woo, Chancellor and Mrs. Albert Bowker, Mr. and Mrs. George Link, and Alan Fong and his friend Leah Lambert.

After dinner, Fong opened the program and introduced Link, then introduced Raymond Tang, who described his visit to the People's Republic of China to buy a large number of books. I was then intro-

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PROGRAM

- Cocktail Hour
- Dinner
- Greetings
- George Link
  President of the California Alumni Association
- Raymond Tang
  Director of the East Asiatic Studies Library
- Introductions
- Dr. Glenn Seaborg, Guest of Honor
  "A Journey to the People's Republic of China"
- Closing Remarks and Festivities

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MENU

- Bird's Nest Soup a la Silver
- Shredded BBQ Chicken Salad Canton
- Royal Peking Duck with Buns
- Cashew Nuts and Sauteed Prawns
- Mushroom Chicken
- Black & White Mushrooms in Oyster Sauce
- Sweet and Sour Pork
- Cantonese Fried Rice

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ALL HAIL BLUE AND GOLD

The California Hymn

All hail Blue and Gold, thy colors unfold,
O'er loyal Californians, whose hearts are strong and bold,
All hail Blue and Gold, thy strength ne'er shall fail,
For thee we'll die, all hail, all hail.

All hail Blue and Gold, to thee we shall cling,
O'er golden fields of poppies, thy praises we will sing,
All hail Blue and Gold, on breezes ye said,
Thy sight we love, all hail, all hail.

Harold W. Bingham '06

The highest good is like water
Water gives life to the ten thousand things and does not strive
It flows in places men reject and so is like the Tao
In dwelling, be close to the land
In meditation, go deep in the heart
In dealing with others, be gentle and kind
In speech, be true
In ruling, be just
In business, be competent
In action, watch the timing
No fight: no blame

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California Monthly
DICK CORTEN

duced by Jean Liu. I spoke on "A Journey to the People's Republic of China," illustrating my talk with about 50 slides. The talk was exceptionally well received with good audience reaction throughout. Mrs. Liu presided over the closing. She announced that today is my birthday and led the singing of "Happy Birthday," then presented me with a tie clasp with Chinese characters meaning "good health."

Saturday, April 20, 1974 - Lafayette - Davis - Lafayette

Leaving at 9:30 a.m., Helen, Dianne and I drove to Davis for Picnic Day. We went to Steve and Brent's apartment on F Street and they helped us unload the furniture we had brought for them. We then drove to the campus, watched the sheep dog trials, and met Eric and Bill Sprotte. Around 1:00 p.m., Ruthie Olson found us and we joined her parents, Helen and William, and her sister Ellie; Bill took a picture of the whole group.

William and Ruthie Olson, GTS, Helen Olson, Dianne, Helen, Stephen, and Eric Seaborg, Ellie Olson: UC Davis campus, April 20, 1974.

We drove by the house Eric, Richard Sproul (Robert Gordon Sproul's grandson), and three girls have rented for occupancy next fall on Mulberry Lane and went back to Steve's house to have the casserole that Helen had prepared. She and Dianne had also brought a birthday cake for me with eight candles on it. At 3:00 p.m., we drove back to the campus (without Steve who was suffering from a cold). We first went to the area of Putah Creek Pond to hear a concert by a band whose vocalist is Delanna Brody, one of the girls Eric will be living with next year. We then returned to the intramural field near Beckett Hall to watch the rugby game between Davis and San Francisco.

We then drove to Hammarskjold House where we talked with Monti Reynolds. He told us that he has spoken to Professor Melvin Green,

Davis Department of Genetics, about David doing his Ph.D. work at Davis and received a positive response. His impression is that David will attend Davis.

At 6:00 p.m., we said goodbye to Monti, Eric and Bill and headed for home, where Suki and I took a hike to the water tank.

Sunday, April 21, 1974 - Lafayette - Washington, D.C.

In the morning, Suki and I took a hike around the rim trail at the reservoir. Helen and Dianne called my attention to my birthday presents in the study which I had missed--two books, guides to historic spots, from Dave, a record, Edgar Bergen-Charlie McCarthy radio shows, from Pete and Jane, an Al Jolson record from Dianne, and a file cabinet from Helen.

Helen then drove me to the San Francisco Airport where I boarded PSA flight No. 68, which left at 3:30 p.m. and arrived in Washington at 11:00 p.m. I took a taxi to Harrison Street, where I talked briefly to Pete and Jane before going to bed.

Monday, April 22, 1974 - Washington, D.C.

I took a bus to the AAAS auxiliary office at 1776 Massachusetts Avenue. Here I met with Dr. Irene Tinker, head of the AAAS Office of International Science (OIS). We discussed a number of possibilities for future AAAS international activities. She gave me a copy of her memorandum report to the AAAS Board of Directors of April 17, 1974 (attached), and we discussed the logistics of the priorities described in it.

I walked to the headquarters of the American Chemical Society to meet Bob Cairns (Executive Director) and Rodney Hader (Executive Assistant) and we went next door to the University Club for lunch. We discussed my candidacy for president. They told me the ACS Council vote in Los Angeles was 181 for me, 179 for Anna Harrison, 174 for Henry Hill, and less for George Watt--thus Anna and I were nominated.

I told them that I was considering withdrawing as a Presidential candidate because I (1) didn't think I should spend my time in electioneering appearances before local sections, (2) didn't want to spend my time if elected speaking before local sections on ACS issues rather than on scientific subjects, and (3) thought it was time to elect a woman President of ACS. They said it wouldn't be necessary to do (1) and (2) and, if I withdrew, (3) wouldn't occur because Emerson Venable, the prospective petition candidate, would win. (If I withdrew, apparently it wouldn't be necessary for the ACS Council to nominate another candidate if Venable qualifies as a petition candidate.) Cairns made the telling point that, if I did withdraw, it could be a serious blow to the prestige of the ACS (apparently on the basis that it would be an expression of lack of confidence in the future of the Society as a scientific society).

After lunch, Glenn Schweitzer and Irene Tinker arrived and the three of us went to the Blue Room to discuss the idea of a meeting of African science representatives at the New York AAAS meeting in 1975.

American Association for the Advancement of Science

1776 MASSACHUSETTS AVENUE, NW, WASHINGTON, D. C., 20036

Phone: 467-4400 (Area Code 202) Cable Address: Advancesci, Washington, D. C.

April 17, 1974

MEMO TO: The Board of Directors
American Association for the Advancement of Science

FROM: Irene Tinker, Director
Office of International Science

The Office of International Science was set up in response to member interest which culminated in the appointment of the Study Group on International Science which met first on 25 April 1973. The final report of the Group, presented to the Board in December 1973, contained an impressive list of suggested activities together with a minimum price tag of $100,000 a year for five years. Instead, the Office was set up with $10,000 remaining from the Study Group and the Director was invited to weigh priorities for international involvement while administering the project on Cultural Factors in Population Programs funded by contract with the Agency for International Development.

The thrust of the Study Group recommendations was that international activities, like all those of AAAS, should capitalize on the breadth and size of its membership. Thus some sort of informational service about job or fellowship opportunities abroad, about cooperative science programs, about international meetings and activities, seems both important and possible. SCIENCE is printing an editorial from the Chairman of the Commission on Science Education, Al Baez, who was also a member of the Study Group, soliciting response to his suggestion on campus contact with foreign students and ideas for the Office of International Science. Funding for a series of articles on science around the world is being explored. Dr. Philip Abelson has indicated that he expects to attend the Circum-Pacific Energy and Mineral Resources Conference in Honolulu in August and will send a reporter to the World Food Conference in Rome this autumn. Dr. James Butler, Director of Communication, has offered help either with an insert in the Bulletin or with a special newsletter.

Committees are also a strength of AAAS. The Committee on Arid Lands, under the able leadership of Harold Dregne, has two international meetings on its agenda: Abu Dhabi in March 1975 and Moscow in 1976. The involvement of Dr. Dregne and Dr. Gilbert White in the UNESCO program Man and the Biosphere has resulted in the AAAS being invited to coordinate American activities for the international committee of MAB on Arid Lands and Grasslands. After an international meeting in London in May, the AAAS has been asked to sponsor a workshop comprised of a core from the Arid Lands Committee with social scientist and management experts as well.

The Commission on Science Education has a long history of international cooperation. Dr. Arthur Livermore spent two years in Penang, Malaysia, working with the Regional Center for Education in Science and Mathematics of the Southeast Asian Ministers of Education Organization. "Science - A Process Approach" has been translated for use in Puerto Rico and Germany. Dr. Newman Hall is presently in Korea exploring for the Office of International Science the possible cooperation with AAAS on a science literacy project; the Director is in correspondence with the Minister of Education in Indonesia concerning technological support for the experimental Development Schools.

The Population Project might form a model for the coordination of small research staffs into larger projects. The large MIT Sahel project is not being refunded; a proposal for research on arid lands, climatic change, and the use of ERTS to monitor population shifts would allow groups of AAAS members in Texas, Indiana and Alaska to participate in this crucial research topic. Assisting in the diversification of research grants away from the super-universities should be an important service of AAAS.

Contacts with scientists abroad should be on an individual, or perhaps institutional, basis, according to the Study Group. Despite hesitations concerning the deadweight of bureaucracies abroad and the difficulties of interregional cooperation, Dr. Glenn Seaborg has taken the lead in working with Latin Americans, and then with East Asians, on the setting up of interdisciplinary science groups in those two areas. He is proposing the bringing of Africans to the New York meeting to encourage a similar association. Using these fledgling organizations as a conduit for the types of substantive project suggested above has been proposed. Korea might lead the Asian group and disseminate information on its science literacy programs. Venezuela has a bio-medical center already. With its new oil money, Venezuela might well undertake the editing of a Latin American SCIENCE monthly and become a conduit for Chautauqua short courses or MAB committees. Africans would necessarily be involved in the Arid Land and Grasslands project and might provide a resource at a workshop following the New York meeting.

The British Association for the Advancement of Science has expressed a strong interest in participating in the 1976 meetings in Boston. The NATO Science Section has been invited to consider developing panels on science issues among developing countries for the 1976 meeting. Panels are being planned for the 1975 meetings. Section H will co-sponsor three panels on population tentatively titled: Frontiers in Population Research, Economic Change and Family Size, Communication of Population Programs. A separate panel on Western standards and stereotypes as impediments to development is also being scheduled.

To increase its interaction with the United Nations agencies, AAAS has filed for inclusion on the roster of Non-Governmental Organizations. An affirmative response is expected before the World Population Conference. A preliminary proposal in connection with International Women's Year on women in development has already been submitted to several funding sources.

The outline for activities of the Office of International Science presented above is primarily the result of discussions with members of the Study Group and with AAAS staff. To aid the Office of International Science during its formative period, a small advisory committee drawn from members of the Study Group has been set up with a life until the New York meeting. Its members are Dr. Glenn T. Seaborg, Dr. Arthur K. Solomon and Dr. Claire Nader.

We decided that Irene will write up a proposal, contact William Long of AID for financial support, and contact various sources for suggestions for suitable African representatives (which will determine the countries involved).

I then rode with Glenn Schweitzer to the National Academy of Sciences building to attend the meeting of the Chemistry Section in the Dryden Auditorium. I spoke in favor of the election of John Rasmussen, John Huizenga, and David Shirley--this should be helpful in making them better known for future balloting.

I had dinner in the Black Steer Restaurant, then took a taxi "home." I returned a call to Victor Sisnev, of the Soviet paper Trud (a National Trade Union paper); he was calling me as a foreign member of the Soviet Academy of Sciences in connection with the forthcoming anniversary observance of the Academy in Moscow; he asked me questions about the relations between the U.S. and Soviet Academies (I said they are good), my opinion of the Soviet Academy (I said its members have more perquisites than do members of the U.S. Academy), and my opinion of the level of exchanges of scientists (I said it is adequate).

Tuesday, April 23, 1974 - Washington, D.C.

I had breakfast at the Rayburn Building with Congressman Craig Hosmer and we were joined by Congressman Chet Holifield (and Cam Holifield). We discussed ERDA and Chet gave me much related information.

I took a taxi to the National Academy of Sciences to attend the business session of the Academy. The balloting on new members was completed; ten chemists were elected. George Hammond was elected Foreign Secretary to succeed Harrison Brown. I had lunch in the Refectory with Lewis Branscomb, Clyde Hutchison, Carroll Williams, and Jake Bigeleisen. I also talked to Hammond, Phil Abelson, and Roger Revelle.

I took a taxi to 1717 H Street, where I first met with Robert Thorne (the new Deputy General Manager of AEC) in his office. Commissioners Clarence Larson and William Kriegsman dropped by to say hello. I dropped in next door to talk to General Manager John Erlewine, then went in to talk to Chairman Dixy Lee Ray. I saw Henry Hinds, who sent his best regards to Dianne and Helen. I ran into John Abbadessa and mentioned our needs for more funding for the SuperHILAC and heavy ion research; he indicated he would look into it.

I met George Gardis and Tom Rehm, two of Dr. Ray's assistants. I learned that John Ryan has taken John Vinciguerra's place as Assistant General Manager for Administration and Bob Kohler has taken Ryan's place as Assistant to the General Manager. Zarb has taken Sawhill's place, in charge of the AEC budget, at OMB.

I took a taxi to Harrison Street; the flowers were in full bloom along Reno Road. I had a pleasant dinner with Pete and Jane.

Wednesday, April 24, 1974 - Washington, D.C.

I took a bus to the Washington Hilton and joined the audience at the Energy Forum, sponsored by the World Future Society, in the International Ballroom Center and East. The opening morning session was on the topic, "What Really Underlies the Current Energy 'Crisis'?" I heard the presentation by Congressman Mike McCormack. He spoke broadly of short- and long-term future requirements and said all the potential sources should be developed.

During the intermission, I talked with McCormack. He plans to talk to Gerry Ford about his idea for a Department of Science, Technology, Energy and Materials (STEAM) and may suggest to Ford that he talk to me about it. He feels Nixon will leave the Presidency between July 4 and the end of the year. If he is impeached, he may resign because, if the Senate convicts him, he loses his pension and he must pay for his defense before the Senate.

After the intermission, there was a roundtable discussion, with Martin Agronsky as moderator, including the morning's speaker--McCormack, Roderic Gorney, Carl Madden, Howard Odum, and Beverly Briley (Mayor of Nashville).

William C. Moore, Jr. (International University Foundation and Legal Counsel of the World Future Society) spoke to me about the Commission for the Future of UNITAR and introduced me to Alastair M. Taylor (Queens University, Kingston, Ontario, Canada) and Ervin Laszlo (Professor of Philosophy, S.U.N.Y.) who are involved with the formation of the Commission. They would like to have a symposium covering this area at the New York AAAS meeting.

The luncheon, attended by 500 people, was in the same area. I sat at a table with Anton B. Schmalz, Martin Agronsky, Ed Cornish, Peter Zuckerman, Irvin L. (Jack) White (Assistant Director, Science and Public Policy Program, University of Oklahoma), Vary T. Coates (Program of Policy Studies, George Washington University), Marvin Cetron (President, Forecasting International), and W. Donham Crawford (President, Edison Electric Institute).

After lunch, Schmalz introduced me and I gave my talk, "The Opportunities in Today's Energy Milieu." I gave or promised copies of this to many people. Agronsky will reproduce it and send it to every member of congress. The WFS will reproduce it and distribute it to the press.

Stan Schneider and I went to hear the panel discussion on "Developing Nations and Energy," where Oscar Schachter (United Nations Institute) and Alastair Taylor each spoke. We then attended the General Session on "What Do New Energy Technologies Imply for Society?" After the presentation by Donham Crawford, Stan left to return to work at NSF. I then heard AEC Commissioner William O. Doub, who spoke on "Society's Decision in Crisis; Facing an Era of Energy Innovation."

I went to the Monroe-West to attend a special dinner for Energy Forum discussion leaders, WFS board of directors, and some institu-

tional members. Jane and Orville Freeman, Michael Michaelis, Arnold Barach, Barbara Hubbard, Rowan Wakefield, and Ed Cornish were among the 100 present. After dinner, Orville led a discussion about the plans of WFS, based on the manuscript written by Cornish. Many of those present made comments and suggestions for future courses of action.

I took a taxi back to Harrison Street and had a nice talk with Pete and Jane.

Thursday, April 25, 1974 - Washington, D.C.

At 9:00 a.m., I was picked up by a DATRAN driver, Claud Purvis, and transported to the headquarters in Vienna. The meeting began at 10:00 a.m., with Sam Wyly, Charles Wyly, Bob Strauss, Harry Bowles, Erwin Canham, Glenn Penisten, Sol Linowitz, Eldon Vaughan, and Jack Scorce. We accepted the resignation of Dean Thornton; he is being replaced by Garlan Braithwaite.

Strauss and Penisten described their meeting last night with AT&T officials to discuss the philosophy concerning their rates which are too low, either by error or, as Strauss stated, to drive DATRAN out of business. It isn't clear whether any progress was made in getting the officials (Ed Crossland and Jim Rowe) to change their minds, but their attention was caught.

Officers of DATRAN came in at this point and Penisten made a report on the wide range of activities since the last Board meeting. This includes arrangements for a $50 million loan from First National Bank of Boston and $10 million investment in DATRAN by Louis Dreyfus through DACOR. Major disappointments include less sign-up of customers than expected and increased cost of construction due to inflation and labor strikes in Japan.

I left the meeting at noon and rode with Bob Strauss back to Washington. We discussed many things en route, from Nixon's troubles to the California gubernatorial race. I went to the Hilton and joined Anton Schmalz, Rodney Gorney (Director, Program on Psychosocial Adaptation and the Future, UCLA Department of Psychiatric), Beatrice Willard (Member, Council on Environmental Quality), and Murray Bowen (Director, Georgetown University Center for the Transdisciplinary Study of Human Adaptation and Evolution) in the International Ballroom Center. About 500 were present and we ate a lunch with vegetable-based proteins, "Shishkebab a la Future."

After lunch, Schmalz, Willard, Gorney, and I went up on the stage to await the arrival of Vice President Gerald Ford. He arrived at 1:35 p.m. and gave a talk on the energy problem. After he left, Schmalz introduced Lester R. Brown (Senior Fellow, Overseas Development Council), author of World Without Borders, who spoke on the world food problem. Schmalz then introduced Gorney who sang a very charming song of his own composition, to guitar accompaniment, entitled, "Take One Step." I then attended the session on "How Can We Adapt Our Institutions and Ourselves to a Wiser Use of Energy?" and heard the talks by Beatrice Willard and James W. McLane (Deputy Director, Cost of Living Council).

Vice President Gerald R. Ford and GTS: 4/25/74.

At 4:00 p.m., I walked to the headquarters of Science Service to preside over the meeting of the Board of Trustees (agenda attached). Bowen Dees, Allen Astin, Joseph Berg, Aaron Rosenthal, Julius Duscha, O. W. Riegel, John Troan, plus Ted Sherburne, Dorothy Schriver, Kendrick Frazier, and Donald Harless were present.

Sherburne described an offer ($500,000) for our buildings from a group of two M.D.'s and two mortgage brokers. We decided to postpone action pending gathering information on site and price of rental property for Science Service, appraisal of value of our buildings, estimated cost of renovating our building, elimination of realty fee, etc.

I rode home with Allen Astin and had dinner with Pete and Jane. Sheila called to bring me up-to-date on my mail, etc.

Friday, April 26, 1974 - Washington - New York - Lafayette

After breakfast, Pete drove me to National Airport, where I boarded Eastern Airlines shuttle to LaGuardia Airport, which left at 10:00 a.m. and arrived at 11:00 a.m.

I took a taxi to the Chemists Club and had lunch. I then walked to the Dreyfus Third Century Fund headquarters for the meeting of the Board of Directors. In attendance were Directors David Burke, who served as chairman in Howard Stein's absence, Robert Goheen, John McCloy, Clifford Alexander, and George Harrar, and staff Kenneth Oberman, Leonard Leiman, Margaret Evans, Elizabeth Paull, Jeffrey Friedman, Michael Glass, and Monte Gordon. The meeting began at 2:00 p.m., followed the agenda (attached), and I left shortly after 4:00 p.m. I took a taxi to Kennedy Airport, boarded United flight No. 29, and arrived in San Francisco at 9:00 p.m. Helen and Suki met me.

Saturday, April 27, 1974 - Lafayette

I spent most of the day reading papers and mail that had accumulated during my absence. In the afternoon, Suki and I took a hike around the reservoir rim trail.

Sunday, April 28, 1974 - Lafayette

I called Jeanette to discuss the options put to the heirs of Edith Ericson's estate by the executor. We decided to vote for selling more stocks now, in view of the uncertain market conditions, and to take our share in cash, not any in stocks. I will mark my distributee's statement accordingly and mail it back.

At 12:30 p.m., Lynne's childhood friend who lived down Glen Road (where her mother and grandmother still live), Beverly Dietz Houston (who now lives with her husband Bjorn in Chicago), and her mother Ruth dropped in to pay us a visit.

Suki and I took our reservoir hike.

AGENDA

MEETING OF THE BOARD OF TRUSTEES OF SCIENCE SERVICE

Thursday, April 25, 1974, 4:30 p.m.

Science Service Building

1. Approval of Previous Minutes

2. Report of the Members Annual Meeting

3. Nominations for Executive Committee

4. Final Report on Fiscal Year 1973-74

5. Preliminary Budget for 74-75

6. Report of Financial Advisory Committee

7. Offer to Purchase Buildings

8. Choice of Auditor for 1974-75 Fiscal Year

9. Report of Science News Advisory Committee

10. Next Meeting Date Sept. 11

11. New Business

12. Executive Session

Next time - Report on Things of Science
Raise for TS + DL + KF Sept. 11
4% for TS, DS as of May

AGENDA

Meeting of The Board of Directors of
The Dreyfus Third Century Fund, Inc.

2:00 p.m. -- Friday, April 26, 1974

I. Approval of Minutes of Previous Meeting

II. Legal Matters

A. Blue Sky Resolution

III. Investment Matters

A. Industries Reviewed

1. Airlines
2. Home Building
3. Multi-Market
4. Railroads
5. Retail
6. Supermarket

B. Industries Reconsidered

1. Insurance
2. Engineering and Construction

C. General Discussion

1. Aerospace
2. Aluminum

D. Special Considerations

E. Valuation of Restricted Security

IV. Portfolio Review and General Business Discussion

Monday, April 29, 1974 - Berkeley

I attended Pimentel's lecture. At 11:00 a.m., I spoke with Bernard Saunders about the possibility of his working with me on the Met Lab Section C-1 history. We don't have budget information for next year, but we can hire him for the last two months of this year at about $75 per day; he is agreeable to this.

I held my office hour; Ann Thor came in for help with problems and Peter Sybert for information for a term paper. I attended the Department luncheon, then taught my lab section from 1:10-2:50 p.m.

Christopher Ritter submitted his first progress report to me (attached). Francois David wrote to inform me that he was awarded the NSF-CNRS scholarship which will enable him to be at Berkeley next year. I wrote Alan Nixon in his capacity as Chairman of the Committee of Scientific Society Presidents, with my responses on various issues of science and technology (attached). I received and acknowledged a letter from Russell Berg in which he reported that the AAAS Local Committee had an excess of about $2,000 which it was able to turn over to the AAAS Meetings Office to help defray costs. I sent Vice President Ford a copy of my luncheon talk for the World Future Symposium Energy Forum last week.

I attended the Nuclear Chemistry seminar; Dr. Richard Sextro spoke on "High-Resolution Measurements of Beta-Delayed Proton Decay."

I missed my hike tonight to watch President Nixon's address in which he said he will not release the tapes requested by the House Judiciary Committee but will give the Committee edited transcripts of the tapes and also release these to the public.

Tuesday, April 30, 1974 - Berkeley

President Nixon released his tapes--subpoenaed by the House Judiciary Committee; they appear to be very incriminating.

Bernard Saunders came in at 9:00 a.m. and we talked about his starting to work. He will work as a Consultant at a base rate of $80 per day. I described to him what I had in mind, which is a journal covering the Met Lab period (1942-46) on a day-by-day basis, preceded by coverage in a prologue of the pre-Met Lab work at Berkeley. I told him about the preliminary work in gathering material that has been done by Joseph Katz and Carol Flemmenhoft and the preliminary writing that has been done by Sydney Gaarder. I showed him the boxes in my office containing the Master Drafts, the chronological file backing up the master drafts as well as miscellaneous materials, and the material in the storeroom consisting of Section C-1 notebooks. We decided that he would work in Room 3363C and he began by moving all of these materials into that room.

I sent to Irene Tinker in the AAAS Office of International Science a list of people whom I met during my visit to Africa in January 1970 (attached). I then spent some time on the phone talking with Ellison Taylor at Oak Ridge and Len Nugent about the latter's working here next year.

LAWRENCE BERKELEY LABORATORY
Room: Bldg.: Ext.:

April 26, 1974

TO: Glenn T. Seaborg

FROM: Christopher Ritter

RE: FIRST PROGRESS REPORT

My work in the lanthanide/actinide group has been involved with the study of optical and magnetic properties of certain lanthanides and actinides. I've worked in two areas: taking EPR measurements of actinides, and investigating various compounds as host lattices for further optical and magnetic studies. A brief outline of the work and its objectives follows.

EPR Measurements

A sample of Bk^{+3} was prepared which was doped into a single crystal of CaF_2 by Tom Parsons. I measured the anisotropic resonance at 4.2°K in the Q-band frequency region. Subsequent analysis by Norman Edelstein has shown that the signal was indeed that of Bk^{+2}. The Bk^{+3} ions in the CaF_2 lattice act as traps for radiation produced free electrons creating the $J=15/2\Gamma_8$ ground state.

A sample of Cf^{+3}, doped into $Cs_2NaLuCl_6$ was prepared at Savannah River. EPR measurements were made at 4.2°K; the X-band signal was isotropic, and indicated a $|\mu|$ value equal to approximately .3.

Crystal Lattice Preparations

Cs_2NaYCl_6

The series of compounds Cs_2NaMCl_6 (M=lanthanide, actinide) was first investigated by Morss, et al. in this laboratory.[1] Due to the O_h site symmetry of the M^{+3} ion, these materials have proven valuable for a recent optical study of Ce^{+3} in Cs_2NaYCl_6 [2] and magnetic susceptibility studies[3] of U^{+3}, Np^{+3}, Pu^{+3}, and Am^{+3} as stoichiometric $Cs_2Na(U;Np;Pu:Am)Cl_6$ compounds and Cm^{+3} and Bk^{+3} as dopant ions in $Cs_2NaLuCl_6$. I have been able to prepare large single crystals of Cs_2NaYCl_6 by the Bridgeman method suggested by Morss et al.[1] One was doped with Gd^{+3} which showed a good room temperature resonance on a Varian E-3 EPR spectrometer. Presently I have a crystal 6mm in diameter, 2cm long, which has been doped with Sm^{+3} (.5%) and Er^{+3} (.1%). Upon completion of assembly of a cold helium blowing assembly on the X-band spectrometer I hope to measure the Sm^{+3} resonance, hitherto unmeasured in an octahedral environment.

As Cs_2NaYCl_6 has high symmetry, the crystal axes cannot be easily oriented by using polarized light. To orient a crystal a cleavage plane must be exposed. While Cs_2NaYCl_6 is rather soft and hygroscopic I was able to cleave a large crystal. By examining the cleaved piece with a single crystal diffractometer using Cu $K_{\alpha 1}$ I was able to conclude that the crystal cleaves along the 110 orientation.

Rb_2NaYF_6

The paramagnetic compound Rb_2NaYbF_6 has been prepared for Mössbauer resonance and magnetic susceptibility study of the electronic properties of Yb^{+3} [4]. As replacement of Yb^{+3} with Y^{+3} in the compound should produce a diamagnetic, relatively non-hygroscopic fluoride compound, it presents a suitable host for magnetic resonance experiments on the covalency effects in actinides, perhaps beginning with U and Pu if good single crystals can be prepared. While I have not yet attempted to prepare a single crystal of Rb_2NaYF_6, I have prepared a polycrystalline sample of Rb_2NaYF_6 from a stoichiometric melt of the requisite fluorides. A powder pattern of the product shows lines which can be indexed using the line list for $Cs_2NaPuCl_6$ prepared by Morss et al.[1] to establish a fcc structure for the crystal with $a_o = 10.854 \pm \sigma = 0.007$A.

$LiYF_4$

Numerous references have appeared regarding the use of single crystals of $LiYF_4$ as a laser host[5,6,7], most notably for Nd^{+3}. The site symmetry of the M^{+3} ion is S_4. According to Jenssen[6], the observed optical transitions in rare earth ions are intra $4f^n$ transitions. Only in sites having no inversion symmetry such as S_4 sites, will these transitions be observed due to the mixing in of small amounts of $4f^{n-1}d$ states. $LiYF_4$ thus represents a very suitable host for optical studies; through electron-nuclear double resonance

measurements it is hoped that $LiYF_4$ will act as a suitable lattice, of differing symmetry from Rb_2NaYF_6, for investigation of covalency effects on dopant actinides.

I have been able to prepare polycrystalline $LiYF_4$ from a $LiF-YF_3$ melt, and confirm its presence by comparing the powder pattern with the original synthesis powder pattern indexing[8]. The crystal growing procedures in the literature suggest use of the Czochralski technique. At the moment I am attempting to prepare a single crystal by the Bridgeman method from a stoichiometric melt of $LiF-YF_3$. If this does not succeed, more suitably configured platinum vessels for crystal growing have been ordered which it is hoped will permit use of this method for crystal growth.

$LaCl_3$

Rare earth halide crystals have been used extensively for magnetic resonance investigations of trivalent lathanides[9,10]. Growing high quality crystals of $LaCl_3$ is not exactly esoteric, but a recent article by Cox and Fong[11] summarizes a preparation which the authors claim will produce high quality anhydrous single crystals in a minimum amount of time.

Using the method of Cox and Fong I have prepared crystals of $LaCl_3$, doping one synthesis as a successful test of the behavior of a specific dopant ion. While I have not been able to prepare a single crystal which was not fractured, this will hopefully involve only using a differently

configured crystal growing tube. Practice with this technique a few more times, using Np^{+3} as a dopant ion will allow me to become adroit enough to prepare a $LaCl_3$ crystal doped with a moderately radioactive actinide. Upon completion of magnetic susceptibility measurements on Cm^{248} recently obtained, I will prepare a $LaCl_3$/ Cm^{+3} doped crystal upon which EPR measurements will be made.

Summary

Analysis of the EPR measurements on Bk and Cf are soon to be published by Norman Edelstein. My work in crystal growing has been rather uninspiring to the present. However, I have been essentially developing skill in synthesis techniques vital to the ultimate preparation of high quality crystals necessary for the various investigations planned for actinides in this laboratory. Success in present preparations of Cs_2NaYCl_6, Rb_2NaYF_6, $LiYF_4$, and $LaCl_3$ to date has given me confidence that I can prepare high quality doped crystals of these materials shortly for the experiments currently envisioned.

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LAWRENCE BERKELEY LABORATORY
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BERKELEY, CALIFORNIA 94720 TEL. (415) 843-2740

April 29, 1974

Dr. Alan C. Nixon, Chairman
Committee of Scientific
Society Presidents
1155 - 16th Street
Washington, D.C. 20036

Dear Al:

Your letter of April 22, 1974 arrived during my absence last week. I hope a quick response today will reach you before the May 2 meeting.

Here are some minimal thoughts on the issues identified.

Action of societies. I'm sure you are up to date on ACS actions. The AAAS has published a good book Energy and the Future by Hammond, Metz and Maugh, and the April 19, 1974 issue of Science is devoted to the energy problem.

National Science Policy. We need better direct input to the President. I'm beginning to think we should have a cabinet level representative of science; i.e., a Department of Science and Technology.

Role of scientific and technical societies. They should have some special mechanism, e.g. committies, to focus on the energy and resources problems, which will be with us from now on. The White House should have some path of communication with these societies--the May 2 meeting is a move in this direction.

Assessment of policy issues. The world food situation is serious--thoughtful people indicate that there will be serious problems in Asia within the next year or so. The United States is going to be faced with resource problems (metals, etc.) which will be as serious as the energy problem.

Dissemination of results of scientific research. The ACS is the leader here with Chemical Abstracts. The widespread dissemination of preprints is here to stay. I don't see how page charges for scientific publication can be avoided--one would hope that federal agencies supporting research, such as NSF, AEC, etc., can have a liberal policy of covering such expenses in their research grants and contracts.

Basically what is needed is national planning in the energy and resources areas. We don't have an adequate amount of this today.

I am including a copy of a speech I gave at the World Future Society's Energy Forum in Washington last week.

Cordially,

Glenn

Glenn T. Seaborg

GTS/my

Enclosure

LAWRENCE BERKELEY LABORATORY
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April 30, 1974

Dr. Irene Tinker
Office of International Science
American Association for
the Advancement of Science
1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Dear Irene:

As promised, I am enclosing a list of people whom I met during my visit to Africa in January 1970. I have included their affiliations and addresses as of that date, which of course may in many instances be different today.

I also had a chance to talk with Roger Revelle after I saw you and Glenn Schweitzer, and he had some suggestions to make as follows:

Bekoe--a chemist, an official of the University of Lagon (University of Ghana), member of the Council of Scientific and Technical Development (COSTED) of ICSU;

Okonjo, of the University of Ibadan, Ibadan, Nigeria;

Tom Odimbo, International Center for Insect Physiology and Ecology, Nairobi, Kenya.

Revelle thinks that Bekoe has leadership qualities and is better for our purposes than Vice Chancellor Kwapong who, he says, is a humanist and not a social scientist.

It will be interesting to see whether some of these names overlap with those that you will get from Schweitzer, Dow, Engle, Pollack, Avensu, and other sources.

I enjoyed talking with you and I believe our meeting was very fruitful.

Cordially yours,

Glenn T. Seaborg

GTS/sms
enc.

PEOPLE IN AFRICA MET BY GLENN T. SEABORG DURING VISIT IN JANUARY 1970

Rabat, Morocco

Dr. Mohamed Benhima, Minister of Agriculture, former Prime Minister. M.D. Impressive

Dean Ben Abdeljlil, Faculty of Sciences, Mohammed V University

Professor Albert Sasson, Head, Biology Department, Mohammed V University. Most impressive scientist we met in Morocco

Tunis, Tunisia

Dr. Adrian Zmerli, Dean, Faculty of Sciences, University of Tunisia

Addis Ababa, Ethiopia

Dr. Aklilu Lemma, Dean, Faculty of Sciences, Haile Selassie I University

Nairobi, Kenya

Dean J. M. Mungai, Faculty of Medicine, Kenyatta National Hospital of University College of Nairobi

Dean David P. S. Wasawo, Dean, Faculty of Sciences, University College of Nairobi

Dr. Ruben O. Abasa, Department of Zoology, University College; Head of Kenya Branch, East African Academy of Sciences

Dr. Thomas Odhiambo, Department of Zoology, University College. Young, impressive. To be Director, International Center of Insect Physiology and Ecology

continued

Nairobi, Kenya (continued)

F. J. Wangati, Head, Physics and Chemistry Division, East African Agricultural and Forestry Research Station, Maguga (near Nairobi)

Kinshasa, Congo (Zaire)

Felix Malu, Director of Trico Nuclear Center, Lovanium University

Andre Tshibangu, Minister of Mines and Energy. Not sure of his field--may not have a scientific background.

Accra, Ghana

Alexander A. Kwapong, Vice Chancellor, University of Ghana (Legon). Non-scientist

Dr. Modjaben Dowuona, Chairman of Council for Scientific and Industrial Research (CSIR), and of National Council of Higher Education. Not sure of his field

Also met Dr. Edward S. Ayensu, Head, Department of Botany, Smithsonian Institute, Washington, D.C. A potential source of information.

Dr. Letitia E. Obeng, Director, Institute of Aquatic Biology. Charming, dynamic. Attended Mexico City AAAS meeting

Dr. Silas R. A. Dodu, Head, Department of Medicine, Medical School, University of Ghana (Korle Bu Hospital)

I had lunch with George Pimentel and Harvey White at a table outside the cafeteria at 12:30 p.m. We discussed the financial stringency of the Lawrence Hall of Science and possible ways to acquire more operating funds.

I went to 444 Latimer Hall and participated from 2:10-3:45 p.m. in the qualifying examination of David J. Vieira. The other members of the committee were Samuel Markowitz, John Rasmussen, Luciano Moretto, and Robert Ely. He passed with a grade of "Good." He did quite well in both the description of his research work and in defending his "appraisal" topic. He answered our questions quite well and, whenever he was stumped by not remembering a formula, Vieira was able to derive it in an approximate way with the prompting of the committee members. After the exam, I went to 419 Latimer and dictated my appraisal of it to Evelyn Connolly.

Dick Diamond dropped in at 4:30 p.m. We decided that there should be two jobs in support of the Users' Group at the SuperHILAC--one a permanent job devoted to the computers and the other a job at a higher level with the status not yet determined. We decided to offer Richard Eppley the job in the first category. Diamond will talk with Hermann Grunder about this. We also decided to approve Frank Asaro's request to offer a position to George Williams of Savannah State College in our summer affirmative action program, since both Fred Bacon and his alternate Adriane Ludwick have turned us down.

I phoned Val Geissler at 5:20 p.m. as a follow-up to my letter requesting his cooperation in keeping what appeared to be Grizzly Peak Stables' vehicles off our land. He indicated that he is anxious to be a cooperative neighbor and expressed the hope that I would talk with his other neighbors there, the Framptons and Dan Mears. Sam Troll appears to be our mutual problem. I told Geissler that Troll had not paid us a cent of what I estimated to be the couple of thousand dollars he still owes us. Geissler indicated that he sometimes found Troll difficult to talk with, but added that Troll had had severe management problems with the property before Geissler took over. He didn't know how Troll would be able to pay off what he owes us because they are just now slowly getting the place pulled back onto its feet.

Suki and I took our water tank hike.

<u>Wednesday, May 1, 1974</u> - Berkeley

I attended Pimentel's Chem 1C lecture, then held my office hour in Latimer Hall; a number of students came in.

Ghiorso called me at 11:30 a.m. He has received an invitation from Flerov to attend a conference on the reactions of heavy ions to produce the heaviest elements at Dubna on September 24-28. He doesn't want to go and suggested Mike Nitschke instead, and I agreed. We reviewed for each other our respective discussions with Diamond regarding offering Dick Eppley the job as a computer specialist for the SuperHILAC Outside Users.

I had lunch in my office, then taught my Chem 1C lab section in Room L from 1:10-2:45 p.m. Back in my LBL office, I called Robert

B. Livingston, Professor of Neurosciences, Muir College, UC San Diego, at Irene Tinker's suggestion. I described my efforts and those of AAAS in the international science area and our interest in bringing together representatives of west Asian countries, such as Iran, Pakistan and Turkey. He will think of people to receive Science and send his suggestions directly to Bill Bevan.

I called Jack Hollander at 3:25 p.m. to report on my conversation in Washington last week with George Kolstad, who had expressed the hope that LBL would go ahead with being the information office on geothermal energy. Jack asked if Kolstad promised any funds; he hadn't, but I suggested that Jack might be able to use this information.

I went down to see Len Nugent at 3:30 p.m. I suggested that the best solution to our dilemma is that he work at an increased pace and finish as much as he can before his expiration date of September 1, which might be extended a little. Since Ryan has already started to work, he might also work at an increased pace and perhaps Penneman can be induced to contribute more than he had planned.

At 3:45 p.m., I went by to see Edelstein, Ritter and Parsons and discussed the general progress in their program. Parsons is separating about 4 milligrams of berkelium-249 and 8 milligrams of californium-249, which has been standing unused in the cave room for some time.

At 4:00 p.m., Norma Bowles of Beverly Hills (former national president of the ARCS Foundation), came in to see me, together with Jane Otto. She is putting together an exhibit on parapsychology and I suggested a number of people for her to contact. She asked me to serve as Honorary Chairman to make sure that the whole effort is done in a scientific and respectable way. I told her I didn't have enough time and suggested others for this purpose.

Suki and I hiked to the water tank. I watched part of a broadcast on CBS-TV on the Watergate tape transcripts released by the White House yesterday; the participants took the parts of Nixon and others in reading and it put Nixon in a very bad light.

Thursday, May 2, 1974 - Berkeley

At 9:05 a.m., I called Edward B. Walker, Vice President of Gulf Oil Company in Pittsburgh, Pennsylvania, at George Milly's request. He indicated that John Landis had written him about his contacting GEOMET. I described GEOMET in detail; he said he will call Milly today. I then called Milly to report this.

At 9:30 a.m., I went up to talk with Ghiorso about the arrangements for a job offer to Richard Eppley. We agreed that the Outside Users position would be split into two positions--one a permanent position at the computer, which would be offered to Eppley, and the other a postdoctoral or senior research position. I then talked to Eppley and outlined the nature of the position to him. He told me that his present salary is $14,000 and that one of his outside offers is in the $18-20,000 range. He would like to have a definite figure

with our offer before the end of day, so I went by to see Earl Hyde, who suggested a range of $15-16,000.

At 11:00 a.m., I went to Jack Hollander's office in Building 50A to meet with a group of East Asian economists who are visiting the United States under the auspices of the State Department "Asian Economic Planners Project." Present were Ian Castles (Australia), Hiroyuki Yoshioka (Japan), Zacarias Baile (Philippines), Gary Makasiar (Philippines), Prakorb Juangbhanich (Thailand), Kie Wook Lee (Korea), and escorts Jordan Tanner (USIA) and George Nassif (State Department).

We held the bi-weekly lunch meeting of the SHEIKS and TAVERNS in my office from noon to 1:15 p.m. Kratz described the breakthrough in the analysis of the data from the uranium plus krypton bombardments; they have succeeded in analyzing the gamma ray curves in terms of yield of products despite the humps on the high energy side and are now proceeding to calculate the yields and plot the yield distribution curves. We discussed the authorship of our various papers and decided to ship the 4,000-channel pulse analyzer back to GSI. We will have the electronics group build a duplicate of the Markowitz 2,000-channel pulse analyzer if this doesn't take too long.

I wrote Bill Bevan, reporting on my conversation with Bob Livingston and sending him lists of people in Southeast Asia who might receive subscriptions of Science (attached).

I called Richard Eppley at 3:55 p.m. to indicate that we can offer $15,500 for his salary. I explained that LBL rates are not up to the other offer he has. I have discussed it with everyone involved and we hope he will take it. He said he will give it serious thought over the weekend and let me know.

Friday, May 3, 1974 - Berkeley

At 9:45 a.m., I went down to Pauley Ballroom West in the Student Union, where I presided over Session 1 of the conference, "Physics in World War II" (program attached), sponsored by the Center for History of Science and Technology (at the Bancroft Library) and the Institute of International Studies.

I attended the luncheon meeting of the section leaders of Chem 1C, then the weekly meeting of the instructional staff. I returned for Session 2 of the conference and attended the reception afterward.

Saturday, May 4, 1974 - Lafayette - San Francisco - Berkeley

A little after noon, Helen, Dianne and I drove to San Francisco to Grace Cathedral. We went to the Chapel where we joined a group of 70-80 people to witness the marriage ceremony of Jane Kingston and Dave Richards. We met: Henry Kingston, Jane's father, from Rochester, New York; her mother, Esther Kingston, from Fort Lauderdale, Florida; her sister Elizabeth Kingston from Eugene, Oregon; and David's father Harold Richards and his wife Pansy from Alma, Michigan.

We then drove back home where we hosted the reception for Jane and David. At 4:30 p.m., they cut the wedding cake, which had been

LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720 TEL. (415) 843-2740

May 2, 1974

Dr. William Bevan
American Association for
the Advancement of Science
1515 Massachusetts Avenue, N.W.
Washington, D.C. 20005

Dear Bill:

Thank you for your nice letter of April 29, 1974. I have gone through my records and tried to come up with a list of Asian scholars to whom subscriptions of Science might be sent, limited to people I met during my travels.

I am enclosing two lists: one including people in Indonesia, Thailand, Iran, Singapore, and Taiwan; and the other of people from the People's Republic of China--both lists are roughly in order of priority. The addresses for the Asians correspond to those that I obtained during my visit with them in March 1970, and thus may have changed in the meantime so that a preliminary probing letter should probably be sent to these people. The addresses for the People's Republic of China are probably up-to-date.

I talked with Robert Livingston at UC/San Diego yesterday about contacts with scientists from western Asian countries. I found him very knowledgeable and stimulating, and in the course of the conversation I asked him for suggestions for recipients of Science. He gave me the names of Chang Hsiang-tung and T. P. Feng (both in neurosciences at the Academia Sinica, Peking), and indicated that he would write you directly about other possibilities from such countries as Iran, Pakistan, Turkey, and so forth.

With best regards,

Cordially,

Glenn

Glenn T. Seaborg

GTS/sms

Enclosures

CONTACTS IN ASIAN COUNTRIES

Indonesia

Dr. J. A. Siwabessy (M.D.), Minister of Health and Director General, National Atomic Energy Agency, Djakarta, Indonesia

Dr. A. Amiruddin, Director, Atomic Research Center, Pasar Djumat, Indonesia

Mr. Satarjo Supadi, Director, Atomic Reactor Center, Bandung, Indonesia

Thailand

Pradit Chiawasakun, Secretary General of the National Research Council, and Research Director General of the Applied Scientific Research Corporation of Thailand, Bangkok, Thailand

Iran

Dr. Shamsedin Mofidi, Vice Chancellor for Scientific Research, Tehran University, Tehran, Iran

Singapore

Dr. Lee Kum Tatt, Chairman, Science Council, Singapore

Professor Choong Shin-Piaw, Dean of Science, Nanyang University, Singapore

Taiwan

Chen-Hsing Yen, Chairman, Atomic Energy Commission, Taipei, Taiwan

CONTACTS IN THE PEOPLE'S REPUBLIC OF CHINA

1. Liu Fu-kuang
   Professor of Chemical Engineering
   Wu-hsi Light Industry Institute
   Wu-hsi, People's Republic of China

2. Chou Hsiao-chien
   Professor of Physics
   Kiangsu Teachers College
   Soochow, P.R.C.*

3. Chao Tung-xin
   Head of Radiochemistry
   Institute of Nuclear Physics
   Shanghai, P.R.C.

4. Kao Tsi-yu
   Vice Chancellor
   Nanking University
   Nanking, P.R.C.

5. Yang Fu-chia
   Head, Nuclear Physics Group
   Fu Tan University
   Shanghai, P.R.C.

6. Sze Shih-yuan
   Professor of Physics
   Nanking University
   Nanking, P.R.C.

7. Chen Shih-shong
   Director, Institute of Zoology
   Academia Sinica
   Peking, P.R.C.

8. Liu Ta-kang
   Director, Institute of Chemistry
   Academia Sinica
   Peking, P.R.C.

9. Shih Ju-wei
   Director, Institute of Physics
   Academia Sinica
   Peking, P.R.C.

10. Ku Kung-hsu
    Vice Director, Institute of Geophysics
    Academia Sinica
    Peking, P.R.C.

continued

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* Write out "People's Republic of China" in addressing mail.

11. Tsien San-tsiang
    Director, Institute of Atomic Energy
    Academia Sinica
    Peking, P.R.C.

12. Hu Shih-chuan
    Institute of Biochemistry
    Shanghai, P.R.C.

GTS/sms

APR 15 REC'D

Center for History of Science
and Technology

Institute for International
Studies

Physics in World War II

MAY 3–4, 1974

UNIVERSITY OF CALIFORNIA, BERKELEY

The conference is free and open to the public.

Students are particularly invited to attend.

Participants

A. Hunter Dupree. George L. Littlefield Professor of American History, Brown University

John L. Heilbron. Professor of History, University of California, Berkeley

Richard G. Hewlett. Chief Historian, Atomic Energy Commission

Thomas P. Hughes. Professor of History and Sociology of Science, University of Pennsylvania

Daniel J. Kevles. Associate Professor of History, California Institute of Technology

Lew Kowarski. Professor of Physics, Boston University; Staff Member, CERN

Arthur L. Norberg. Coordinator, Project for History of Science and Technology, The Bancroft Library, University of California, Berkeley

Glenn T. Seaborg. University Professor, University of California; Nobel Prize in Chemistry; former Chairman, Atomic Energy Commission

Emilio G. Segrè. Professor Emeritus of Physics, University of California, Berkeley; Nobel Prize in Physics

Charles Susskind. Professor of Electrical Engineering and Computer Sciences, University of California, Berkeley

Frederick E. Terman. Professor Emeritus of Electrical Engineering and former Provost, Stanford University

Herbert York. Professor of Physics and former Chancellor, University of California, San Diego

Program

May 3: SOME WARTIME PROJECTS

SESSION 1, Pauley Ballroom West, Student Union, 10–12 noon.
Glenn T. Seaborg, Chairman

10:00 Welcome—Vice Chancellor Mark N. Christensen

Nuclear Physics in the United States During World War II
Richard G. Hewlett

11:00 *Radar*
Charles Susskind

SESSION 2, Pauley Ballroom West, Student Union, 2–5 p.m.
John L. Heilbron, Chairman

2:00 *ENIAC: Invention of a Computer*
Thomas P. Hughes

3:00 Panel Discussion
Mssrs. Hewlett, Hughes, Seaborg, Susskind, and Terman

May 4: POLICY PROBLEMS

SESSION 1, 155 Dwinelle Hall, 10–12 noon.
Herbert York, Chairman

10:00 *The New Advisors: Scientists and Military Strategy*
Daniel J. Kevles

11:00 *From War to Postwar: The Evolution of Science Policy Structure 1944–1950*
A. Hunter Dupree

SESSION 2, 155 Dwinelle Hall, 1:30–4:30 p.m.
Arthur L. Norberg, Chairman

1:30 *Some Experiences in the Postwar Start-Up of Nuclear Science in Europe*
Lew Kowarski

2:30 Panel Discussion
Mssrs. Dupree, Kevles, Kowarski, Segrè, and York

baked by Dave, and drank their champagne toast. They left under a shower of rice at 5:15 p.m., driving off in their car which was decorated with signs, streamers, and a string of tin cans.

Jane Kingston and David Richards,
Glen Road, Lafayette: 5/4/74.

After the guests left, Helen and I drove to University House on the campus to attend a reception given by Chancellor and Mrs. Bowker for Mina Rees who was in town for a meeting of the Board of Directors of Phi Beta Kappa. Others present were Dr. and Mrs. Hugh Heffner, Dr. and Mrs. Jerzy Neyman, Dr. and Mrs. Charles McKinnon (retired Professor of Psychology, Berkeley), and Dr. and Mrs. Ed Begle (of Stanford and leader of the national new mathematics program for precollege schools).

Sunday, May 5, 1974 - Lafayette - Berkeley

Suki and I took a hike around the rim trail of the Lafayette Reservoir. In the afternoon, I presided over a meeting of Citizens for Urban Wilderness Areas at the Reeve home in Berkeley (minutes attached). Present were Lucile Arnon, Mary Bowerman, Marge Bowman, Tom Bowman, Leo Brewer, Joyce Burr, Don de Fremery, Lucretia Edwards, Arthur Emmes, Susan Fruge, Margo Gwinn, Alice Howard, Jerry Jackson,

CITIZENS FOR URBAN WILDERNESS AREAS
1052 Merced, Berkeley, California

The following agenda was considered at the May 5, 1974 meeting and action taken as indicated:

POINT RICHMOND

Lucretia Edwards presented an informational report, pointing out that no progress has been made on the Park's expansion since its inclusion in the EBRPD Master Plan of June 1973. New problems have developed (1) in the Park District's negotiations with Santa Fe Railroad concerning a proposal to move the tracks back into the curve of the hill; (2) with BCDC concerning the proposed 8-acre bay fill for the park; and (3) with regard to a proposal involving Union Oil Co. and others to install two anhydrous ammoniatanks immediately adjacent to the Park as well as within a mile of residential area nearby, which would create serious hazards and could ruin the Park; however it is hoped it may be possible to stop this development with the support of chemists who live in the residential area. There will be a non-public meeting on the tank problem May 8, before the EIR is released, and a public meeting in July.

Another problem is that no money was earmarked in this year's budget for acquisition of land for the Park, and Joyce Burr then proposed a step CUWA could take provided Proposition I passes and there is a ruling that funds from this measure cannot be used for buildings, i.e., CUWA could ask the City of Richmond to designate the sum earmarked for the rebuilding of its "Plunge" facility to be used for the Shoreline Park instead, and that a letter to this effect could be prepared and ready for this eventuality. It was so agreed, and a motion was made and unanimously approved that if Proposition I is passed and it becomes apparent the State will not allow the monies from this bond issue to be used for buildings, CUWA is then to contact the Richmond City agencies involved to ask that the $126,000 now set aside for rebuilding the Plunge be made available to purchase land for the Point Richmond Park.

Mrs. Edwards then asked if CUWA could undertake a tentative, contingent stand on the tank problem as well, for the July public meeting, on the grounds that the tanks will be incompatible with Park use and that CUWA send a representative to the hearing to make this presentation. There was a general consensus that this should be done by CUWA.

OPTION 2A GENERAL PLAN AMENDMENT, ALAMEDA COUNTY

A proposed CUWA letter was presented, addressed to Joseph Bort, Chairman of the Alameda County Board of Supervisors, urging the adoption of Option 2A for Alameda County's General Plan, in support of keeping Ridgelands in open space and park use. The letter was approved as presented, with copies to be made available to each member of the Board of Supervisors, and it was agreed that Marion Reeve is to attend the Supervisors' Board meeting on May 7 to present CUWA's statement; in addition, Roger Reeve is to call Mr. Bort to confirm that Option 2A is on the agenda for that meeting.

HUCKLEBERRY PRESERVE and TRAIL

Jana Olson, Trails Coordinator for the EBRPD, and Margie Bowman had made a survey of this area and discussed various possibilities for the location of the equestrian trail (the National Skyline Trail link) which they indicated should be located well below the Huckleberry Preserve area. They had also found a good deal of winter damage and pointed out that the entire slope is loose soil and needs support on the backside. Alternatives for the equestrian trail were explored and a recommendation was made that long-distance hikers should use the equestrian trail for through hiking, with a connecting spur trail (but not a loop) for visiting the Huckleberry Preserve (Huckleberry Preserve and its trail are not within Miss Olson's jurisdiction, however).

Of immediate concern are the high Manzanitas that have gone down this past winter. The Huckleberry Advisory Committee has requested CNPS help for a clean-up operation and Dr. Leo Brewer stated they were awaiting the Park District Board's response to this request. It was decided that Dr. Brewer and Margie Bowman would collaborate on this matter and decide on the action to be taken, as no official action by CUWA is necessary at this time.

MORGAN TERRITORY

Manfred Lindner, representing the Contra Costa Parks Council, gave a slide presentation on two areas in the Territory. Joyce Burr pointed out that if Proposition I passes, $100,000 has been earmarked for the EBRPD to buy land in Morgan Territory and that there should be some guidance provided to EBRPD as to which land to purchase.

It was suggested that CUWA should become more familiar with this Territory in order to be able to make specific recommendations to the Park District as to which areas are the best and it was decided that the initial work could come from Mr. Lindner's group, the Contra Costa Parks Council. Mr. Lindner is to take this up with the Council's Board and report to the next CUWA meeting with more detailed information. (In addition, the EBRPD Advisory Committee could use this information as well.)

WILDCAT CANYON

Copies of the March CUWA letter and resolution that had been sent to Dr. Cogswell were distributed at the meeting. It was reported that, after CUWA's resolution was presented to the Park District Board, their staff instructed the City of Richmond to postpone their meeting until the EBRPD had more time to consider this. Word was subsequently received from the City that it would not come up until July, so the matter is presently in abeyance.

Regarding the proposed Villa Mira Vista development, the citizens took the developer into court and proved the City of Richmond had illegally granted a permit to build, so the City now has to redo its General Plan and must have a new EIR. The situation amounts to a delay in a decision until a new General Plan is available and nothing more needs be done at this time by CUWA.

PT. ISABEL and RICHMOND MARSH LANDS

Joyce Burr reviewed developments and the current status. There is no action to be taken by CUWA at this time.

PROPOSITION I

The importance of everyone helping to promote this measure was stressed, and the need for ads and letters to the editor. It was agreed that CUWA should go on record to take action in support of Proposition I, including authority for anyone in CUWA to follow through on the implementation, and it was so moved and passed. In addition, it was further agreed that Roger Reeve is to write a news story, in collaboration with Joyce Burr, telling of CUWA's support of the measure; he is also to contact the Committee for Proposition I regarding CUWA's action.

MT. DIABLO and RELATED AREAS

Mary Bowerman reported. The problem is lack of sufficient funds to buy all the needed land. If Proposition I passes, it is expected $3 million would be allocated for land purchase on Mt. Diablo and it may be possible to obtain a Federal matching grant of $1½ million as well. The State would like to complete acquisition by June 30 but it will be necessary for them to go before the State Public Works Dept. twice, the first time to tell what lands are to be acquired. The appraisals and the EIR are completed. There are two parcels of land the Mt. Diablo group is working for particularly, and one is outside the recommended boundaries. The State has given the top of the mountain priority but the Mt. Diablo Committee is trying to encourage the State to buy the land around the foot of the mountain as the first priority, since the top is not threatened by developers.

Devil Mountain was lost and some housing may be built but this could be taken to court.

The Black Hawk development is before the Planning Commission and meetings will be held May 14 and 28. The County Planning staff has recommended against it on the economic basis of additional facilities that would be required, such as schools, etc., and Mrs. Bowerman thinks opposition is increasing. It was then pointed out that the State Parks Commission passed a resolution urging the foothill areas be saved and CUWA could call this to attention; also that CUWA could support the action of the County Planning Dept. in their recommendations and could recommend that the General Plan needs to be reviewed, as well; CUWA can also support the ABAG General Plan for open space and environmental considerations in its presentation. It was then concluded that CUWA can adopt a course of action along these lines and Joyce Burr and Mary Bowerman are to write a letter stating this point of view and determine where it should be sent.

RIDGELANDS

Margaret Tracy reported on behalf of the Preserve Area Ridgelands Committee and distributed a Progress Report. She also stressed the critical hearing before the Alameda County Board of Supervisors on May 7 regarding Option 2A--see that item for CUWA action taken in response.

PARC is preparing TV programs, one for Cable TV in Moraga on June 13, 8 - 9 p.m., and a documentary for Congressman Stark.

RIDGELANDS, Cont'd:

Mrs. Tracy also reported that, for the first time, an economic report has been issued, equating short and long-term planning, and that State law needs to be changed to require economic analysis as well as environmental considerations and hopes we can get public interest and support on this.

NEJEDLY BILL

Not discussed. Roger Reeve is to obtain a copy of the bill.

NEW BUSINESS

The issue of security within Parks was raised.

CUWA TREASURY

$50 reported on hand. A collection was subsequently taken.

NEXT CUWA MEETING

Sunday June 9 is the date set for the next meeting.

Dr. Emmes requested that the agenda on June 9 include a presentation on the Hayward Shoreline.

CITIZENS FOR URBAN WILDERNESS AREAS
1052 MERCED, BERKELEY, CALIFORNIA 94707

Glenn T. Seaborg
Chairman
Thomas Bowman
V. Chairman
Geraldine Jackson
Treasurer
Roger Reeve
C. Secretary
Karen Davis
R. Secretary

May 5, 1974

Mr. Joseph P. Bort, Chairman
Alameda County Board of Supervisors
1221 Oak Street
Oakland, California 94612

Dear Mr. Bort and County Supervisors:

I am writing in behalf of Citizens for Urban Wilderness Areas (CUWA) to urge that the Alameda County Board of Supervisors act favorably on Option 2A of the Alameda County General Plan to zone the Dublin-Pleasanton-Sunol area ridgelands and similar areas as open space for major parks, recreational, and uncultivated agricultural uses. CUWA is a consortium of all major conservation-minded organizations of the East Bay Area and includes members professionally understanding the environment. CUWA is particularly concerned that open space be preserved and closed to development in areas closely associated with large metropolitan centers, as are the Alameda and Contra Costa County ridgelands.

At its May 5, 1974 meeting CUWA unanimously agreed that the Dublin-Pleasanton-Sunol ridgelands should be designated as open space in the Alameda County General Plan, and that such designation is imperative to future Federal and State assistance to obtain much-needed urban-related parkland. Most of these ridgelands are unstable and unsuitable for residential development. East Bay Area history is replete with examples of consequences from residential and other developments on such unstable lands. New roads and excavations often have altered natural drainage channels so that properties of adjacent, lower elevations have been damaged, often irreparably, by slides, slippage, and increased sedimentation in valley streams. CUWA would seek intelligent planning to eliminate the consequential and unnecessary expenses suffered by innocent people.

In urgently requesting that Option 2A of the County General Plan be adopted, CUWA reaffirms its position twice previously stated: (1) by Mrs. Marian Reeve at the September 17, 1973 meeting of the Alameda County Planning Commission, and (2) as expressed by letter dated October 8, 1973 to Chairman Martin C. Kauffman of the Alameda County Planning Commission. CUWA supports the position of the Preserve Area Ridgelands Committee (PARC) and considers that Option 2A of the County General Plan is both highly desirable and very essential to wise land use in Alameda County.

Sincerely yours,

Glenn T. Seaborg, Chairman.

Mary Jefferds, Manfred Lindner, Jana Olson, Marian and Roger Reeve, Mary Jane Sills, Erwin and Leonora Strohmeier, Margaret Tracy, and Susan Watson.

After dinner, I called Ghiorso to discuss a possible answer that Dr. Dixy Lee Ray might use in her answer to USSR Chairman Petrosyants's letter to her (attached), suggesting that the United States send two physicists to Dubna to reproduce their work on elements 104 and 105; we will suggest that, instead, Dubna send two people to LBL to help try to produce the isotopes they think they have identified.

Monday, May 6, 1974 - Berkeley

I attended Pimentel's lecture. At 10:15 a.m., Norman Edelstein brought in Dr. Henry Crosswhite of John Hopkins University. He is working on the spectroscopy of actinide elements. He will spend next year at Argonne with the hope of a permanent position there if funding comes through. He will work on the spark spectra of metallic uranium, plutonium, and so forth. He is giving a talk in Leo Brewer's seminar today.

I received from Robert Pranger the press release (attached) announcing the members of the American Enterprise Institute National Energy Project Advisory Council, of which I am a new member. I sent to the Pre-Medical Advisory Program on the Berkeley campus a letter of evaluation on Peter Sybert.

I walked down to the campus and held my office hour in 446 Latimer from 11:10 a.m. to 12:10 p.m. Luke Perkocha and Jonathan Keyak dropped in and asked questions for an hour on their Chem 1C lab work. I had lunch with the Chem Department faculty, then taught my lab section from 1:10-2:45 p.m. We gave them the second quiz of the quarter (attached), which I composed for the entire Section 2.

I met with Stan Thompson over tea at 3:30 p.m. He is concerned over the increasing tendency to make the decisions in the Nuclear Chemistry Division by committee action.

At 4:00 p.m., I presided over the Nuclear Chemistry Seminar in the conference room. I first introduced Joseph Wong (a student of Gordon Struble), who spoke on "A Variational Method in Nuclear Shell Model Calculations." I then introduced Richard Streater (David Shirley's student), who spoke on "Hyperfine Fields in Co Fe by NMR on Oriented ^{60}Co." During the seminar, Dick Diamond brought into the office the message that Richard Eppley has decided not to accept our offer. He will, however, not leave until the end of the summer.

Tuesday, May 7, 1974- Berkeley

At 9:00 a.m., I went over to the Director's Office in Building 50A and met with the group of seismologists from the People's Republic of China (program attached). Present were Ku Kung-hsu (President of the Chinese Geological Society, Professor of Geophysics and Vice Director of the Institute of Geophysics, whom Helen and I met in Peking), Professor Ting Kuo-yu (Associate Professor of Neotectonics, National Bureau of Seismology), Ch'en Hsin-lien (Vice Chairman of the

Glenn - John Tam is concerned about the political implications, its relation to US-USSR relations. He, I told him, that we would, at least, support a unified position. He will call you on Monday, for your views.

Moscow
April 23, 1974

only [illegible]

Dear Dr. Ray:

After my visit to the United States, where in particular I was able to visit Berkeley, and my recent visit to Dubna, I would like to exchange views with you on the question of the "discovery" of new elements.

As you know experiments conducted in our countries in the course of the past 10 years have led to the synthesis of new elements with atomic numbers 102, 103, 104 and 105. Modern day developments on this direction in physics are connected with progress into the region of the heavier and super-heavy elements together with which the question of "legalizing" the already discovered elements remains until now undecided.

A similar situation has arisen as a consequence of the fact that the results obtained in Dubna as regards the synthesis of elements with atomic numbers 104 and 105 are held in doubt by the group working in the same direction in Berkeley. Unfortunately other laboratories of the world where heavy ions are being accelerated do not have the possibility to conduct similar experiments and the situation which has arisen naturally evokes serious difficulties in the work of the international nomenclature commissions of IUPAP.

In Berkeley and in Dubna different nuclear synthesis reactions were used to check on applied different methods for the detection of new nuclei.

To fully repeat the experiments of the Dubna physicists in Berkeley turned out not to be possible because of the low intensity of the beam of accelerated Neon 22 ions. At the same time in Dubna where the search for new elements is carried out with regard to spontaneous fission the use of Curium and Californium targets is extremely undesirable.

In connection with this it would be expedient by joint efforts to repeat these experiments in Dubna. Therefore I would like to invite to Dubna two American physicists working in the field of the synthesis of new elements to participate in the experiments, both in regard to the obtaining of "disputed" elements and in the study of their properties.

This could be done soon, in May of this year or in the autumn, in October-November. I hope that the arrival in Dubna of scientists from the USA will be not only useful for the general purpose but also pleasant.

Accept my best wishes.

Regards,

A. Petrosyants

Received in Russian at AEC-Wash.
on May 1, 1974 and translated there.

American Enterprise Institute for Public Policy Research

PressRelease

1150 Seventeenth Street, N.W., Washington, D.C. 20036

Jack Buttram 466-8225

FOR RELEASE:
April 29, 1974

LAIRD ANNOUNCES MEMBERS OF
ENERGY ADVISORY COUNCIL

Former Defense Secretary and recent Presidential Counsellor Melvin R. Laird today announced the names of the full advisory council to the AEI national energy project of which he is chairman. Laird agreed to chair the two-year project, conducted under the auspices of the American Enterprise Institute for Public Policy Research, earlier this year and said he would be seeking advice from all affected segments of American life.

The names released today include two Nobel Prize laureates, several former cabinet officers, representatives of consumer, ecological, labor, business and industry groups, as well as elected officials from local, state and national governmental levels.

Laird said the first meeting of the council had raised important future policy questions which would be addressed in the energy project's first studies to be published this summer. He said the project director, Dr. Edward Mitchell, has already commissioned one study on the subject of shortages--how they arose and what the future impact would likely be of another Arab embargo. Another study is looking into the complex question of profitability in the oil industry, with the aim of uncovering lessons for the future as well as information which is useful now. Both studies should be ready by early to mid-summer, said Laird.

In announcing the council members, Laird reiterated his statement that: "The future of energy policy in the United States is so basic to the strength and welfare of American society, that issues surrounding this policy deserve serious treatment as

matters of urgent national strategy. I am pleased that each member of this distinguished council has agreed to lend his expertise and wisdom in advancing research in this important sector of public policy."

The members of the advisory council are as follows:

KENNETH J. ARROW, professor of economics at Harvard, received the Nobel Prize in economics for 1972 and was a member of the Council of Economic Advisers during the Kennedy administration.

GEORGE W. BALL, under secretary of state during the Kennedy and Johnson administrations and former ambassador to the United Nations, is now senior managing director of Lehman Brothers, Inc.

TOM BRADLEY, mayor of Los Angeles and president of the National League of Cities. As a member of Los Angeles's City Council, Bradley led efforts to establish the City Consumer Affairs Bureau.

HAROLD BROWN, president of the California Institute of Technology, is a distinguished physicist who served as secretary of the air force under President Johnson and is now a member of the U.S. SALT talks delegation.

JAMES L. BUCKLEY, New York's Conservative-Republican junior United States senator, is a member of the Senate Public Works and the Interior and Insular Affairs committees.

ROBERT CAHN, Pulitzer Prize-winning environmental editor of the Christian Science Monitor, was one of the three original members of the Council on Environmental Quality. He is now on leave from the Christian Science Monitor.

RUTH CLUSEN, president-elect of the League of Women Voters, is the league's national environmental quality chairman and the only woman and non-engineer on the EPA Technical Advisory Group on Wastewater Treatment.

WENDELL H. FORD, governor of Kentucky, is vice-chairman of the National Governors' Conference Natural Resources and Environmental Management Committee and was selected as the 1973 Conservation Man of the Year by the Kentucky Association of Conservation Districts.

STANLEY K. HATHAWAY, governor of Wyoming, is chairman of the National Governors' Conference Natural Resources and Environmental Management Committee and has served as chairman of the Interstate Oil Compact Commission.

PAUL R. IGNATIUS, president and chief executive officer of the Air Transport Association of America, is a former president of The Washington Post Company and was President Johnson's secretary of the navy from 1967 to 1969.

MIKE McCORMACK, Democratic congressman from Washington, chairs the Subcommittee on Energy of the House Science and Astronautics Committee and serves on the Joint Committee on Atomic Energy and the House Public Works Committee. As a freshman legislator he chaired the 1971 House Task Force on Energy.

WALTER F. MONDALE, senior Democratic United States senator from Minnesota, is a member of the Senate Finance and Labor and Public Welfare committees.

JOHN N. NASSIKAS, chairman of the Federal Power Commission, is a member of the President's Joint Board on Fuel Supply and Fuel Transport and a director of the U.S. National Committee of the World Energy Conference.

VERMONT ROYSTER, Pulitzer Prize-winning columnist and contributing editor for The Wall Street Journal, is professor of journalism and public affairs at the University of North Carolina and a member of the advisory committee on Pulitzer Prizes at Columbia University.

PHILIP E. RUPPE, Republican congressman from Michigan, is the ranking minority member on the Environmental Subcommittee of the House Interior and Insular Affairs Committee and serves on the House Merchant Marine and Fisheries Committee.

GLENN T. SEABORG is the Nobel Prize-winning chemist who chaired the Atomic Energy Commission from 1961 to 1971. He is now a professor of chemistry and associate director of the Lawrence Berkeley Laboratory at the University of California, Berkeley.

CHARLES E. SPAHR, chairman of the board and chief executive officer of Standard Oil of Ohio, is a director of the American Petroleum Institute and a member of the National Petroleum Council and the National Industrial Conference Board.

EDGAR B. SPEER, chairman and chief executive officer of United States Steel Corporation, is a director of the American Iron and Steel Institute and the Regional Industrial Development Corporation of Southwestern Pennsylvania.

ELVIS J. STAHR, president of the National Audubon Society, served as secretary of the army under President Kennedy and was awarded the first Doctor of Environmental Science by Rollins College in May 1973.

CHAUNCEY STARR, president of Electric Power Research Institute, is a member of the President's Energy Research and Development Advisory Council, the Environmental Studies Board of the National Academy of Sciences-National Academy of Engineering and the former dean of the UCLA School of Engineering and Applied Sciences.

The American Enterprise Institute for Public Policy Research is a nonpartisan, nonprofit, publicly supported educational and research organization which itself takes no positions on issues studied by its scholars and associates.

# # # #

Chem 1C Section 2
Quiz #2, May 6, 1974
40 points OPEN BOOK
40 minutes

Name _____
Locker No. _____
T.A. _____

1. (12 points) An unknown was prepared by taking one or more of the following solids:

$Hg_2(NO_3)_2$	$FeCl_3$	$CaCO_3$	$Hg(NO_3)_2$	Ag_2O	$ZnCl_2$
−	+	+	+	−	?

The unknown dissolved completely in 1 M. HNO_3 at room temperature with the evolution of a gas. Saturation of the solution with H_2S gave a black precipitate. After this black precipitate was separated, addition of excess 6 M. NH_4OH to the supernatant produced another black precipitate. Write + for any solid definitely present, − for any definitely absent, and ? for any not determined by the experiment.

2. a. (6 points) Balance the equation for the solution of Cu in HNO_3:

$$8H^+ + 3\underset{0}{Cu} + 2\underset{+5}{NO_3^-} \rightarrow 3\underset{+2}{Cu^{+2}} + 2\underset{+2}{NO} + 4H_2O$$

(+2)3

(−3)2

b. (8 points) Using the relevant standard reduction potentials (Table 6-5, page 210, Pimentel and Spratley), calculate the equilibrium constant for the reaction

$$2Fe^{+3} + Fe \rightarrow 3Fe^{+2}$$

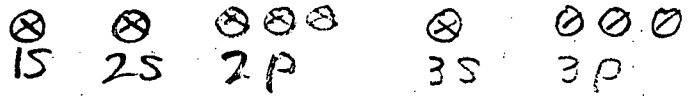
Show your work.

$$K = 10^{\frac{2(1.21)}{.059}} = 10^{41}$$

0.771
0.440
1.211

$$\Delta E^\circ = \frac{0.059}{n} \log_{10} K \quad p.377$$

3. (3 points) List the electron configuration (orbital occupancy) of a phosphorus atom (an energy level diagram is not required).

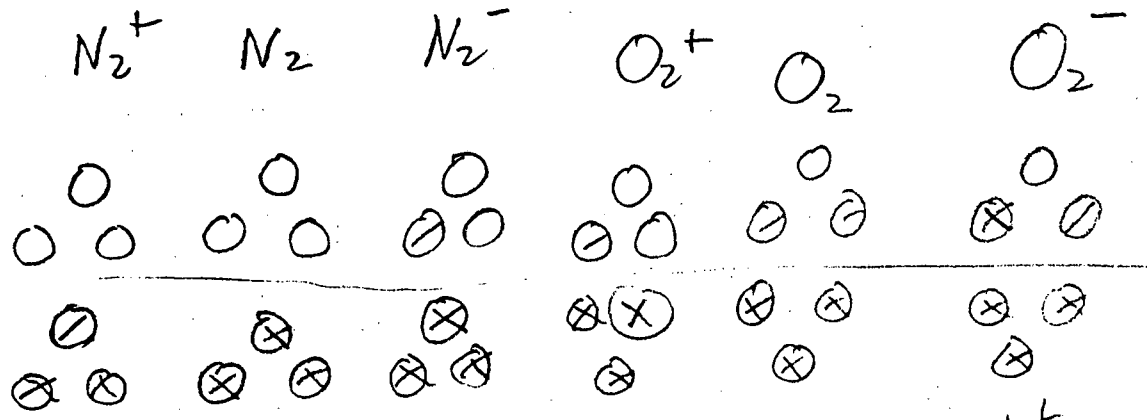


4. (3 points) What is the ionization energy (in kilocalories per mole) of hydrogen in the 5p state?

$$E = -\frac{313.6\,Z^2}{n^2} = -\frac{313.6(1)^2}{5^2} = -\frac{313.6}{25}$$

$$= -12.5$$

5. (8 points) Deduce from the Molecular Orbital (M.O.) concept whether (a) O_2^+ should have a stronger or weaker bond than O_2, (b) O_2^- a stronger or weaker bond than O_2, (c) N_2^+ a stronger or weaker bond than N_2, and (d) N_2^- a stronger or weaker bond than N_2. Show the basis for your reasoning.



B.O. $2\frac{1}{2}$ 3 $2\frac{1}{2}$ $2\frac{1}{2}$ 2 $1\frac{1}{2}$

125h

GTS, want me to inquire as to whether you might come to the greeting in the Director's Office at 9:00 a.m.?

sms

LAWRENCE BERKELEY LABORATORY
Room: 4112 Bldg.: 50A Ext.: [illegible]

21 March 1974

MEMORANDUM

TO : Distribution

FROM : Jack M. Hollander

SUBJECT: Visit of Chinese Seismologists on 7 May 1974

On Tuesday, May 7, 1974 a group of seismologists from the People's Republic of China will be visiting the Laboratory and I have agreed to be host for the morning. The following schedule has been arranged to introduce some LBL activities in which the group may have an interest:

9 - 9:30 a.m.	Meeting with Andy Sessler
9:30 - 10 a.m.	Review of Geothermal program Paul Witherspoon (In Jack Hollander's office)
10 - 10:30 a.m.	Visit Computer Graphics Bob Harvey
10:30 - 11 a.m.	Tour through the Bevatron if time allows Hermann A. Grunder
11:00 a.m.	**To Lawrence Hall of Science for tour and lunch.**

Jack M. Hollander

JMH/po

Distribution;
Bruce Bolt
Bob Harvey
Paul Witherspoon
Andy Sessler
Hermann Grunder

cc: GTS
Owen Chamberlain
Luis Alvarez

Geodetic Survey Brigade for Earthquake Research, National Bureau of Seismology), Kuo Tseng-tsien, Chang Yi-lin, Ts'ui Tso-chou, Teng Ch'i-tung, Ho Shihhai, Ch'en Chun-liang, Ch'ien Hao (interpreter), and Hsu Hsin-hsi (Second Secretary of the liaison office of the PRC). They were accompanied by Mary Bullock, staff coordinator, and Gary Schatz and Alan Golacinski of the State Department. Earl Hyde and Luis Alvarez were also present.

GTS with Ku Hung-hsu: May 7, 1974.

After this, I went to the conference room in Building 70A for the meeting of the SHEIKS that was just getting under way. Present were Albert Ghiorso, Matti Nurmia, Kenneth Hulet, Jens Kratz, Ted Norris, Roland Otto, Kim Williams, Irwin Binder, Diana Lee, Donnie Murphy, Ron Lougheed, Taisto Raunemaa, Darleane Hoffman, Bill Daniels, Kurt Wolfsberg, and Philip Horwitz.

Ghiorso reported on the SuperHILAC status and schedule, then Kratz reported on the search for superheavy elements in U plus Ar and U plus Kr bombardments. He reported as cross sections for U plus Ar: (1) 600 mbarns for the "rabbit ears," (2) 450 mbarns for fusion-fission, and (3) 150 mbarns for low energy fission. The recent treatment of data from U plus Kr casts doubt on the previously reported 300 mbarn for the fusion-fission reaction; more complicated reactions seem to take place.

After a coffee break, Darleane Hoffman reported on the yields of actinides and lanthanides from their work on a U plus Kr bombardment. Hoffman et al. at LASL didn't find any Cf^{248}, but Horwitz et al. at ANL did. Horwitz found Cf^{246}, missed at LASL due to elapse of time. Horwitz then reported on the ANL yields. He said some predictions suggest a VI state element 110 which would appear in the U fraction and hence be missed. The only discrepancy between the ANL and LASL

results is in the Cm^{240} and Cm^{242} yields which are 4 times lower in the ANL results. Horwitz gave us a list of the ANL yields of a wide range of products from their two Faraday Cup bombardments and the lanthanide-actinide fraction they received from us and these otherwise agree with the LASL results.

After lunch in the cafeteria, Binder reported on his bombardments of Au with Kr, Norris on Gd plus Kr, and Otto on his planned experiments. We discussed techniques for preparing targets out of precious and valuable material. We then went on to the last agenda item, namely, discussion of future plans. It was agreed that, in our publication of the U plus Ar and U plus Kr work, we could cite the results on the yields of lanthanides and actinides obtained by the LASL and ANL people either as a private communication or, if they write it up for publication, cite it in that form. We agreed that, on the forthcoming bombardment on May 22 of U plus Xe^{136} we would send the actinide-lanthanide fraction to LASL, and on the July bombardment of U plus Kr^{86} we would send the fraction to ANL.

After our meeting, we toured the SuperHILAC and various labs. At 6:00 p.m., I hosted a dinner for the SHEIKS in the Faculty Club.

Wednesday, May 8, 1974 - Berkeley

I attended Pimentel's lecture, then conducted my office hour in Latimer from 10:00-11:00 a.m.

At 11:30 a.m., Earl Hyde came in to tell that he is appointing Jim Harris as the LBL special minority representative, representing the Nuclear Chemistry and Physics Divisions. We also discussed the letter from Petrosyants to Dixy Lee Ray.

I had lunch at my desk. Frank Stephens came in to discuss the reallocation of space in Building 70. He would like more participation in this planning.

I taught my Chem 1C lab section from 1:10-3:15 p.m., then walked back up to my office. I mailed to the Woodrow Wilson School a seconding nomination of David Leighton for a Rockefeller Public Service Award, as requested by Hyman Rickover (attached).

Stanley Prussin and Thomas Pigford came in for a 4:00 p.m. appointment to discuss support for Prussin's work on the delayed neutron emitters in the fission process. I said that this work is worthy of support and that I would bear his requirements in mind in my contacts with Washington.

I cut weeds around the tennis court for about an hour before dinner.

Thursday, May 9, 1974 - Lafayette, California - Lafayette, Indiana

Helen drove me to the Oakland Airport where I boarded United Airlines flight No. 394, which left at 8:00 a.m. and arrived at O'Hare Airport in Chicago at 1:20 p.m. I then boarded Air Wisconsin No. 924, which departed at 1:50 p.m. and landed at Purdue University Airport in

May 8, 1974

Ms. Ruth L. Greenstein
Woodrow Wilson School
Princeton University
Princeton, New Jersey 08540

Dear Ms. Greenstein:

I am writing to second the nomination of David T. Leighton for a Rockefeller Public Service Award in the field of professional accomplishment or leadership.

I have known Mr. Leighton for more than ten years, including most of the period that I served as Chairman of the U.S. Atomic Energy Commission. During this period, I developed the greatest respect for his technical ability, common sense, and outstanding capacity to work with people to get things done.

During all of this period he served as one of Admiral Hyman G. Rickover's assistants, and during the latter part he served as his main assistant. I had the opportunity to make firsthand observation, in meeting after meeting and numerous personal conferences involving Mr. Leighton and Admiral Rickover, of the tremendous extent of Mr. Leighton's own contributions to many aspects of this program.

His responsibility included the program for the development of nuclear power plants for surface warships. This included the extraordinary advances that were made in reducing the size of these nuclear power plants and increasing the lifetime of the nuclear fuel elements.

I also observed that he played a key role in the development of the Light Water Breeder Reactor--a very extensive program that required incisive direction of research and development, planning, budgeting, and scheduling of its manifold aspects.

Mr. Leighton is not only a very competent engineer, innovator and manager, but is also exceptionally strong in the human relations aspects of his work. He has a pleasant demeanor and unusual ability to get along with people, both those working for him and those to whom he reports; this is rather uniquely combined with an ability to make decisions and to keep people working hard in order to meet stringent schedules.

In summary, I believe that his accomplishments and his positive influence on young scientists and engineers qualify him very well for a Rockefeller Public Service Award.

Sincerely yours,

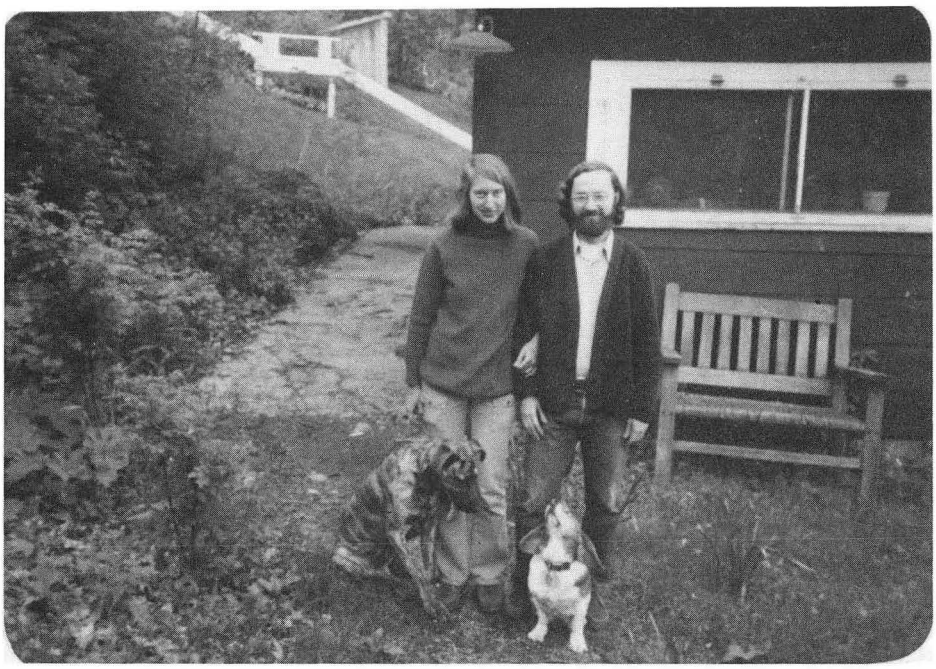
Glenn T. Seaborg

GTS/sms

Thursday, May 9, 1974 (con't)

Lafayette at 2:30 p.m. Lynne met my in their Volvo with dogs Bessie and Jonah (their 7-months-old Great Dane). We picked up Pat Siprello (Lynne's friend, a sophomore physics major at Purdue) and drove to Happy Hollow Park where the three of us took a hike.

After dropping Pat off, we picked up Bill at the Wabash Valley Hospital (the psychiatric hospital he is working at) and drove to their cottage overlooking the Wabash River. I took a number of pictures of Lynne and Bill, some including Bessie and Jonah, near their cottage and in their canoe on the Wabash River.



Lynne and Bill Cobb with Jonah and Bessie.

After dinner, we listened to an hour-long tape from Steve; he described his work as a teacher's aide in a school for retarded children in Sacramento, indicating that he enjoys it. We discussed Bill's attempts to gain admittance to some medical school. I agreed that I might contact representatives of some of the schools to which he has applied to see if I could help him gain admittance.

Lynne told me that her professor, Dr. Ottinger, confided in her that her written ratings by her departmental professors were very good--she was rated "a gem." She is well into her Masters Degree research project on the attitude of children toward death (interviewing a large sample of largely Catholic children) and will write her thesis during the summer--she thinks it may be publishable. She has been awarded a fellowship as an assistant in pediatric psychology at Home Hospital in Lafayette for next year at the same pay rate as her present fellowship--this will require 20 hours work per week, is a continuation of her NIMH Fellowship which Ottinger awarded to her--there was only one available and Lynne was very happy to get it. I spent the night on the sofa in their living room. Bill left for work on the graveshift shortly after I retired for the night.

Friday, May 10, 1974 - Lafayette - South Bend, Indiana

Bill returned from work at 7:45 a.m. and we had breakfast. Lynne then drove me to the Purdue University Airport where I boarded Air Wisconsin flight No. 545 which left at 9:40 a.m. and arrived at O'Hare Airport at 10:15 a.m. I then boarded North Central Airlines flight No. 807, which left at 11:30 a.m and arrived in South Bend at noon. I was met by Bernie Waldman (Dean of Science, Notre Dame) who drove me to the Morris Inn where I checked in.

I went to lunch in the dining room with Waldman, Bob Hentz (Associate Director, Radiation Laboratory, Notre Dame), Milton Burton, Jeremiah Freeman (Chairman, Chemistry Department), and John Mihelich (Department of Physics; he spent the summer of 1955 at LBL). I met the ISEF students from Sweden and the winners of the Nobel Visit Award and the Operation Cherry Blossom Award, as well as their U.S. Army, Navy and Air Force sponsors. The Operation Cherry Blossom Award winners were Jewel Anne Jurovich (17, Metairie, Louisiana) and Lawrence A. Wiedman (18. Fort Wayne, Indiana). The Nobel Visit Award winners were Christopher S. Willson (17, Merritt Island, Florida), Richard James Foch (17, Titusville, Florida), and Denise Anne Miller (17, Rockledge, Florida).

After lunch, Bernie took me to the Field House of the Athletic and Convocation Center where ISEF exhibits were set up. I met Dr. Emil T. Hofman, in charge of arranging for the ISEF at Notre Dame and teacher of freshman chemistry here. After viewing the exhibits, I went to the auditorium of the Library Building. At 3:00 p.m., I gave my "Status Report on the Transuranium Elements" lecture.

Later, I went with Dorothy Schriver and Carrie Levandoski, of Science Service, to the pre-dinner reception which included those who were instrumental in putting on the ISEF at Notre Dame. Also present were members of the Advisory Council of the ISEF, among whom I met Theodore W. Beck (Physics Instructor, El Cerrito High School, El Cerrito, California), Dr. Clay T. Smith (Professor of Geology, New Mexico Institute of Mining and Technology, Socorro, New Mexico), Lawrence Bellipanni (Instructor, University of Southern Mississippi, Hattiesburg, Mississippi), William R. M. Ritter (Chairman, Science Department, Upper Dublin High School, Fort Washington, Pennsylvania), Dr. Luther Arnold (Executive Director, Florida Foundation for Future Scientists, University of Florida, Gainesville, Florida), John S. Boccuzzi (Science Coordinator, Cloonan Middle School, Stamford, Connecticut), C. Michael Farmer (Assistant Director of Continuing Education, Marquette University, Milwaukee, Wisconsin), Albert C. Finley (Joel E. Ferris High School, Spokane, Washington), Byron O. Parvis (Reporter, Lafayette Journal and Courier, Lafayette, Indiana), and Dr. H. Calvin Fisher (an ex officio member of the ISEF Council). I talked to various people about Bill's medical school attempts.

After the reception, we went to the dinner, attended by about 1,000 people--379 finalists, their teachers, parents, etc. I gave the principal address and the awards for the 25th International Science and Engineering Fair were announced and distributed.

Saturday, May 11, 1974 - South Bend, Indiana - Houston, Texas

I took a taxi to South Bend Airport and boarded United Airlines flight No. 751, which left at 7:15 a.m. and arrived at O'Hare at 7:45 a.m. I then took Braniff No. 129 to Houston, which left at 9:45 a.m. and arrived at noon. I took a taxi to the Rice Hotel and checked in. I had lunch in the Stinson Room with Roger Wolfe and members of the Welch Scientific Advisory Board--Henry Eyring, W. O. Baker, E. J. Corey, C. S. Marvel, George W. Beadle, and W. O. Milligan.

We walked to the Bank of the Southwest Building for the continuing meeting of the SAB in the conference room on the 20th floor. We discussed the people to be featured in the 1976 Welch Conference XX, "American Chemistry--Bicentennial" and the people to speak about them. We also discussed nominees for the Welch Award. We had dinner in the Heritage Room of the Houston Club.

Sunday, May 12, 1974 - Houston, Texas - Lafayette, California

At the continuing Welch SAB meeting, we decided to submit the following names for the Welch Awards: (1) Albert Eschenmoser, Federal Institute of Technology, Zurich, "For his profound and highly creative contributions to synthetic chemistry, which include the discovery of important new reactions, and the construction of complex naturally occurring molecules;" (2) Neil Bartlett, UC Berkeley, "For his synthesis of chemical compounds of inert gases and the subsequent opening of broad new fields of research in inorganic chemistry;" and (3) John C. Slater, University of Florida, Gainesville, "For his fundamental contributions to the deep understanding of chemical valence, atomic and molecular structure."

We had lunch in the Stinson Room with Roger Wolfe and Robert Wise. We made our report to Wolfe. I talked to Milligan and Marvel about Bill's medical school admittance problem.

I rode in a limousine furnished by the Foundation to Houston International Airport where I bought a Mother's Day present for Helen (silver pendant necklace) and a T-shirt for Dianne. I boarded National flight No. 27 which left at 3:15 p.m. and arrived in San Francisco at 6:00 p.m. Helen met me and drove me home.

I took a hike with Suki to the water tank. Steve had spent the weekend at home. I had dinner with him before he returned to Davis. Eric called from Davis; he has accepted a job at the same place where he worked last summer in the state of Washington--he must start early, June 17.

Monday, May 13, 1974 - Berkeley

I gave the main lecture, "Science in China," for Chem 1C from 9:10-10:00 a.m., substituting for George Pimentel while he is in Germany.

I sent to the Planning Commission a letter indicating CUWA's support of preserving Mount Diablo as open space, which Bill Landis will present at the Commission's meeting tomorrow (attached). I

bxc: Mary Bowerman
Roger Reeve
Joyce Burr

CITIZENS FOR URBAN WILDERNESS AREAS
1052 MERCED, BERKELEY, CALIFORNIA 94707

May 14, 1974

Glenn T. Seaborg
Chairman
Thomas Bowman
V. Chairman
Geraldine Jackson
Treasurer
Roger Reeve
C. Secretary
Karen Davis
R. Secretary

Mr. Richard J. Jeha, Chairman
Planning Commission
Contra Costa County
P.O. Box 951
Martinez, California

Dear Mr. Jeha and Members of the Commission:

Re: 1840 RZ-Black Hawk Development Company

Citizens for Urban Wilderness Areas (CUWA) is a coalition of over 35 conservation, educational, and community interest groups of Contra Costa and Alameda Counties. Our objective is to foster the preservation of wilderness areas close to urban centers.

We endorse a major objective of the Contra Costa County General Plan to preserve liberal amounts of open space, including parks, woodlands, range land and agricultural land. We should like to see the whole of Mount Diablo become a part of Mount Diablo State Park or preserved as open space. We therefore support the Contra Costa County Planning Director and staff in recommending denial of the applicants' request for rezoning, for the following reasons.

1. This proposal for intensive and extensive development is not consistent with the existing General Plan (page 10 of the County's Environmental Impact Report). In addition, the proposal does not reflect the timing of development as projected by the General Plan. The existing General Plan did not anticipate what is essentially a new community east of existing development at this time, if ever.

2. The proposal is in conflict with the "Regional Plan 1970-1990" adopted by the Association of Bay Area Governments (ABAG). The ABAG plan shows much of the Black Hawk Ranch as permanent open space. A small portion of the site is contained in a subcategory of open space--the Controlled Development areas--which should not be considered for urbanization until after 1990.

We hope that you are in agreement with this position.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

received from Robert Livingston a list of Iranians who should be contacted in relation to Science subscriptions (attached). I sent my approval to Moses Passer, head of the American Chemical Society Short Courses program, for them to use my quotation in their introductory material (attached). I sent to Roy Crawley, Executive Director of National Academy of Public Administration, nominations for membership for Emilio Daddario and Anthony Downs (attached).

I held my office hour in Latimer, then had lunch with the Chem Department faculty in the Howard Room. I taught my Chem 1C lab section from 1:10-3:15 p.m., then returned to the hill.

Art Poskanzer came in at 4:15 p.m. He told me that David Natusch had turned us down because he is being promoted to Associate Professor at the University of Illinois--presumably accelerated because of our offer. We decided to invite Dr. Zoller and Kenneth Rahn back for visits.

Tuesday, May 14, 1974 - Berkeley

John Landis called at 8:40 a.m. to inform me that the General Atomic Board of Directors has given approval to my consultantship agreement, and they will send me a contract. At 9:15 a.m., I met with Toru Kuroiwa (of the Mainichi Newspapers in Japan) for an interview on my ideas concerning a Recycle Society.

I again gave the main Chem 1C lecture, "Science in China," then had lunch in my office. At 2:00 p.m., I met with Dr. John A. Apps, who is under consideration for a position at LBL as our geochemist. He is interested in applied research--that is, in carrying projects through to completion.

Dean Ernest Kuh of the College of Engineering came in at 3:00 p.m. to discuss the proposal for a Center for Energy Research at Berkeley. I indicated that the statement about the labs must be corrected because we do basic research and conduct interdisciplinary programs. I said that the distinction written in the present proposal is unwarranted and Kuh agreed to change this.

I then called Andrew Sessler to report on my meeting with Kuh. Andy said that he does not think Kuh has as much faculty support for this proposal as he assumes. I added that I did not think Birdsall is as supportive as Kuh seems to think.

At 4:00 p.m., I drove to the campus and went to the Alumni House. I was met by Sarah Motley and met informally with about 25 Cal-in-the-Capitol students. The discussion covered such topics as the energy crisis, changes in government needed to meet these crises including the materials crises, ERDA, NEC, FEO and FEA, the role of nuclear power, problems with nuclear power, and prospects for fusion and geothermal energy. I gave a generally optimistic outlook for the future, provided we undertake sufficient research and development for energy and resources, have sufficient planning, and move toward a recycle society. I urged them to have the courage to go directly to the principal for whom they will be working and express their well-thought-out opinions on matters of importance.

Dr. Mahmood Hessabi
Tehran University
Tehran, Iran

Dr. Mahmood Sanai
Tehran University
Tehran, Iran

Dr. Hossein Nasr, Chancellor
Aryamehr University
Tehran, Iran

Dr. Reza Moghaddam
Deputy Director
Plan Organization
Tehran, Iran

Dr. Hooshang Rasekh
Deputy Director
Plan Organization
Tehran, Iran

Dr. Majid Majidi, Director
Plan Organization
Tehran, Iran

Dr. Amir Badakhshan
Director, Iran Petrochemicals
c/o National Iranian Oil Company
Tehran, Iran

Ms. Sattareh Farmanfarmaian, Director
School of Social Work
Tehran, Iran

American Chemical Society

DEPARTMENT OF
EDUCATIONAL ACTIVITIES

1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
Phone (202) 872-4600

7 May 1974

Rec 5/10/74

Dr. Glenn T. Seaborg
Department of Chemistry
University of California, Berkeley
Berkeley, CA 94720

Dear Dr. Seaborg:

I am writing to ask your help in connection with the ACS Short Courses program.

As you will note from the enclosures, we are preparing literature to promote the concept of in-house (package) sessions of ACS Short Courses to chemical firms and other interested groups. We are encouraged by the fact that, primarily by word of mouth, a number of firms — including Eastman Kodak, du Pont, and Atlantic Richfield -- are using our package sessions with great success in their company continuing education programs. We have now reached the point where we can offer a greatly expanded program of ACS Package Courses.

Because of your interest in ACS, we hope you will allow us to include in our literature one of your comments on the need for continuing education. This quotation, and the context in which it would appear, is shown in enclosure A. The quotation would appear on the inside front cover of a portfolio that would contain individual sheets describing each course in detail and a flyer (enclosure B) providing general information on the program.

I look forward to your response.

Sincerely,

Moses Passer

Moses Passer
Head

MP/evf
Enclosures

PROMOTIONAL LITERATURE FOR ACS PACKAGE COURSES

DRAFT/ 5-6-74

Copy for inside cover of portfolio

"The practice of science is not merely one man extracting facts from a stubbornly obscure geometric system, it is the process of growing -- creative human organisms wrestling with the dynamic changing environment of which they are a part. Such a vital intellectual contest requires and, at the same time, is a continuing education."

Glenn T. Seaborg
Professor of Chemistry
University of California, Berkeley

ACS SHORT COURSES: A SOLID FOUNDATION IN A FLUID STATE

The struggle to which Dr. Seaborg refers is as real to the bench chemist as it is to other scientists doing the most esoteric research. And the fastest way to lose ground in the complex scientific community of which we are a part is to allow yourself to fall behind that constantly changing battle line we call the state of the art.

It is to meet this need for constant updating that the ACS continuing education program began in 1965. Now, over 27,000 students later, we can say that the program is meeting that need with flexibility and growing sophistication in developing courses. This program has necessarily been as dynamic as the science it was created to service -- we have learned as you have learned.

May 13, 1974

Mr. Roy W. Crawley, Executive Director
National Academy of Public Administration
1225 Connecticut Avenue, N.W.
Washington, D.C. 20036

Dear Mr. Crawley:

This is in reply to your memorandum to the Academy members of May 1, 1974, concerning the 1974 election of new active members.

I wish to nominate the following for active membership in the Academy:

The Honorable Emilio Daddario
Director
Office of Technology Assessment
Congress of the United States

Dr. Anthony Downs
Chairman of the Board
Real Estate Research Corporation
Chicago, Illinois

I am enclosing biographical material on each of them, and will be glad to provide further information if it is needed.

Cordially yours,

Glenn T. Seaborg

GTS/sms

Enclosures

Wednesday, May 15, 1974 - Berkeley

I attended the Chem 1C lecture, which was given by Emil Krogh, who spoke on Metals and Semiconductors. I held my office hour after and several students came in with questions.

Back on the hill, Roland Otto dropped into my office to say they have observed one spontaneous fission in the distillate fraction (which would contain element 112) of the last long U plus Kr bombardment (17 U); the energy was 120 Mev.

I received from Craig Hosmer's office another press release; this, however, is a parody on the Watergate Transcripts, very well done (attached). I also received a telegram from Henry Gomberg at KMS Fusion, announcing their observation of neutrons from shock compression and heating of a deuterium pellet illuminated by a neodymium glass laser. The announcement was carried in yesterday's Chronicle as well (attached).

I had lunch at my desk, then walked down to teach my Chem 1C lab section from 1:10-3:30 p.m. We gave them a 60-minute midterm composed by Pimentel (attached).

I walked to the Faculty Club to meet with the American Academy of Arts and Sciences group which had had lunch there to brainstorm the content of an issue of Daedalus which will be related to the American Bicentennial. The meeting, which had included Luis Alvarez, Geno Ballotti, Robert Bellah, Reinhard Bendix, William Bouwsma, Lynn Carroll, J. West Churchman, Elizabeth Colson, James Hart, Stephen Graubard, John Heilbron, Daniel Koshland, Beverly Rowan, John Searles, Emilio Segre, Henry Nash Smith, Aaron Wildavsky, Robley Williams, and Theodore Wirths, had ended, so I joined a rump session out on the veranda. Graubard, editor of Daedalus, summarized for me their conclusions, which were that they should focus on a broad subject like the nature of knowledge or knowledge in the human condition 1776-1976.

I returned a call to Roger Reeve at 5:25 p.m. He said that the Los Angeles Times and the Los Angeles County Board of Supervisors have voted a sort of negative neutrality on Proposition 1. He plans to write a personal letter to the Times; after some discussion, I agreed that he could enclose the CUWA press release on our support of Prop 1.

Suki and I hiked to the water tank.

Thursday, May 16, 1974 - Berkeley

I met from 9:10-11:00 a.m. in Andrew Sessler's office with Sessler, Hollander, Hyde, Birge, and Brewer. We discussed Hollander's memorandum on staff appointments and on personnel policy in the Energy and Environment Division. We discussed the general principles involved and made a few suggestions for changes both in the policy itself and in the listing of people. With respect to the memorandum regarding the Sumner Davis-Jack Conway program on spectroscopic investigations of interest to the CTR Division of AEC (attached), Sessler said this would be handled out of overhead funds. The work would be centered in the Nuclear Chemistry Division. Brewer and Davis

REP. CRAIG HOSMER (R-Calif.)
2217 HOB, D. C. 20515
(202) 225-2415

Release on Receipt

HOSMER RELEASES TAPE TRANSCRIPT - CITES PRESSURE - CLAIMS ACCURACY

Explaining that he could not "withstand the pressures any longer," Congressman Craig Hosmer decided "to let it all hang out" and release the transcript of his extemporaneous speech to the Atomic Industrial Forum's Seminar on Uranium Enrichment.

He described the document as "super-subpoena stuff" with a lot of "bottom-line significance."

"Nothing is not there," the Congressman told an unattended press conference. "Only expletives were deleted. Everything unintelligible is in, everything inaudible, too."

Pinned down over erasures in his tapes, Hosmer grudgingly admitted, "Yes, 18 1/2 minutes are missing. They were erased by a new secretary unfamiliar with the machine. The girl who usually erases my tapes was not there that day."

A Washington source assailed the accuracy of the Hosmer transcript, citing numerous rumors from usually reliable sources that many "characterizations omitted" and "expletives deleted" had been secretly removed from the document. "But that would be wrong," Hosmer declared flatly.

Asked to guarantee that his transcript contained every "bleep, swerk, wow, click and flutter of the original tapes," the Congressman tersely stonewalled, "no comment -- and that's off the record."

-0-

(Transcript Attached)

051574

XC: MY
SSK
3 to J
JK
AS

MH
2 to SMS

10

5/15/74
Peggy brought this in today. Meanwhile, see telegram that follows -

CHRONICLE 5/14/74

Step Toward Electricity From Fusion

Washington

An Ann Arbor, Mich., firm announced yesterday its scientists, using powerful laser beams, have achieved a definitive step toward harnessing the hydrogen bomb fusion reaction to generate electricity.

The announcement, significant especially because of the energy shortage, came from KMS Industries, Inc., which said the development had been achieved by scientists of its principal subsidiary, KMS Fusion, Inc.,

A spokesman for the Atomic Energy Commission when told of the announcement — made public by a Washington public relations firm — said "it appears KMS has made a small but significant initial step toward the achievement of laser fusion power."

The announcement said the KMS scientists had, for the first time in the United States, unquestionably produced so-called thermonuclear neutrons by heating a pellet of deuterium A — a form of heavy hydrogen — with a laser beam.

"The company believes," said the announcement, "its new system has the potential for commercial application by the early 1980s."

The announcement quoted Henry J. Gomberg, president of KMS Fusion, as saying that the new research development not only provided a definitive step toward producing electricity from the so-called hydrogen fusion reaction, but also toward the direct generation of additional hydrogen from the same process.

And this, the announcement said, could lead to production of hydrocarbon fuels, such as methane.

Associated Press

Lab Section 2 | Chem 1C Midterm | NAME_____

May 15, 1974 | T.A._____

150 points | Room No._____

60 minutes

OPEN BOOK: NO CALCULATORS

SHOW ALL WORK

Kathy (M)

1. (32 points) ~4 each Circle T or F (true or false). Score will be number marked right minus number marked wrong.

T (F) a) The Sun's mass is constant because nuclear reactions in its core replenish the energy loss due to radiation.

(T) F b) The ionization energy of He^+ in the 4p state is 78.4 kcal/mole. $E = 313.6\frac{Z^2}{n^2} = 313.6\frac{2^2}{4^2}$

(T) F c) If the 1s electrons in a neutral boron atom shielded the nucleus perfectly and the valence electrons did not repel each other, the valence electrons would feel an effective nuclear charge of $Z^*=3.00$.

(T) F d) The orbital occupancy of a neutral phosphorus atom is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$

(T) F e) The first ionization energy E_1 for oxygen (314 kcal) is less than that for nitrogen (335 kcal) because of larger electron repulsions in oxygen.

T (F) f) When two lithium atoms form gaseous Li_2, 25 kcal/mole of energy is released. This means that the average electron kinetic energy in Li_2 is less than that in the separated atoms by 25 kcal/mole. $\Delta T = -\Delta E = -(-25) = +25$ higher KE

T (F) g) Both CO^+ and CO^- are predicted to have shorter bond lengths than that of CO. Both weaker, longer bonds

T (F) h) The compound trimethyl arsenic, $As(CH_3)_3$ should have a planar, triangular shape.

pyramidal, ~tetrahedral

4 × 4 = 16

4 C-H

4

Punto (C)

2. (38 points) Nitric oxide in the ground state has a bond energy of 151 kcal/mole, a bond length of 1.15Å, and a force constant of 15.5 mdyne/Å. The graph below shows how the energy varies with bond length. When NO absorbs ultraviolet light (wavelength, 2274Å, energy per quantum=126 kcal/mole) the excited state formed has a bond length of 1.06Å and a force constant of 24.0 mdyne/Å.

Nitric oxide bond (162)

a) What bond order, bond energy, bond length and force constant would be expected if the excitation were due to the change in orbital occupancy:

16 pts.

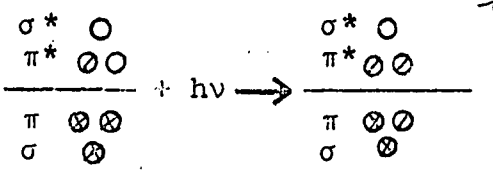


Table 157

Bond order= $2\frac{1}{2} - 1 = 1\frac{1}{2}$

$D_o = \frac{D_o(O_2) + D_o(F_2)}{2} = \frac{118+36}{2} \cong 77$

$r_o = \frac{1.21 + 1.44}{2} \cong 1.33$ (1.27–1.32)

$k = \frac{11.4 + 4.5}{2} \cong 8.0$ (6 – 10)

b) What bond order do the observed values of r_o and k suggest?

12 pts.

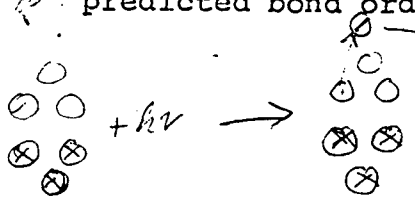
k=24.0 (cf N_2 22.4) B.O. 3

Bond order r_o=1.06 (cf N_2 1.10) B.O. 3

D_o = 225-250

5 pts c) On the graph, draw in the potential energy curve you predict, using your value of D_o in b).

-4 pts d) Propose a way in which electronic excitation of NO could give your predicted bond order and the observed properties.

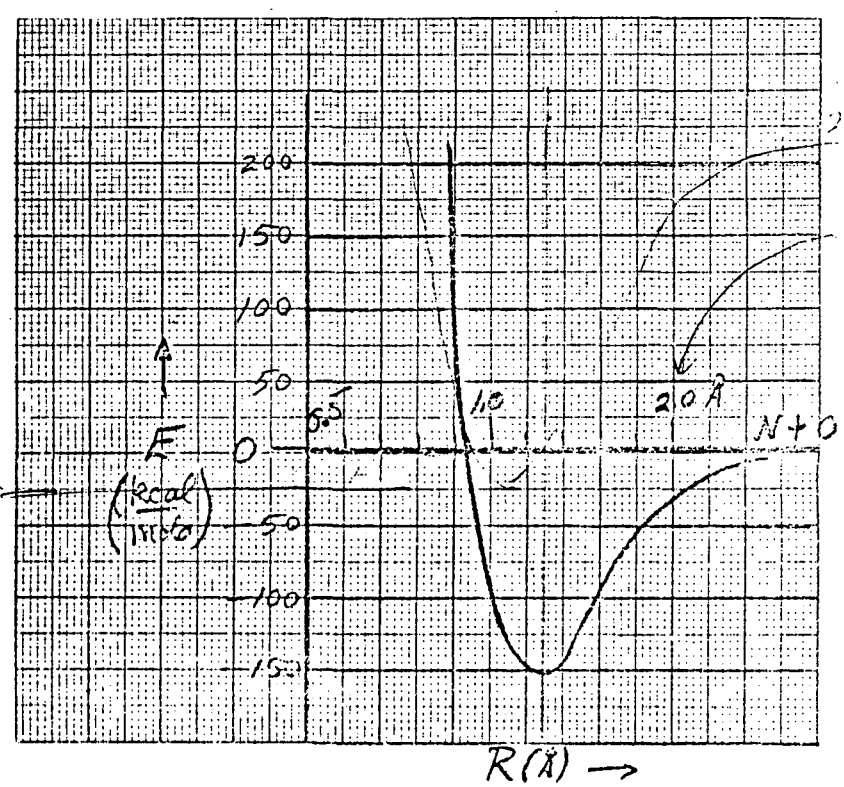


$E = h\nu = \frac{hc}{\lambda} = \frac{6.6\cdot10^{-27}\cdot3\cdot10^{10}}{2.274\cdot10^{-5}}$

$\cong 9\cdot10^{-12}$ ergs

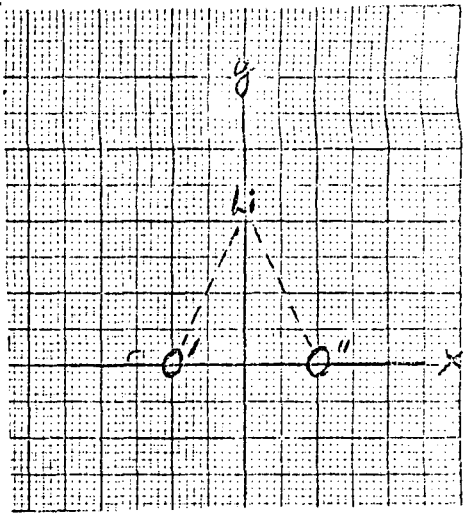
$\frac{9\cdot10^{-12}\cdot6.02\cdot10^{23}}{4.2\cdot10^{10}} \cong 126$ kcal/mole

240-25



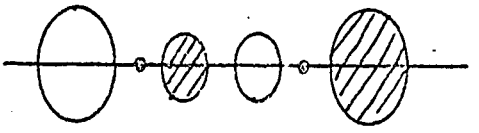
−151 + 126 = −25

3. (36 points) When a single lithium atom reacts with an oxygen molecule, a triangular structure results in which the lithium atom seems to be partially "embedded" in the π bonding M.O.'s of O_2. Consider the bonding in this molecule $LiO_2(g)$ by correlation with the M.O.'s of O_2 as the lithium atom approaches along the y axis. Bear in mind that the lithium 2s orbital is symmetric to reflection in a plane through its nucleus (in the picture, including both the xy and the yz plane).

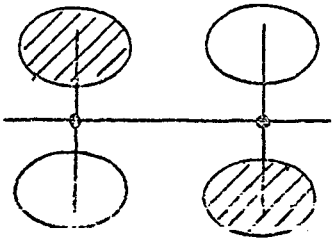


a) Here are pictures of the M.O.'s of an O_2 molecule placed on the x axis. Circle all the ψ's that have the same symmetry as a lithium 2s orbital placed on the y axis as shown.

$\psi_8^* = p_x' - p_x''$

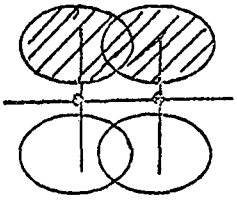


$\psi_6^* = p_z' - p_z''$ $\psi_7^* = p_y' - p_y''$



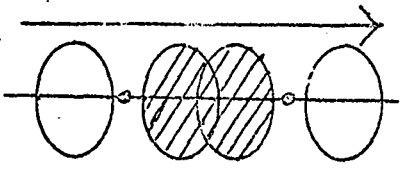
(ψ_6^* simi

$\psi_4 = p_z' + p_z''$ $\psi_5 = p_y' + p_y''$

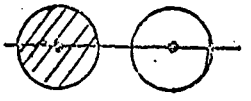


(ψ_4 similar)

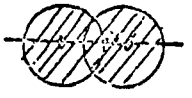
$\psi_3 = p_x' + p_x''$



$\psi_2^* = 2s' + 2s''$



$\psi_1 = 2s' + 2s''$



Lab. Section 2 -4- NAME_____

Problem 3 (continued)

b) Suppose that the Li atom remains on the y axis at a sufficiently large distance so that it interacts only with π electrons of O_2. Write out the form of the new M.O.'s derived from those shown in a) and draw a picture of each (using cross hatching to indicate phase changes). Label each new M.O. to indicate whether it is bonding, non-bonding or antibonding to the lithium atom. Show how the O_2 evergy level diagram is altered and the new orbital occupancy.

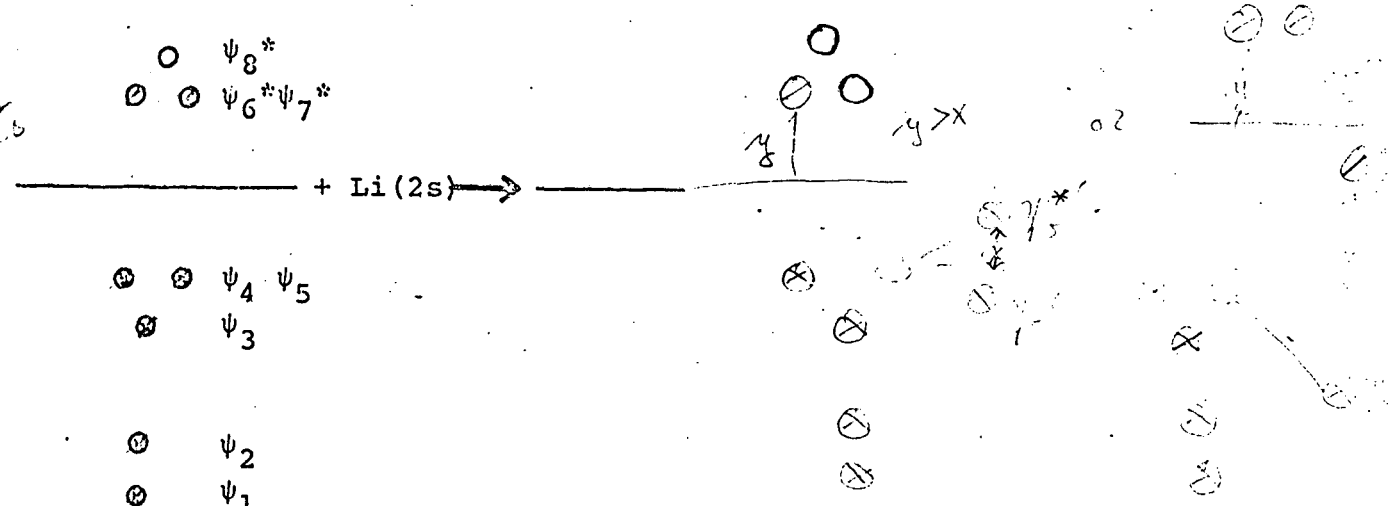
10 pts

$\psi_5' = (p_y' + p_y'') + 2s$

$\psi_5^{*\prime} = (p_y' + p_y'') - 2s$ antibonding

Change of energy level - only as affected by our assumption is ψ_5 which splits into bonding and antibonding pairs

10 pts



One of O_2 antibonding electrons might transfer in ψ_5^* depending on whether the difference between ψ_6^* and separated atomic greater or less than the $\psi_5^{*\prime} - \psi_5$ difference

4. (44 points) A solid mixture of one or more of the six compounds listed below is treated by four tests in the order given.

Test #1. A portion of the solid was treated with 1 M HNO_3 and a portion dissolved but a white precipitate P_1 remained. The precipitate P_1 was centrifuged and removed from the solution S_1.

Test #2. Solution S_1 was saturated with H_2S and a black precipitate P_2 appeared. The precipitate P_2 was centrifuged and removed from the solution S_2.

Test #3. Solution S_2 was heated to boiling for a few minutes, then cooled and excess 6 M NH_4OH was added. A precipitate P_3 formed which, on removal from the solution S_3, slowly turned brown.

Test #4. Solution S_3 was heated to boiling for a few minutes and then 6 M NaOH was added. At first a precipitate P_4 appeared but then it redissolved.

a) Indicate for each possible compound whether definitely present (+), definitely absent (-) or undetermined (?).

28 pts

$Zn(NO_3)_2$	$Fe(NO_3)_2$	$FeCl_3$	$Cu(NO_3)_2$	$Hg(NO_3)_2$	$Hg_2(NO_3)_2$
+	?	+	?	?	+
Test 4	Can't tell $Fe^{+3} + H_2S \rightarrow Fe^{+2}$	Test 1	Test 2	Test 2	Test 1

b) What is the composition of each precipitate?

16 pts.

P_1 Hg_2Cl_2

P_2 CuS and [illegible]

P_3 $Fe(OH)_2$

P_4 $Zn(OH)_2$

c) For each substance definitely present or definitely absent, indicate what evidence gave the proof.

BERKELEY: LAWRENCE RADIATION LABORATORY
ROOM: BLDG.:

May 9, 1974

To: Andy Sessler

From: Leo Brewer

Re: Spectroscopic work of interest to CTR division

I am enclosing a proposal from Sumner Davis to exapnd his research effortto cover topics of importance to the CTR program. This work would be done jointly with John Conway of the Nuclear Chemistry Division and would be largely carried out in Building 70. I have a SeyaNamioka monochromator that is on loan to the Space Sciences Lab that would be needed for this work. The Space Sciences group has agreed to share the instrument with Professor Davis. In addition, a 3-meter grazing incidence instrument at NASA Ames has not been used for two years and they have no plans for its use. We could probably get it either as surplus or on a long-term loan basis. The only other piece of instrumentation that might be needed is a high voltage power supply.

In regard to operating costs, the main item was be the salary of a post-doctoral fellow. Professor Davis has located a person with extensive experience in Israel who would be free to come during the academic year 1974-5. I would guess that a salary of around $1000/mo would be required amounting to $21,000 per year including all overheads. Davis's salary is already covered for this summer. Other operating costs would be of the order of $4,000 for the year; so a total of around $25,000 would be needed for the first year. I have not discussed this proposal with any of the other LBL divisions as yet.

RECEIVED
DIRECTOR'S OFFICE
BERKELEY
MAY 13 1974

UNIVERSITY OF CALIFORNIA — (Letterhead for interdepartmental use)

May 8, 1974

To: Leo Brewer

From: Sumner Davis

Re: Spectroscopic work of interest to the AEC

The recent draft of the Atomic Physics Sub-Panel Report to the CTR Division of the AEC lists as a nominal five year goal: spectroscopic data for highly ionized atoms, especially for heavy element impurities (wavelengths, energy levels, transition probabilities). The problem area is plasma diagnostics, where it is essential to know the energy levels and wavelengths of the strong resonance lines of heavy elements. ~~Immediate~~ Attention should be devoted to the resonance lines of the copper and zinc isoelectronic sequences all the way to the upper end of the periodic table, but with immediate attention to tungsten and gold as most likely heavy impurity components of Tokamak plasmas.

Right now we are working on the excitation and analysis of Mn VI and VII (we've already done ScIII and VV). I'm not sure this is of enough interest to the CTR program. But, the techniques developed for excitation of ionized atoms are directly applicable. We could begin work on the ionized states of Au, with an excellent chance (if not certainty) of success. The production of the ions depends on the source; Van Deurzen made a thorough study of excitation energy as a function of source conditions of the sliding spark--it is published as LBL Report 1657. So far we are up to about 120 eV, in a controllable fashion. To go higher, we need either a higher voltage supply, or a triggered spark, or both. We have started construction on the triggered spark. With this source, we should be able to reach several times this energy.

Beyond this, we would need to use a less controllable source, such as a laser-generated plasma. In any case, we have experience in exciting ionized states of atoms.

We've already done some work on Au I, II, III, and IV (this was by Ehrhardt, several years ago), and could pick right up where we left off.

The resonance lines go farther and farther into the vacuum ultraviolet, as the stage of ionization increases.

We have a 3-meter normal incidence vacuum spectrograph for wavelengths to about 1000Å; shorther than that, we can use your Seya-Namioka monochromator with the photographic plate attachment to about 250Å; still shorter, the Space Sciences Lab will soon have a scanning grazing incidence spectrograph to about 100A. What I would really like to do is get hold of the 3-meter grazing incidence instrument now at NASA Ames; it has not been used for two years. If it looks like we can go ahead with this program, I might contact Hans Mark and ask if he would give it to us or LBL on a long-term loan basis. Of course, it would take a semi-permanant installation, but I'm sure we can find room.

The only piece of new equipment we might need fairly soon is a higher voltage power supply.

For personnel, both John Conway and I could devote some time to the work, and of course would oversee it. I may have another student in the Fall who would work on it, but it would be best to have a post-doc. The only possibility I have located so far is Samuel Goldsmith from Israel. He has the ideal background for what we want to do. I am enclosing a letter from him.

What do you think should be the next move? I don't think we need to wait until John returns from Orsay--our correspondence indicates his enthusiasm, although he has other things he'd like to do too (such as triply ionized rare earths).

Thursday, May 16, 1974 (con't)

will prepare a 189 form for FY76. I said I would discuss this with our Program Committee to ascertain whether they would approve this new program. We also discussed Sessler's memo allocating $10,000 of equipment money to the Atomic Beam Group from the Nuclear Chemistry, IMRD, and Energy and Environment equipment budgets; we agreed to this.

I called Richard Frankel at 11:25 a.m. in response to his memo of May 14, which enclosed his first draft of the annual report. I suggested that, because some of the elements cannot be analyzed, he should get a more careful determination to correct the figure "82 elements." He will follow this up; I encouraged him to keep it short.

I telephoned Warren Henry at Howard University in Washington to ask if he could provide a hand in connection with Bill Cobb's application for admission to the Howard Medical School. I explained that Bill is a brilliant fellow but majored in social sciences at Harvard and has only picked up his pre-medical work later--at Berkeley, Hayward State and Purdue. His now being 28 years old makes his admission into medical school very difficult. Henry will follow it up and be back in touch.

We held the bi-weekly lunch meeting of the SHEIKS in my office at noon. We discussed general plans for the new pulse analyzer and the need for more alpha and spontaneous fission counters, and Ghiorso agreed to collaborate with Otto and Lee in setting this up.

I attended the meeting of the Associate Directors in Sessler's conference room from 1:30-2:40 p.m. Present were Andrew Sessler, Earl Hyde, George Pappas, Jack Hollander, Melvin Klein, Harold Fidler, Leo Brewer, James Born, Robert Birge, Denis Keefe, and Walter Hartsough. It was suggested that we could check the recommended salary increases for FY74 again since laboratory-wide we are going for a slightly larger increase. Hyde told us that AEC Assistant Controller Greer has written to ask that foreign travel next fiscal year be reduced below the level of the last fiscal year. Hyde will write to protest this.

Richard Rietz came in to my office at 3:00 p.m. He would like a non-permanent position with Norman Edelstein's group to work on any of the number of aspects of actinide chemistry.

I met John Unik (who is visiting to do work at the HILAC) in the room 203 office, together with Kratz, Norris, Otto, Binder, and Lee to discuss our results from the uranium plus krypton bombardments and further collaboration with Horwitz in experiments in chemical separations which he will do in the HILAC Building. Unik reiterated that their next main interest is in a bombardment of U plus 8.5 Mev per nucleon Kr^{86}. I discussed with Binder and Otto the plans for their doing the counting and data treatment respectively for the scheduled gold plus krypton and uranium plus xenon bombardments; they agreed.

I wrote Florence Knudsen a letter of condolence upon the news of Vern's passing. Suki and I took our water tank hike.

Friday, May 17, 1974 - Berkeley

I returned a call from Warren Henry at 8:35 a.m. He has arranged for Bill to have an interview with the Howard University Medical School. He asked me to have Bill call him when the interview is scheduled, so he can accompany Bill to introduce him. I expressed my appreciation for his efforts.

From 10:30 a.m. to noon, I attended the SuperHILAC Research Progress meeting. John Huizenga, at LBL with Unik for a RANN experiment, reported on interpretation of previous experiments on Bi plus Kr. Frank Stephens described interpretations of his and Diamond's Coulex experiments in which they measured yields of gamma rays from heavy ion, xn reactions.

I was interrupted by a call from Viki Weisskopf, the USAEC Representative on the USAEC-Soviet State Committee Cooperative Council. I said I had talked with John Teem and suggested that Silva might go to Dubna; he was pleased with this potential arrangement.

I had lunch at the lower level of the cafeteria with John Rasmussen, Richard Diamond, Arthur Poskanzer, and John Huizenga. We discussed a problem that has arisen concerning the Gordon Conference on Nuclear Chemistry scheduled for next month. There is an evening session scheduled for two "Science in Society" topics--the radiological hazards of nuclear power and the Soviet restriction on the emigration of Jewish scientists. The Board of Governors objects to these political topics. We agreed that a compromise might be to reschedule them for an informal afternoon or evening session.

Erika Wulf of the AEC San Francisco Operations Office security section came in with three envelopes of my Washington files which I had had transferred from Livermore to SAN. I reviewed them and she will ask to have them declassified so that I can keep them under my own lock and key here.

I called Father Theodore Hesburgh, President of Notre Dame University, to tell him how impressed the Science Service people and I were with the way they handled the ISEF there. We also discussed Bill Cobb's med school problems.

At 4:10 p.m., John Rasmussen and I called George Dennison, Chairman of the Board of Directors of the Gordon Research Conference, to discuss the scheduling of the "Science in Society" topics. We suggested that the meeting be informal and not printed in the program, but announced by word of mouth. Dennison said the Board was unanimous in turning down the original program entry; he indicated, however, that he would like to compromise with us on this new proposal. I said I am concerned about US-Soviet relations and the fact that we could hurt our colleagues in the USSR with this, but I think it is wrong not to make some sort of provision for this discussion at this time.

Suki and I took our hike to the water tank. The evening news was interrupted to give views from Los Angeles where a house holding members of the SLA was being surrounded, set afire and finally entered. Five occupants of the house were shot and burned to death,

their identity beyond immediate recognition. Eric, riding with Ben Orlove, arrived home from Davis to spend the weekend with us.

Saturday, May 18, 1974 - Lafayette

Today's Chronicle carried the announcement of the administrative changes in the University President's Office as approved by the Regents in their meeting yesterday (attached).

Helen and I took a hike along Lafayette Ridge as a scouting prelude to the hike I will lead in two weeks.

While watching the preparation for the running of the Preakness (Little Current won), we learned that Patricia Hearst was not among the five people who died in the shooting and fire last night; the SLA leader "Cinque" (Donald DeFreeze) was among the five.

Sunday, May 19, 1974 - Lafayette

The newspapers carried the announcement by India's Prime Minister Indira Gandhi and Chairman of India's AEC H. N. Sethna that India exploded an atomic device, of yield equivalent to 10-15,000 tons of TNT, in an underground test. They said this was for peaceful purposes and India has no intention of producing atomic weapons. The test apparently was conducted on the Great Indian Desert in Rajasthan.

Eric, Suki and I took a hike in Briones. After dinner, Helen drove Eric back to Davis. We heard on the news that Patricia Hearst is wanted by the FBI for possession and use of firearms in the shooting, along with Bill and Emily Harris, at a Los Angeles sporting goods store last Thursday. We also learned that Valery Giscard d'Estaing won today a close election over Mitterand for the Presidency of France.

Monday, May 20, 1974 - Berkeley

I attended Pimentel's lecture. I mailed to Roscoe Drummond at the Los Angeles Times Syndicate in Washington the remarks on the solution of future problems that he had requested (attached). I sent to Allan Kastrup at the Swedish Information Service the corrected typescript which covers my family in his book on Swedish immigrants in America (correspondence attached).

I held my office hour, then lunched with the Chem Department faculty and taught my lab section from 1:10-3:15 p.m.

Back on the hill, I met with Dick Diamond who told me he called George Rogosa and Elliot Pierce today and learned that all our requests for extra money in FY75 have been turned down except for about $200,000 for running the SuperHILAC and some $35,000 for me from Rogosa's Nuclear Sciences branch for heavy ion radiochemistry and some $35,000 from Pierce's Molecular Sciences branch for actinide chemistry.

I attended the Nuclear Chemistry Seminar where Professor Schaefer spoke on "Selection and Computation of Multi-Configuration Wave

SAN FRANCISCO CHRONICLE MAY 18, 1974

New Assignments On the UC Staff

Los Angeles

University of California Regents, meeting here yesterday, approved several changes in offices and assignments for the university's statewide administration in Berkeley's University Hall.

The reorganization will take effect July 1.

Several shifts are aimed at increasing the number of women and members of ethnic minorities in the university's work force.

David S. Saxon, executive vice chancellor of the University of California at Los Angeles, will now spend half his time in the newly-created post of university provost, relating academic planning to budget resources.

Loren M. Furtado, in charge of the operating budget, will add to his purview the capital outlay budget.

John A. Perkins, vice president for administration, will take top charge of physical planning and construction.

Vice President Angus Taylor will add non-academic employees to the academic personnel under his juridiction.

Moreley Walker will be Taylor's special assistant for all employee relations.

Gloria L. Copeland will be acting assistant vice president under Taylor, and Robert R. Headley will be acting coordinator of staff personnel.

James C. Goodwin will become a special assistant to the vice present for university relations in affirmative action programs.

Our Correspondent

Our country is faced with a present and continuing energy problem, a result of inadequate national planning. We are going to be faced next with a series of resource crises--metal crises (copper, aluminum, chromium, nickel, tin, manganese, and so on), food crises, water crises--if we do not plan better for the future.

The worst need not happen if we can find the needed national leadership to provide for national planning and the required research and development which is capable of mitigating our problems. Also, in the decades ahead we must move toward a "recycle society" in which virtually all materials are reused indefinitely and virgin resources become primarily "make-up" materials.

To achieve this requirement for our survival a whole new public outlook will have to be acquired. I think this will come about as an outgrowth of a number of painful shocks--shocks of recognition--that we will undergo over the coming years, as exemplified by our current energy situation.

My own outlook is optimistic. If it seems we are being told from all sides today that man is a failure, this comes about ironically enough because we are being judged

in terms of a whole new set of standards in a world where almost everything seems possible, thus making every want, every injustice and every wrong seem unbearable. For the first time in human history--within our lifetimes here--technology has made possible on a massive scale what an economist has called "the democratization of privilege." Until this century, multitudes of people could not afford to think about "quality of life" beyond the humblest provisions of food and shelter. Today increasing numbers of that multitude enjoy freedom from enervating, back-breaking labor; the means to travel and explore the world's wonders; the leisure to enjoy nature's beauty and new dimensions of one's own creativity.

Glenn T. Seaborg
Berkeley, California

May 20, 1974

SWEDISH INFORMATION SERVICE

May 15, 1974

Dr. Glenn T. Seaborg
University of California
Berkeley, California 94720

Dear Dr. Seaborg:

Between us, I have just finished a typescript of some 900 pages, dealing with relations between America and Sweden from the beginning until our days, and also with the Swedish immigrants in America and their descendants. Parts of the script are now being checked with local or regional experts, or with persons who are mentioned in the text.

I am now sending you two pages dealing in part with you, and hope that you will go over them at your convenience. The book we are aiming at will not be published until the fall of 1975.

I will be grateful for your help. A self-addressed envelope is enclosed for your convenience.

Sincerely yours,

Allan Kastrup

Allan Kastrup

SWEDISH CONSULATE GENERAL, 825 THIRD AVENUE, NEW YORK, N.Y. 10022
TEL. (212) PL 1-5900 CABLE: INFORSWED

Swedes feel at home on the Upper Peninsula, but many depart to form new colonies

During the latter part of the 19th century, most of the mining, lumber and railroad-construction camps on Michigan's Upper Peninsula were full of Swedes and Swedish-speaking Finlanders. About 1890, nearly half of the workers in the largest mine at Iron Mountain in the southwestern section were Swedes, but this was an unusually large proportion.

At an early stage, Ishpeming in Marquette County on Lake Superior became the leading Swedish center of the Upper Peninsula. As soon as it seemed somewhat crowded, however, the Swedes began to swarm, and many moved to other parts of the United States, where they founded new colonies. For instance, the largest Swedish settlement in rural California, Kingsburg some 150 miles north of Los Angeles, was in great part populated from Ishpeming.

The first Swede at Ishpeming seems to have been one John Wahlman, who arrived about 1866. Better known is an early newcomer named John Eric Sjöberg or Seaborg, born in 1844, who before his emigration from Sweden in 1867 had been a master mechanic in the ironworks at Hällefors in the west of the province of Västmanland. At Ishpeming he married a girl from the Örebro district in the same section of Sweden, Charlotte Wilhelmina Farrell, whose family name originally had been Andersson, and in 1880 they had a son named Herman Theodore. He, in turn, married Selma Olivia Eriksson from Grängesberg, the leading mining center in the province of Dalarna, and in 1912 they had a son, Glenn Theodore Seaborg, who became an outstanding figure in nuclear science and a Nobel prize winner. When he was 10 years old, the family moved from Ishpeming to southern California.

At Ishpeming, the first Swedish church was founded in 1870. In the early 1880's one Conrad Carlson, said to have been a member of the noble Klingenstierna family, began editing its first Swedish-language newspaper. At that time, the Swedish community at Ishpeming also included Benjamin Owen (1830-89), a noted musician, whose father Samuel Owen, born in England, has been called the founder of both steam shipping and temperance reforms in Sweden. The younger Owen was a cousin of August Strindberg, and he had received some of his

Among well-known Californians of Swedish birth was also Carl M. Friden (1891-1945) from Alvesta in the province of Småland, who developed the Friden calculating machines. As a young laboratory apprentice and student in a technical school in Stockholm he met an inventor of calculating machines, Karl Rudin, and conducted experiments for him. In 1911 he became a traveling engineer for a Swedish match company, and via Australia he came in 1917 to California, where he began as a draftsman. His first calculating machine was sold to a well-known manufacturer but in 1934 he established his own firm in Oakland, which at that time had about 3,000 Swedish-born inhabitants.

The most prominent scientists of recent Swedish ancestry in California are two Nobel prize winners, Glenn T. Seaborg, who has already been mentioned in connection with his birthplace, Ishpeming on Michigan's Upper Peninsula, and Carl David Anderson of the California Institute of Technology at Pasadena.

Seaborg, who came to southern California with his parents in 1922 at the age of ten, made his scientific career in the University of California at Berkeley, where in 1958-61 he served as chancellor. In 1951, at the age of 39, he and his Berkeley colleague Edwin M. McMillan received the Nobel prize in chemistry for their work on the transuranium elements, including plutonium. Later he helped discover more chemical elements, among them nobelium, which was named for Alfred Nobel. For ten years, 1961-71, he was chairman of the U.S. Atomic Energy Commission. Seaborg's father was born at Ishpeming of Swedish immigrants, while his mother had come from Sweden at the age of 17. His forebears in Sweden were master machinists for three generations. He has taken part in several family reunions in that country.

In 1936, when he was 31 years old, Carl David Anderson became co-winner of the Nobel physics prize, chosen for his discovery of the positron four years earlier. He was born in 1905 in New York. Both his parents came from the province of Östergötland, his mother from Tjärstad where her father, a soldier named Ajax, had been given a cottage and a few acres of land, and his

LAWRENCE BERKELEY LABORATORY
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BERKELEY, CALIFORNIA 94720 ▫ TEL. (415) 843-2740

May 20, 1974

Mr. Allan Kastrup
Swedish Information Service
825 Third Avenue
New York, New York 10022

Dear Mr. Kastrup:

I have read the pages enclosed with your letter of May 15, 1974, and found them interesting.

The only correction I have to make is in the 7th line from the bottom on page 198, where you should substitute "two" for "three" (generations). My forebears were master machinists for three generations--two generations being in Sweden, and one being my father who was born in the United States.

Cordially yours,

Glenn T. Seaborg

GTS/sms

Functions." After this, I went up to work with Kratz on the interpretation of our U plus Kr yield curve. I then went to talk to Nitschke about plans for the 106 experiment.

I met Helen at the BART station at 6:30 p.m., and we drove to Hs Lordships Restaurant on the Berkeley Marina to attend the Annual Dinner of the Berkeley Chamber of Commerce (program attached). We sat at the head table with Mr. and Mrs. Robert Montgomery, Mr. and Mrs. Joseph Bort, Mayor Warren Widener, City Manager John Taylor, and Fred Rowley. After dinner, Montgomery introduced me and I gave my speech, "Our Energy Problems," then the awards were presented.

Tuesday, May 21, 1974 - Berkeley

Colin Watanabe dropped in at 10:30 a.m. to tell me that, after much soul searching, he has decided that he doesn't want a career in science and hence would like to terminate his employment at LBL. He thinks he may go into some peripheral area like science education.

The Nuclear Chemistry Division Program Committee held a bag-lunch meeting in my office from 12:00-1:45 p.m. After presenting Eileen Eiland with her 10-year service pin, I introduced James Harris in his new capacity as Minority Scientist Representative for the Nuclear Chemistry and Physics Division. Earl Hyde described the ARCS Foundation scholarship program and read a memorandum from AEC Assistant Controller Greer requesting that we attempt to lower our foreign travel ceiling in FY75. He also reported that the new LBL personnel director will be Gordon Olsen, who is outstandingly qualified, having headed personnel at Shell Development Company and at BART. Poskanzer described the work of the Committee on the Structure of the Scientific Staff.

I returned my signed contract for consulting services to General Atomic Company. I sent to Ruth Greenstein a letter supporting the nomination of Lester Rogers for a Rockefeller Public Service Award (attached). I sent to the Journal of Physical Chemistry my review of the manuscript by Keller, Nestor and Fricke on "Predicted Properties of Element 115" (attached).

Suki and I took our hike to the water tank.

Wednesday, May 22, 1974 - Berkeley

I attended Pimentel's lecture, held my office hour, had lunch in my office, and taught my lab section from 1:10-2:50 p.m.

I went to Provost Maslach's office in California Hall at 3:00 p.m. for the ad hoc meeting, set up as a follow-up to my meeting with Dean Ernest S. Kuh of the College of Engineering, to discuss the proposed new organized research unit, Center for Energy Research, on the campus. Present were Charles Birdsall, Ralph Greif, George Maslach, Antoni Oppenheim, Andrew Sessler, Ernest Kuh, Leo Brewer, Fred Balderston, and David Templeton. We discussed the need for coordination between the new Center, the Campus Energy and Resources Committee, and the Energy and Environment Division at LBL and suggested names for a coordinating committee.

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Hs Lordships
MAY 20, 1974

P R O G R A M

WELCOME AND INTRODUCTIONS

Robert L. Montgomery
1973-74 President
MASTER of CEREMONIES

"OUR ENERGY PROBLEMS"

Dr. Glenn T. Seaborg
Guest Speaker

PRESENTATION of AWARDS

RICHARD E. JOHNSTON COMMUNITY SERVICE AWARD
Presented by Thomas B. Shaw, 1973 Recipient
Paul E Kierdorf

NORMAN T. BRANGWIN CIVIC AWARD
Presented by Clinton A. White, 1973 Recipient
Rene Jope

PRESIDENT'S AWARD — Dave Wittstock
RECOGNITION OF RETIRING DIRECTORS
CERTIFICATES OF APPRECIATION
Presented by President Robert L. Montgomery

INSTALLATION OF 1974-75 OFFICERS AND DIRECTORS

Joseph P. Bort, Chairman
Alameda County Board of Supervisors

INTRODUCTION OF 1974-75 PRESIDENT

Fred K. Rowley

May 21, 1974

Ms. Ruth L. Greenstein
Woodrow Wilson School
Princeton University
Princeton, New Jersey 08540

Dear Ms. Greenstein:

I am writing in support of the nomination of Lester Ras Rogers for a Rockefeller Public Service Award in the field of Physical Resource Development and Protection.

I knew Lester Rogers during my entire ten years as the Chairman of the U.S. Atomic Energy Commission and was extremely well impressed with him. He held positions at increasing levels of responsibility in the area of radiation protection standards. He was perhaps the most articulate person working in this area and we depended upon him continuously to serve as our expert in contacts with other governmental departments and agencies, the U.S. Congress, representatives of industry, and interested members of the general public. He always presented the material fairly, honestly, clearly, conscientiously, and in a most personable manner.

During my tenure as Chairman of the USAEC, he took off a couple of years from his duties in the regulatory field to serve as the scientific representative for South America with headquarters in Buenos Aires, Argentina. Here also, his performance was outstanding and he is remembered as one of the best representatives that the USAEC has had in its offices in foreign countries.

I believe that Lester Ras Rogers very much qualifies for the Rockefeller Public Service Award.

Sincerely yours,

Glenn T. Seaborg

GTS/sms

JOURNAL OF PHYSICAL CHEMISTRY

Please return one signed and one anonymous copy of your comments, together with the manuscript, by ~~June 6, 1974~~. If you will be unable to review the manuscript by the date indicated, please return it immediately.

Author: MS 4766 - Keller, Nestor and Fricke

Title: Predicted Properties of...

The editorial staff would like your opinion of the scientific content and the significance of the work reported and would appreciate your comments on the general style of writing. Is the motivation of the research sound, and is it clearly stated? Yes If new measurements are presented, are they adequately interpreted in the discussion section? n/a Do title and abstract properly describe the contents of this paper? Yes Would publication of this manuscript in another journal be more appropriate? No

If so, which journal? _____

Comments of Reviewer: (J)

This is an interesting paper that uses a wide range of predictive techniques to arrive at the relative stabilities and chemical properties of the aqueous ions of element 115 (eka-bismuth). It is one of a series of papers on the prediction of chemical properties of the superheavy elements and incorporates an increasing degree of sophistication compared to its predecessors. Since I had the opportunity to see this paper in draft form, I have already had the opportunity to pass on to the authors my specific comments and notation of the misprints and minor errors I detected. Appropriate changes have been made. My careful reading of this final version has not led to any additional comments that I might make.

Recommendation of reviewer The paper appears interesting and sound, and I think it is worth publishing in the Journal of Physical Chemistry.

Please sign original only Glenn T. Seaborg Date May 21, 1974

I walked down to University Hall, where George Pimentel, Harvey White and I met with Owsley Hammond, Treasurer of the Regents, and his assistant, Jock Thompson to discuss possible sources of operating funds for the Lawrence Hall of Science, which is in dire need. Hammond's suggestion was a $100,000 yearly appropriation from the Nuclear Science Fund.

Suki and I took our hike to the water tank. Helen, Dianne and I went to Acalanes High School to attend an initial meeting of the summer 1974 class for Mentally Gifted Minors (MGM) for which Dianne has been chosen as a participant. The instructor is Bruce Reeves; about 40 people were present, including only a few parents. There are three categories in the program: (1) college planning, (2) fine arts and (3) independent study; Dianne is involved in the last. These students will work at home on individual projects. The course will run six weeks, a minimum of 90 hours of work will be required, and will be good for 10 credits of high school work. Reeves will make a contract with each participant which will proscribe specifically what the participant agrees to do and the time schedule for accomplishing it.

Lynne called to tell us that Bill has received notification from Howard University Medical School of an interview on May 29.

Thursday, May 23, 1974 - Berkeley

I had lunch with the actinide chemistry group in their room. Present were Edelstein, Peacock, McLaughlin, Halstead, Baker, Gradl, Streitwieser, Raymond, and Ritter. Peacock reported on his unsuccessful attempts to synthesize fluoride compounds of neptunium (VII). Edelstein reported on EPR measurements on Cf(III) in $Cs_2NaLuCl_6$ which gave a nuclear magnetic moment of 0.3 ($\pm$ 20%), which agrees with 0.5 estimated by Nilsson. He also reported on EPR evidence for berkelium (II) in CaF_2; this work will be repeated with BaF_2.

Evelyn Connolly called me from the Chemistry Department to tell me that Joel Levinson is in Merritt Hospital and is quite ill. He has a heart condition for which he has been under treatment for some time. A bad cold turned into pneumonia which aggravated the heart condition; this morning his heart was fibrillating. His Qualifying Examination has therefore been put off, but Rasmussen would like the committee to meet to discuss Joel's options.

I met Helen at the Claremont Hotel and we attended the retirement reception for Harold Fidler. There were about 200 people present. Terry Tough read a letter from President Hitch and called on Wally Reynolds and Bill Douglass who made some charming remarks about their associations with Harold over the years and his accomplishments. He made a short and moving response.

Friday, May 24, 1974 - Berkeley

I walked up to the HILAC Building to talk to Ghiorso about the 106 experiment (bombardment of a 250 microgram Cf^{249} target with O^{18}) conducted early this morning. Using the wheel arrangement to catch recoils and to detect daughter isotopes, an apparently new alpha

activity of 9.0 Mev and relatively long half-life (equal to or greater than 15 seconds) seems to be consistent with decay to Rf^{259} (alpha energy 8.77 Mev, etc.). This activity, at a yield of about 2 alpha counts per hour, could be 106^{263}!

I had lunch with the Chem 1C section leaders in the Popper Room of the Faculty Club, then went with them to the meeting of the Chem 1C instructional staff from 1:10-1:50 p.m.

At 3:30 p.m., Wendell Williams came in to talk to me about the grading of his midterm exam. I said I would look it over and decide on a number of areas he identified as possibly worth additional points.

I met in my office with William Zoller at 4:00 p.m. to discuss his interest in a position in our LBL Nuclear Chemistry Division to conduct research and be in charge of our environmental chemistry program. He understands that we couldn't offer him a faculty position and says that he would strive to achieve this if he accepts our offer. He has been promoted to Assistant Professor at the University of Maryland with a salary of $19,000 per year, so our offer would have to be better than this.

Suki and I hiked to the water tank. Helen and I hosted a buffet dinner for a diverse group of our friends. Present were Albert, Marjorie and Bob Alexander, Dick and Marian Diamond, Jim and Helen Harris, Mary Jefferds, Joe and Peg Josephson, Adrian and Billie Kragen, Donald and Dale Marshall, Ben Orlove, Josephine Owen, Harry and Molly Reeves, Ken and Jane Street, Fred Stross, Stan and Alice Thompson, Bob and Sue Watson, Dan and Evelyn Wilkes, and the DeBoers. Dianne was with us, and Eric and his friend Janet Rosati joined us when they arrived from Davis.

Saturday, May 25, 1974 - Lafayette

I wrote a review of Goldanskii and Polikanov's book The Transuranium Elements for American Scientist and began writing my talk, "Search for New Elements." In the afternoon, Suki and I took a hike on the rim trail around the Lafayette Reservoir. It was quite hot and Suki just barely made it.

Sunday, May 26, 1974 - Lafayette

Eric, Suki and I hiked in Briones Regional Park; it was not so hot as yesterday. We had dinner in the patio. After, we called Bill and Biddy Jenkins at their home in Wilmington, Delaware, to discuss summer plans; Ty may arrive before Eric leaves for Washington.

Monday, May 27, 1974 - Lafayette

Memorial Day. I worked on talks and read Chem 1C material. Suki and I took the Reservoir hike. It was considerably cooler than yesterday. Eric returned to Davis.

Tuesday, May 28, 1974 - Oakland - Berkeley

I drove to the Atlas Heating Company plant on the waterfront in Oakland and met with Wally Costa and Bob Tuck to discuss the possibility of the acquisition of Panorama Ranch by the City of Lafayette. Tuck was quite receptive and will ask his co-owners if they would be willing to sell for $600 per acre on a ten-year payment plan.

I arrived at LBL at 9:30 a.m. I received from E. J. Corey some ideas for our 1975 Welch Conference, which I will forward to Milligan. Irene Tinker wrote me (attached) as a follow-up to our conversation in Washington to discuss the matter of inviting African Scholars to the New York AAAS meeting. I sent to C. H. Heathcock a statement for the new Chemistry Department brochure which he is compiling (attached).

I walked down to the campus and met from 11:10-11:50 a.m. with John Rasmussen, Kenneth Street, Joseph Cerny, Luciano Moretto, and Buford Price to discuss Joel Levinson's Ph.D. qualifying examination situation. In addition to his health problems, Moretto gave his assessment that Joel is not capable of completing his Ph.D. program--his understanding of his problem and the general field of nuclear chemistry is inadequate and his research ability is probably inadequate. We will suggest that he undertake an alternate course, such as accepting a Master's Degree on the basis of work completed and dropping his Ph.D program.

I had lunch at the lower level of the cafeteria with Kratz, Norris, Stephens, Bucher, and Ken Toth (visiting from ORNL for his experiment with Hahn and Eppley at the SuperHILAC).

I met with Kenneth Rahn in my office from 3:00-3:30 p.m. He understands the requirements for our environmental chemist. His present salary is $13,000; he is not anxious to leave his position, but would consider it if the offer were right. At 4:00 p.m., I attended the Nuclear Chemistry Seminar where Rahn spoke on "Physical-Chemical Regularities of Natural and Anthropogenic Atmospheric Aerosols." He spoke very well, although the theoretical interpretation of his work is at a low level.

Suki and I took the water tank hike.

Wednesday, May 29, 1974 - Berkeley

I attended Pimentel's lecture, then held my office hour, to which several students came. After, I went by to see Kratz and Norris to discuss our yield from U plus Kr, then conferred with Ghiorso, Hulet and Nitschke on the results of their 106 experiments last night and this morning. They bombarded for about eight hours early this morning the 160 microgram Cf^{249} fluoride target with 2 microamperes of O^{+18} ions, but saw very few if any alpha particles of energy greater than about 8.8 Mev (which can be due to At or Po isotopes produced from Pb impurities).

After lunch in my office, I taught my lab section from 1:10-2:45 p.m. I drove to the Lawrence Hall of Science to attend the meeting of

American Association for the Advancement of Science

1776 MASSACHUSETTS AVENUE, NW, WASHINGTON, D. C., 20036

Phone: 467-4400 (Area Code 202) Cable Address: Advancesci, Washington, D. C.

May 16, 1974

Dr. Glenn T. Seaborg
Lawrence Berkeley Laboratory
University of California
Berkeley, California 94720

Dear Glenn:

I was pleased to have such a long talk with you, especially with regard to inviting Africans to the AAAS meetings in New York. Since we met I have been in touch with AID, the State Department and the National Academy of Sciences and the Overseas Liaison Committee of the American Council of Education concerning both individual Africans who perhaps should be invited and ongoing continental or regional organizations in Africa whose membership is similar to that of AAAS. In the enclosed memo I have summarized the resultant information.

Since there are several viable science organizations in Africa I should like to recommend that we invite one representative from each of the major science groups and suggest the setting up of some sort of network among us all. By doing this we can avoid inviting the science bureaucrat who is often a non-scientist, but who would have to attend if an organization was on the agenda. In addition, I would like to invite a few "young dazzlers," active scientists with controversial views. It was suggested that two or three of the organizations might be asked to nominate such scientists to participate in a symposium at the annual meeting which questions the applicability of Western science to African problems. Alternatively, we might ask the Americans working in Africa to suggest these younger scientists who are not normally invited to foreign meetings. In addition they might have comments on our choice of organizations to invite. These three men are: Michael Horowitz, in Abidjan; Wilbert LeMelle, in Tunisia; and Robert Maybury, in Nairobi.

Besides the meetings, the AAAS' most visible asset is SCIENCE magazine. I have been trying to encourage Phil Abelson to hire a special reporter to do a series of five or six articles on science in the developing countries. Herman Pollack has suggested Sy Bourgin who is retiring from USIA this summer. I have put this together with several other ideas concerning Latin America and if Mr. Bourgin agrees we shall then go to various foundations to get funding for the SCIENCE magazine correspondent, for support to start a Latin American type science magazine, for training scientists to return to Latin America and other countries and for a series of chautauqua like courses for catch-up purposes for scientists in Latin America. Our development officer is suggesting Lilly or Tinker foundations. Do you have any additional suggestions?

I also have your list of Asians to receive SCIENCE magazine. Since this particular free membership is sponsored by the Asia Foundation, we are really talking only about East Asia. Their area of interest goes as far as Afghanistan and Pakistan, but does not go into West Asia. We have written letters to the embassies concerned asking them to help us get more complete addresses and alerting them to the existence of our office. We will follow this up next week with a telephone call so that the SCIENCE magazine will certainly begin fairly early in the summer.

Plans for the 1976 AAAS meetings in Boston are already beginning to gel. Eugene Kovach, Deputy Assistant Secretary General for Science Affairs of NATO is going to be in Washington later in the week and I expect to talk with him about the possibility of sponsoring several mutual panels in Boston. Bill Bevan has been back in touch with the British Association for the Advancement of Science as well. How do you think we could best use these resouces at the Boston meetings?

I look forward to your reply.

Cordially,

Irene Tinker

Irene Tinker
Director
Office of International Science

IT:ek
Enclosure

MEMO ON AAAS CONTACTS IN AFRICA May 17, 1974

ORGANIZATIONS WITH SCIENTIFIC INTERESTS:

Economic Commission for Africa P.O. Box 3001 Addis Ababa, Ethiopia	Dr. R.K.A. Gardiner, Executive Secretary Dr. David Wasawo, Chief, Natural Resources Division (formerly Prof. of Zoology and Dean of the Faculty of Science, University College, Nairobi)
Association for the Advancement of Agricultural Sciences in Africa P.O. Box 30087 M.A. Addis Ababa, Ethiopia	Dr. Victor Oyenuga, President (also Prof. of Animal Science, University of Ibadan, Nigeria)
Association of African Universities P.O. Box 5744 Accra North, Ghana	Dr. Kaiso N'Quot, Secretary General
UNESCO Division of Science Policy Place de Fontenoy Pairs 7eme, France	Dr. Yvan De Hemptinne, Director
Field Science Office for Africa P.O. Box 30592 Nairobi, Kenya	Chief Olu Ibujun, Head
East African Academy P.O. Box 47288 Nairobi, Kenya	Dr. Wilbert Chagula, President (also Ministry of Economic Development Dar-es-salaam, Tanzania) Dr. J.M. Mungai, Secretary General (also Dean of Medecine, University College Nairobi)
International Center for Insect Physiology and Ecology P.O. Box 30772 Nairobi, Kenya	Dr. Thomas Odhiambo, Director
Ecology Center: UN Family Planning Organization and Population Council, co-sponsors Nairobi, Kenya	Simeon Ominde Professor of Geography University of Nairobi P.O. Box 30197 Nairobi, Kenya

Nigerian Research Institute

Dupe Olatunbolun, President
African Association of Agricultural Economics
author: The Neglected Majority

West African Science Association

Dr. Victor Cooker
Department of Zoology
University of Ghana
Legon, Ghana

****

INDIVIDUALS WITH SCIENTIFIC INTERESTS:

EGYPT

Dr. Adel A. Sabet, Director General
of Scientific Relations
Academy of Scientific Research & Technology
101 Sh. Kasr al-Aini
Cairo, A.R.E.

ETHIOPIA

Dr. Aklilu Lemma, Director
Institute of Pathobiology
Haile Sellassie I University
P.O. Box 1176
Addis Ababa, Ethiopia

GHANA

Alexander A. Kwapong, Vice Chancellor
University of Ghana (Legon)
Legon, Accra
Dr. Modjaben Dowuona, Chairman of Council
for Scientific and Industrial Research
Accra, Ghana

Dr. Edward S. Ayensu
Department of Botany
Smithsonian Institution
Washington, D.C.

Dr. Letitia E. Obeng, Director
Institute of Aquatic Biology
Council for Scientific and Industrial Research
P.O. Box M 32
Accra, Ghana

Dr. Silas R.A. Dodu
Department of Medecine
Medical School
University of Ghana
P.O. Box 4236
Accra, Ghana

GHANA

Dr. D.A. Bekoe, Pro-Vice-Chancellor
University of Ghana
Legon, Ghana

KENYA

Dr. Ruben O. Abasa
Department of Zoology
University College
P.O. Box 30197
Nairobi, Kenya

F.J. Wangati
Physics and Chemistry Division
East African Agriculture and
Forestry Research Organization
P.O. Box 30148
Nairobi, Kenya

Phillip Mbithi
Department of Sociology
University of Nairobi
Nairobi, Kenya

MOROCCO

Dr. Mohamed Benhima
Minister of Agriculture
Rabat, Morocco

Dean Ben Abdeljlil
Faculty of Sciences
Mohammed V University
Rabat, Morocco

Professor Albert Sasson
Biology Department
Mohammed V University
Rabat, Morocco

Dr. Abdelmalek Guessous
Department of Physics
University of Rabat
Rabat, Morocco

NIGERIA

Dr. Okonjo
University of Ibadan
Ibadan, Nigeria

SENEGAL

Ben Mady Cisse
Assistant to the President
Ministry of Human Development
Dakar, Senegal

SUDAN

Dr. el-Sammani Abdalla Yacoub, Secretary General
National Council for Research
P.O. Box 2404
Khartoum, Sudan

TUNISIA

Dr. Adrian Zmerli
Dean, Faculty of Sciences
University of Tunisia
Tunis, Tunisia

ZAIRE

Dr. Felix Malu
Director of Trico Nuclear Center
Lovandium University
Kinshasa, Zaire

Andre Tshibangu
Minister of Mines and Energy
Kinshasa, Zaire

American Association
for the Advancement of Science

1776 MASSACHUSETTS AVENUE, NW, WASHINGTON, D. C., 20036
Phone: 467-4400 (Area Code 202) Cable Address: Advancesci, Washington, D. C.

MEMORANDUM May 13, 1974

TO: William Bevan

FROM: Irene Tinker

SUBJECT: Latin American Package

Michael Greene came in Thursday to discuss the possibility of his joining the International Office. He has agreed to draft two preliminary proposals which he would administer if we can get funding: (1) A chautauqua series for Latin America. He has already begun to talk with Howard Foncannon and Art Livermore concerning the ideas of the Commission on Science Education, and is adding his own ideas. He might decide to favor catch-up seminars rather than more involved chautauqua type courses. (2) He had submitted a rather hasty proposal for a summer seminar for foreign science students to be held at Maryland in 1974. Emphasis would be on how to order books, run a laboratory as well as on science teaching. It was not funded. However, a similar proposal for 1975 to be held in Oregon has been funded by UNESCO. Green's idea is to get a larger amount of money and run several such summer seminars, perhaps varying them somewhat and building in a study component and evaluation component. This of course would not be specifically addressed to Latin America, although it perhaps could be.

If the funding for these two projects came through, but still did not cover his whole salary, I thought perhaps we might make up the difference by having him work on the newsletter.

Arthur Solomon called to tell me that the Assistant Director of the Venezuelan Scientific Institute is on a month study leave at Yale. I talked to Guillermo Wittenbury yesterday and will send him a background letter before we talk again on the phone. He is not, unfortunately, coming to Washington. If necessary, however, I could go up to New Haven to see him.

Solomon indicated that his student, who was head of the Scientific Institute, Sr. Villegas, resigned with the change of government, although he remains on the staff. A Mr. Carbonell has replaced him. Wittenbury, who was Villegas' right hand man is apparently continuing as Assistant. Solomon seemed very interested, willing to talk with you and Abelson; when asked if he was interested in going to Caracas, he answered "no comment."

It is my thought that Michael Greene, who speaks fluent Spanish, would be most useful in the Association. Wittenbury, who is a bio-physicist, might also be a useful liaison should a Latin American science magazine be set up.

The Latin American package would then consist of: (1) a Latin American science magazine, as proposed by Abelson; (2) a chautauqua type series of courses or catch-up seminars, run out of this office for the time being; (3) a few places in the summer course series on running science departments and libraries, which might be open to young faculty still in Latin America; (4) perhaps the first of the series of articles on science in the developing world might focus on Latin America.

Phil Abelson has been receptive to the idea of five or six articles on science in different parts of the developing world. One specific topic which was suggested by Herman Pollack was a study of the reponse of the U.S. science community to the problems in the Sahel. Such an article would show overlapping or misdirected priorities and inept research as well as the positive side of the response. Pollack also suggested Sy Bourgin, presently with USIA, as a possible correspondent for such a series. Bourgin was formerly the science editor for Newsweek and is currently expecting to retire in July of this year. I have mentioned his name to Abelson; Pollack was supposed to call Abelson directly as well. I hope you will expedite this contact.

Fran Freeman is anxious to go to the Lilly Foundation with a proposal from the Office of International Science. I think all of the above would make a very nice package. If they are not willing to fund the entire amount, including subsidy for the Latin American science, a fall-back position could be with the Tinker Foundation which specializes in Latin American education.

Michael Greene's contract has not been renewed but he can be paid till August. He would like a month vacation sometime. Thus, if we are able to find funding that would begin in the fall, or even funding that would begin in January, if it were guaranteed, we could pick up the salary for two or three months, I think we could go ahead and hire him. He is very excited about the possibility, has no immediate propsects for other jobs at this time. He had an almost firm offer from UNESCO to go to Colombia, but this seems now to have fallen through.

Glenn T. Seaborg received his A.B. at UCLA in 1934 and Ph.D. at Berkeley in 1937. He worked with G. N. Lewis (1937-39), joined the Berkeley faculty in 1939, is now University Professor of Chemistry. He was in charge of transuranium research at the wartime Metallurgical Laboratory (1942-46), served as Chancellor at Berkeley (1958-61), and as Chairman of the U.S. Atomic Energy Commission (1961-71). He received the Nobel Prize for Chemistry with E. M. McMillan in 1951. He has served as Associate Director of the Lawrence Berkeley Laboratory (1954-61 and 1971-present).

Professor Seaborg's research interests are in nuclear chemistry, heavy ion reactions, and transuranium elements, as follows:

1. Synthesis and identification of new elements. The recently rebuilt heavy ion accelerator, the Superhilac, is being applied to the synthesis of new elements beyond atomic no. 105. Two regions are being emphasized: (a) the near elements such as 106 and 107, and (b) the far out "superheavy" elements such as 110 to 120. The yields may be very small, an atom or less per hour of bombardment, and the half lives may be quite short. Chemical identification is based on the prediction of chemical properties in sufficient detail that they can be used in the design of experiments. (Ref. 1)

2. Heavy ion radiochemistry. The Superhilac will be capable of accelerating ions as heavy as uranium to sufficient energies to make them capable of undergoing nuclear reactions with any target (up to and beyond uranium). A powerful tool of investigation is the chemical separation, and identification through their radiation, of the products (some 200 isotopes distributed among some 70 elements) of such bombardments. A broad program of investigation is yielding much

definitive information on nuclear structure and nuclear reaction mechanisms. (Ref. 2)

3. Lanthanide, actinide and transactinide chemistry. The objective is to characterize the chemical properties of the actinides (atomic nos. 89-103) and, for comparison purposes, the lanthanides (nos. 57-71), and the transactinides. The techniques utilized, for the actinide elements up to einsteinium (no. 99) and the lanthanide elements, include optical spectroscopy, magnetic resonance, magnetic susceptibility, x-ray diffraction, Mössbauer spectroscopy, and chemical synthesis and metal production. For the elements fermium (no. 100) and beyond, the tracer technique must be used and special emphasis is being placed on the transactinides (no. 104 and beyond) which are produced at a yield of only one atom per experiment or less. (Ref. 3)

Recent publications which are typical of his research are:

(1) G. T. Seaborg, "Prospects for Further Considerable Extension of the Periodic Table," J. Chem. Ed., 46, 626 (1969).

(2) I. Binder, J. V. Kratz, J. O. Liljenzin, A. E. Norris and G. T. Seaborg, "Radiochemical Yield Determination of Various Reaction Products in the Reaction of ^{238}U with ^{40}Ar and ^{84}Kr Ions," Nuclear Chemistry Annual Report, 1973 (LBL-2366), Sec. I, p.

(3) N. Edelstein, D. Brown and B. Whittaker, "Covalency Effects on the Ligand Field Splittings of Octahedral 5f Compounds," Inorg. Chem., 13, 563 (1974); and R. J. Silva, J. Harris, M. Nurmia, K. Eskola and A. Ghiorso, "Chemical Separation of Rutherfordium," Inorg. Nucl. Chem. Letters, 6, 870 (1970).

the LHS Advisory Committee from 3:15-5:00 p.m. (minutes attached). After the meeting, Pimentel, White and I met with Laetsch, Content and George Moynihan. We agreed to ask for $200,000 from the Nuclear Sciences Fund and to seek an appointment with Chancellor Bowker for Pimentel, White and me during June 20-26.

Helen and Marjorie Alexander went to San Francisco today to see the play Good News this afternoon at the Curran Theater starring Alice Faye and John Payne.

Suki and I hiked to the water tank.

Thursday, May 30, 1974 - Berkeley

I had my annual physical examination in the Medical Services Building. Dr. Weaver said that I am in good physical condition.

After getting feedback from Edelstein and others, I mailed to American Scientist my book review of Goldanskii and Polikanov, The Transuranium Elements (attached). I sent an reply to Irene Tinker, encouraging her to carry out her ideas for getting African scientists to the New York AAAS meeting.

At 11:00 a.m., I went to greet the group of Soviet scholars visiting the Bay Area. Their full program and list with identifications is attached. The leader, Kirill Nikonorovitch Plotnikov, brought me greetings from Aleksandrov, Director of the Kurchatov Institute.

The biweekly lunch meeting of SHEIKS and TAVERNS was held in my office from 12:00-1:20 p.m. Williams reported on the experiments by her and Otto on the identification of Pb, Bi, Ra, Ac, and Th isotopes produced in the bombardments of thorium plus krypton. Kratz reported on his interpretation of the distribution of products formed in the bombardment of uranium with krypton. An explanation of the peak at gold, which we now refer to as the "gold finger," is still lacking. Binder gave a report on the observation of some translead alpha-emitting isotopes formed from gold with krypton.

At 6:30 p.m., I drove to the Alpha Chi Sigma house to have dinner and speak. I became acquainted with John Olof Larson, a member of the professional chapter working at Chevron Research, and discussed with him a large number of mutual friends. After the dinner, I was introduced by Irwin Binder and gave my talk on "Science in China."

Friday, May 31, 1974 - Berkeley

At 10:30 a.m., I attended the SuperHILAC Research Group meeting. Myers reported on his theoretical considerations of the "deep inelastic scattering" portion of the radiochemical distribution curve (from U plus Kr) and the kinematical (angular distribution) results of the RANN group for this same product (from Bi plus Kr). The Kr^{84} projectile is carried around the target nucleus a certain distance, then expelled via an oscillator force as the "deep inelastic scattering" product at the observed angle and the observed Gaussian distribution of mass numbers.

JUL 18 REC'D

Minutes of the Meeting of the Advisory Committee to the Lawrence Hall of Science

May 29, 1974

ATTENDANCE

Advisory Committee

George C. Pimentel, Chairman
John Addison
Robert Arnold (substituting for Marvin Chachere)
James Cason
Howell V. Daly, Jr.
Robert G. Jones
Jeannie Levanthal
Frank Oppenheimer
Lester Packer
Frederick Reif
Glenn T. Seaborg
Wilbur H. Somerton
Harvey E. White

LHS Executive Committee

W. M. Laetsch, Director
Robert Content
George Moynihan, Manager LHS

Absent

George Briggs
Marvin Chachere
J. Desmond Clark
John Helms
Jonas Langer
Todd LaPorte
Thomas V. McEvilly
Edwin M. McMillan
C. Don McNeill
Lloyd F. Scott
David B. Wake
R. Brady Williamson

The meeting was called to order at 3:15 p.m. Professor Pimentel noted how well the second LHS Memorial Lecture by Herbert Simon was received.

Director's Report

1) The Science Curriculum Improvement Study (SCIS) is now ending its six year development stage for writing science curriculum for grades K through 6 and is continuing in its implementation stage. It is now used in about 15% of the elementary schools in this country and is being translated for use abroad.

Other appects of SCIS are now being developed and tested. These are: A) Enrichment Centers - individualized science learning centers; B) Science for the blind and the visually handicapped; C) Computer education for handicapped children in the California School for the Deaf; and D) Science materials for the Native American schools in the Southwest. This last project is being funded by the Office of Education and is being developed in conjunction with the Pueblo Indian Council schools.

2) The Outdoor Biology Instructional Strategies (OBIS) funded by the National Science Foundation has been in great demand. It involves the use of non-classroom science activities.

3) An astronomy program is now being worked on, funded by the National Science Foundation.

4) There is an increase in the use of students from the Berkeley campus in developing publicity materials, evaluating programs, constucting exhibits and offering new classes such as in paleontology and health sciences. The students receive research project credits on their transcripts for their work at the Hall.

5) LHS is a member of the American Association of Science and Technology Centers, an organization headquartered in Washington D. C. which is now about four years old. One of the purposes of this organization is to help science centers such as LHS find new funding, particularly through encouraging new legislation for federal funds for these centers.

6) LHS funding is still inadequate and spending has been cut back as much as possible. The deficit this year is one-half of what it was last year.

The Committee was then shown a new film about the Lawrence Hall of Science. The making of the film was partially supported by CHEM Study money and is available for use by any interested persons.

Prof. Somerton described the displays which the Engineering Department has been setting up in the Hall. EECS's exhibit shows integrated electronics, a graduate student project, while several undergraduates are developing a microcomputer display. Other exhibits which are being worked on are an operating oil reservoir and earthquake-proof model structures.

The discussion of the Director's Report opened with Prof. Reif asking about the increase in grants, contracts and income as noted in the Director's Report. Dr. Laetsch replied that the increases are due in part to faculty initiative in expanding the services which LHS can offer. The figure noted under "Income" in the Report is from the sale of curriculum materials which are developed by LHS staff, sales in the LHS store and snack shop and other public programs. However, income reflects the gross intake, not the net. There is no profit from the income; all of the money is used to support those programs that generate this income. Public programs are not yet self-sufficient, though they are moving toward it.

Meanwhile, cost of living increases in salaries and employee benefits are rising, but the general funds which pay these are not. The campus has agreed to help develop a hot food service which would increase income and the LHS store is expanding its sales, particularly in children's science books.

Dr. Laetsch noted that the Hall is still too dependent on NSF funds. Over 90% of its funding is from NSF. This money is mainly earmarked to support curriculum projects. The staff is trying to increase gifts and private funds. Programs not funded by federal money or other income, such as some of the public programs, are still in debt and there is no money with which to start new projects.

At this point, the meeting went into executive session. Dr. Seaborg reported from the minutes of the January Planning Sub-Committee meeting. The letter to Dean Elberg concerning the Committee's review of the LHS Annual Report will express the Committee's satisfaction with the work being done in the Hall and will raise the funding question.

Profs. Reif and Pimentel elaborated on the Planning Sub-Committee's discussion of computer use at LHS. The feeling was that the computer program is not as coordinated as it might be and that it would benefit from better leadership (as was noted in the Ad Hoc Committee on Computer's report last year). That report had recommended that the Hall hire a director for its computer program, an individual with creative leadership ability, interested in social and educational strategies.

Dr. Laetsch explained that the Hall needs additional funds to hire such a director. The present staff cannot handle any new programs. Prof. Pimentel asked, if the base funds were increased, would this be a high priority for the use of new funds. Dr. Oppenheimer interjected that perhaps the computer program should not have such a high priority at this time. Many new advances are now taking place in the computer field and it is in a state of flux.

Dr. Laetsch indicated that the Campus Computer Committee is interested in educational uses of computers on the campus and is talking with LHS about the use of time-sharing computers on campus. There is a possibility for some money for such a campus computer system. In answer to the question about the priority of hiring a computer program director, Dr. Laetsch said that it has a fairly high priority. He would like to find someone with computer expertise and educational interests plus management ability.

Returning to the Planning Sub-Committee minutes, Dr. Seaborg spoke about the action that had been taken concerning the endowment problem. Drs. White, Seaborg and Pimentel had talked with Owsley Hammond, the University finance officer, about increasing the funds for the Hall from the endowment.

Prof. Pimentel explained that they had asked if the Hall could either receive more interest from the endowment or break it open to have more of the principle. Both of these possibilities were rejected by Mr. Hammond, but he suggested that the Nuclear Science Fund would be a likely source of additional support provided that a good case could be made for such new funding.

The steps involved in seeking the additional funding would be, first, to gain the support of the Chancellor, then that of Dr. Hitch and finally, to ask the Regents. Drs. Seaborg, White and Pimentel, in communication with the Director, will pursue this course.

Dr. Laetsch added that at the present time there is no one person at the Hall who is working on finding new endowment funds. However, this possibility is not being ignored and if new funds were found, they would not necessarily have to be placed in the general endowment fund. They could then be managed in another way which might bring more money into the Hall.

Finally, Dr. Oppenheimer noted that there is a new Museum Services Act before Congress that would privide more operating funds for museums such as LHS. He urged that Committee members write to their congressmen in support of this bill. Dr. Laetsch added that there would be an article in the next LHS Newsletter about this bill also asking for support for it from the members.

The meeting adjourned at 5:00 p.m.

George C. Pimentel

George C. Pimentel
Chairman, Advisory Committee
to the Lawrence Hall of Science

BOOK REVIEW: V. I. Gol'danskii and S. M. Polikanov, The Transuranium Elements (Studies in Soviet science), translation of Tiazhelee urana. New York-London: Consultants Bureau, 1973.

The summary on the dust cover of this book opens with the curious statement, "Since the discovery of certain transuranium elements at the Joint Institute for Nuclear Research in Dubna, there has been a resurgence of interest in this largely unexplored area." On the brief 160 pages between these covers, two brilliant Soviet nuclear scientists--the chemist V. I. Gol'danskii and the physicist S. M. Polikanov--have put together a potpourri of information on elementary atomic and nuclear structure, radioactivity, nuclear fission, history, methods of production, chemical and nuclear properties of the transuranium elements.

The first 50 pages are devoted to a concise, sound, and necessarily fragmentary treatment of elementary atomic and nuclear principles. Here and later in the book, emphasis is placed on spontaneous fission, discovered in 1940 by the Soviet physicists Petrzhak and Flerov, and on spontaneous fission isomers, a relatively recent outstanding discovery in which one of the authors (Polikanov) played a key role.

The Preface states that "This book is a reworked and enlarged version of Gol'danskii's 'New Elements in the Periodic System,' which had editions of 1953, 1955 and 1964"; much of the discussion of the chemistry of the transuranium elements is of this vintage, which makes the publication date of 1973 misleading. For example, there is no discussion of the recent

interesting investigations of the chemical properties of heavy actinide elements, including the important (II) oxidation state to which the Soviet chemists Spitsyn and coworkers have made significant contributions. Similarly, the correlations of nuclear properties are outdated and only casual mention of the predictions concerning superheavy elements is included.

There are an appreciable number of errors in the sections on the transuranium elements, some typographical and some the result of the authors' remoteness from the history and experimental work on many of these elements.

Glenn T. Seaborg

Berkeley, California

May 30, 1974

LAWRENCE BERKELEY LABORATORY
Room: 4133 Bldg.: 50A Ext.: 5111

Visit of Soviet Specialist Tourist Group
Thursday, May 30, 1974

10:35 a.m.	Lee Davenport to meet visitors at LBL bus stop at University and Shattuck.
11:00 a.m.	Lee Davenport and visitors to meet Dr. Andrew M. Sessler, Director Dr. Earl K. Hyde, Deputy Director Dr. G. T. Seaborg, Associate Director Photo of group in front of Bldg 50 then proceed to Director's Office to sign guest book and greetings
11:20 a.m.	Lee Davenport to lead tour of Bevatron 50 Lobby Cloud Chamber 50B Spiral Reader 70 Water-shielded hot cave
12:30 p.m.	Buffet lunch - lower level of cafeteria
	Art Rosenfeld, Physics Rolland Johnson, Physics Bob Pyle, CTR Program Physics John Rasmussen, Nuclear Chemistry Jack Hollander, Assoc. Director, Energy & Environment Leo Brewer, Assoc. Director, Inorganic Materials Dick Diamond, Acting Assoc. Director, Nuclear Chemistry Denis Keefe, Acting Assoc. Director, Accelerators Carol Alonso, Nuclear Chemistry Yvonne Howell, Public Information Officer Lee Davenport, Tour Director Ken Mirk, Geothermal Research, Energy & Environment
1:45 p.m.	Depart for walking tour of UC Campus

SPECIALIST TOURIST GROUP 22 May 1974 Thursday, May 30, 1974

1. Kirill Nikonorovitch Plotnikov--Director of the Faculty of Finance of the Moscow Engineering Economics Institute, Doctor of Economic Science, Corresponding Member of the Academy of Science, USSR

2. Vladimir Ivanovitch Kovalev-----Assistant Director of the Society Znaniye of the Ukranian Soviet Socialist Republic, Asst. Director of the Group

3. Maya Ivanovna Gordeeva----------Senior Instructor of the Faculty of English and Translation of the First Moscow Pedagogical Institute for Foreign Languages, M. Torres Institute, Candidate of Philosophical Science, Consultant Translator for the Group

4. Vagab Sapharovitch Aliev--------Director of the Institute of Petroleum Chemical Processes of the Azerbijan Academy of Sciences, Doctor of Technical Science, Member of the Academy of the Azerbijan Academy of Science

5. Alexsandr Yonovitch Ansberg-----Assistant Director of the Praesidium of the Supreme Soviet Congress of the Estonian S.S.R.

6. Oskar Aleksandrovitch Bakshi----Pro-rector of the Scientific Work of the Chelyabin Polytechnic Institute, Doctor of Technical Science, Professor

7. Valdis Valdovitch Gavar----------Chief Engineer of the Atomic Reactor of the Physical Institute of the Latvian S.S.R. Academy of Science, Candidate of Technical Science

8. Antanas Antanovitch Gaidis-------Senior Scientific Coworker of the Division of Philosophy, Law and Sociology of the Institute for History of the Lithuanian Academy of Science, Candidate of Philosophical Science

9. Nikolai Fedorovitch Irshov------Leader of the Faculty of Theoretical Mechanics of the Gorki Polytechnic Institute, Doctor of Technical Science, Professor

10. Maya Konstantinovna Indulin-----Director of the Laboratory of the Institute of Microbiology of the Latvian Academy of Science, Candidate of Medical Science

11. Konstantin Flegontovitch Kotov--Director of the Faculty of Law of the University of Kazan, Docotor of Juridical Science, Professor

12. Viktor Ivanovitch Lisunov-------Dean of the Stavropol Agricultural Institute, Candidate of Technical Science, Professor

13. Petr Maksimovitch [illegible] Assistant Director of the Study and of Scientific Work of the Habara Party School, Candidate of Economic Science, Instructor

14. Sona Muradova----------Artist of the Turkman Academy of Theater and Drama People's Artist of the USSR and the Laureate of State Prize Laureate.

15. Vladimir Vasilevitch Pruchakov--Director of Plant and Factory Construction in the Kiev municipality

16. Veniamin Petrovitch Pyatovskii--Instructor in the Faculty of Marxism/Leninism of the Murmask Higher Nautical Engineering School, Candidate of Historical Science

17. Igor Solodov----------Assistant Professor, Radio Physics and Acoustics of Solids

18. Igor Zhurbenko----------Main scientific worker, "one of the foremost statisticians in the world"

I attended the regular lunch meeting of Chem 1C section leaders and the meeting of the instructional staff that followed.

I dropped into the conference room, where the Nuclear Chemistry Division staff was giving a farewell party for Kathy McCracken, head of our report library and technical typing section, who has taken a new job at Syntex.

Wendell Williams came in at 4:30 p.m. for my help in working Chem 1C problems. I went over the final exam problems with him.

Suki and I took a hike to the water tank.

SIGN-UP SHEET for DAY HIKES: MT. DIABLO REGIONAL GROUP

LOCATION: LAFAYETTE RIDGE/BRIONES REGIONAL PARK

DATE: JUNE 1, 1974

Page 1

LEADER'S NAME: DR. GLENN SEABORG

NAME:	ADDRESS:	PHONE #:	SIERRA CLUB MEMBER?	WHERE LEARNED OF HIKE?
1) Helen & Glenn Seaborg	1154 Glen Rd	283-3452	Yes	Outing
2) Bob and Suzy Watson	3 Garden Dr O.	[illegible]	Yes	CCPC
3) CLIFF & RUTH STANFIELD	HALFMOON BAY 152 JIB COURT	405-7262744	YES	YODELER
4) Jane McArthur	1171 Camino Valle[illegible]	[illegible]	No.	Yodler
5) Bob Alcade	1162 Glen Kyle Lafayette	283-3087	Yes	Seaborg
6) Charlotte Montrose	1 Estate Ct Orinda	254-5411	Yes	Yodler
7) WALT FUREN	951 BANCROFT RD #211 CONCORD	937-5172	YES	YODELER
8) Cayo [illegible]	[illegible]	[illegible]	No	[illegible]
9) Anna Kell Clinicate	4056 Flora Pl Lafayette	283-6664	Yes	John Kennedy
10) John Kennedy	3242 Sweet Dr.	283-2382	No	Dr. Seaborg
11) Walter Costa	1264 Redwood Ln Lafayette	283-2917	Yes	Dr. Seaborg
12) [illegible]	2345 Carquinez [illegible]	236-0886	Yes	Yodeler
13) [illegible]	[illegible]	"	No	"
14) [illegible]	631 Benton Dr	284-9710	[illegible]	CCPC

(Page 2)

SIGN-UP SHEET for DAY HIKES: MT. DIABLO REGIONAL GROUP

LOCATION: LAFAYETTE RIDGE/BRIONES REGIONAL PARK

DATE: JUNE 1, 1974

LEADER'S NAME: DR. GLENN SEABORG

NAME:	ADDRESS	PHONE	SIERRA CLUB MEMBER?	WHERE LEARNED OF HIKE?
15) [illegible]	[illegible]	[illegible]	[illegible]	CCPC
16) Hurst Harnsberg	4507 John Muir Rd Martinez	228-2350	"	CCPC
17) [illegible]	Oakland	-	✓	
18)				
19)				
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LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
INFORMATION RESOURCES DEPARTMENT
BERKELEY, CALIFORNIA 94720