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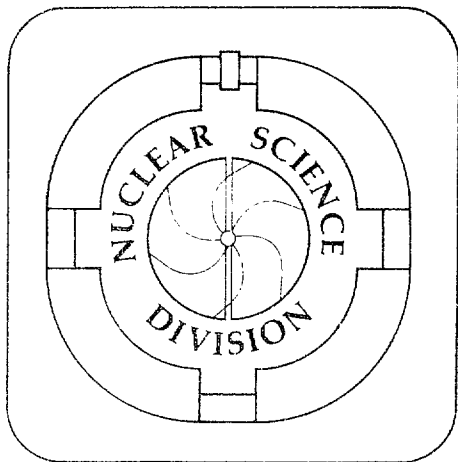
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The 40th AAAS Gordon Conference on Nuclear Chemistry

G.T. Seaborg

June 1991



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The 40th AAAS Gordon Conference on Nuclear Chemistry

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June 27, 1991

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The 40th AAAS Gordon Conference on Nuclear Chemistry

Remarks by Glenn T. Seaborg
Colby Sawyer Junior College
New London, New Hampshire
June 27, 1991

I am pleased to speak at the Fortieth Gordon Conference on Nuclear Chemistry. I served as Chairman of the first Gordon Conference on Nuclear Chemistry held June 23-27, 1952, at New Hampton, New Hampshire.

In my remarks, during which I shall quote from my journal, I shall describe some of the background leading up to the first Gordon Conference on Nuclear Chemistry and my attendance at the first seven Gordon Conferences during the period 1952 through 1958. I shall also quote my description of my appearance as the featured speaker at the Silver Anniversary of the Gordon Research Conferences on December 27, 1956 held at the Commodore Hotel in New York City.

I shall begin with reference to my participation in the predecessor to the Gordon Conferences, the Gibson Island Research Conferences 45 years ago, on Thursday, June 20, 1946, as a speaker. This was 15 years after the start of these conferences in 1931. Neil Gordon played a leading role in these conferences, which were named (in 1948) in his honor -- the Gordon Research Conferences -- soon after they were moved to Colby Junior College, New London, New Hampshire in 1947. W. George Parks became Director in 1947, Alexander Cruickshank became Assistant Director in 1947 and Director in 1968.

In this summary I show a list of all the Chairmen of the Gordon Conferences on Nuclear Chemistry from their start in 1952 up to the present time, 1991 (attached).

Thursday, June 20, 1946 - D.C./Gibson Island, Maryland

I arrived in Washington, then travelled to Gibson Island, Maryland.

I gave the talk, "Use of Radioactive Tracers in Chemical Research," (see abstract attached) to the Gibson Island Conference on Petroleum (see program attached).

Wednesday, July 18, 1951 - Berkeley, California

I replied to a July 11th letter from Charles Coryell, who wrote at length about the first Gordon AAAS Conference on Nuclear Chemistry scheduled for 1952. Coryell said that Dr. Herman Mark (Chair, Management Committee, Gordon Conferences) informed him that I am Chairman and he

GORDON CONFERENCE CHAIRMEN

1952	G.T. Seaborg
1953	C. D. Coryell
1954	G. Friedlander
1955	A. Turkevich
1956	L. Yaffe
1957	Earl K. Hyde
1958	John R. Huyizenga
1959	Morris L. Perlman
1960	John C. Rasmussen
1961	Ellis P. Steinberg
1962	Arthur W. Fairhall
1963	J. M. Miller
1964	T. Darrah Thomas
1965	Richard M. Diamond
1966	John M. Alexander
1967	G. Davis O'Kelley
	Raymond K. Sheline
1968	Robert Vandenbosch
1969	Sven Bjornholm
1970	Arthur M. Poskanzer
1971	Thomas T. Sugihara
1972	M. Marshall Blann
1973	Eugene Eichler
1974	James J. Griffin
1975	P. G. Hansen
1976	J. Rayford Nix
1977	Frank S. Stephens
1978	Franz Plasil
1979	Noah R. Johnson
1980	H. C. Britt
1981	Amand Faessler
1982	Luciano G. Moretto
1983	David Ward
1984	J. B. Natowitz
1985	Lee L. Riedinger
1986	Victor Viola
1987	D. B. Fossan
1988	J. Randrup
1989	Teng Lek Knoo
1990	W. U. Schröder
1991	J. D. Garrett

AAAS

(Abstract of talk to be presented at the 1946 Conference at
Gibson Island on Thursday, June 20, 1946)

USE OF RADIOACTIVE TRACERS IN CHEMICAL RESEARCH

The tremendously intense neutron sources available in connection with the huge nuclear chain reacting structures make it possible now to produce radioactive isotopes in much larger amounts than was possible before this development. In addition to these new neutron sources there will be available in about six months the new 184-inch Berkeley cyclotron, which will be capable of producing deuterons of 200 Mev energy and helium ions of 400 Mev energy for the production of induced radioactivities. These instruments make available for tracer or "atom tagging" experiments not only new radioactive isotopes but amounts of practically all previously known induced radioactivities which are larger by many orders of magnitude than were hitherto available.

This discussion will be concerned with a brief review of the new methods of production of radioactive isotopes, a short description of the methods of radiochemistry and a discussion of some of the future possibilities for these isotopes in the fields of chemistry, biochemistry (and medicine).

The discussion of radiochemistry will include brief descriptions of the principles and techniques and of the equipment and instruments which are used.

January 8, 1946

FINAL PROGRAM

1946 Gibson Island Conference on Petroleum Chemistry

Monday, June 17

- A.M. Infrared and Raman spectra (considered from a fundamental point of view) -- Prof. E. Bright Wilson, Jr.
P.M. Ultraviolet absorption spectra (theoretical aspects) -- Prof. R. S. Mulliken.

Tuesday, June 18

- A.M. Theory of the chemical bond and resonance in hydrocarbons -- Prof. G. W. Wheland.
Afternoon Report of Committee on future policy of Conference on Petroleum Chemistry at Gibson Island -- Prof. P. D. Bartlett. Discussion is invited.
P.M. Isomerization equilibria in high molecular weight paraffins -- Dr. L. S. Kassel.

Wednesday, June 19

- A.M. Theory of viscosity of hydrocarbons -- Prof. Henry Eyring.
P.M. Correlation of structure with physical properties of heavy hydrocarbons -- Dr. R. W. Schiessler.

Thursday, June 20

- A.M. Use of stable isotopic tracer elements in chemical research-- Dr. A. Farkas.
P.M. Use of radioactive tracers in chemical research -- Dr. G. T. Seaborg.

Friday, June 21

- A.M. Recent developments in spectrochemical analysis -- Dr. O. Beck.

is Vice-Chairman; he then went on to make several suggestions. I replied that I have not yet heard from Dr. Mark, but I agree with his preliminary comments on the areas that might be covered and am especially interested in having some topics concerning the nucleus. I mentioned that I shall spend about two weeks at the International Congress in New York, so that we will have a chance to get together then; I concluded by telling Coryell that we had a nice visit with Dr. Pappas.

Monday, September 10, 1951 - New York, New York

At 10 a.m., in the Grand Ballroom of the Hotel New Yorker, I gave the introductory remarks at the Nuclear Chemistry Section of the XIIth International Congress of Pure and Applied Chemistry, I said:

As you know, we are celebrating at this same time the 75th anniversary of the founding of the American Chemical Society. The science of nuclear Chemistry is not quite this old, but it would be fair to presume that we are celebrating as well the semi-centennial of the founding of this science. Probably most scientists would agree that the elegant experiments of Madam Curie on the isolation of radium at the turn of the century represents the birthdate of nuclear chemistry. We are especially pleased to have with us here today such men as Fritz Paneth, who has been present almost from the birth of this science and who is still active today. This I know is a thrill to many recent disciples in this field who are with us today. Unfortunately, Hevesy, who also has been active in the field since almost the beginning, has found it necessary to change his plans and cannot be with us here.

Tuesday, September 11, 1951 - New York, New York

The Nuclear Chemistry Section Dinner was held at 6:30 p.m. in the Keystone Room of the Statler. We had no after-dinner speaker, but instead I called on many of the "old timers" to reminisce. Some of those who spoke were Fritz Paneth, Berta Karlik, Les Cook, John Willard, Kasimir Fajans, Bill Libby, Charles Coryell, George Boyd, Milton Burton, and Gert Friedlander. At the dinner I presented Berta Karlik with a copy of Volume 9 (Fission Products) and a copy of Volume 14B (Transuranium Elements) of the National Nuclear Energy Series. Miss Karlik seemed most pleased with the gift.

Later some of the younger men, including such people as Meinke, Rasmussen, and Diamond, approached me and told me that they found the speakers both amusing and inspirational.

Wednesday, September 12, 1951 - New York, New York

Charles Coryell spoke with me for a few minutes about plans for the 1952 Gordon Conference in Nuclear Chemistry (scheduled for the week of June 23, 1952). This will be the first Gordon Conference in this field.

Charles suggested a number of names of possible foreign participants.

The International Congress Banquet was held at 7:30 p.m. in the Waldorf-Astoria. This was an exceedingly large affair, with possibly a thousand attending. The Berkeley group (Ghiorso, Hyde, Jenkins, Meinke, Perlman, Thompson, and I) all sat at Table 27, along with Dr. and Mrs. Harry L. Fisher (he served as Administrative Assistant to the Committee on Organization of the Congress), and W. Wahle.

Thursday, October 25, 1951 - Berkeley, California

I replied to Charles Coryell's letter of October 10 in which he reviewed and expanded the ideas we discussed on September 12th in New York about the Gordon Conference in Nuclear Chemistry to be held in New Hampton, New Hampshire next summer (the week of June 23rd). Coryell said he is in the process of preparing a list of 250 names to whom we should send a mimeographed letter to inquire about their interest in attending.

Wednesday, January 23, 1952 - Berkeley, California

Our supply of letters of invitation to The Gordon Research Conference on Nuclear Chemistry arrived from Charles Coryell, and Doral had one of the girls mail them out to our list of prospective attendees. The letter read as follows:

The authors of this letter have been asked by the Program Committee of the GORDON RESEARCH CONFERENCES to arrange a program in Nuclear Chemistry for the 1952 Conference series, to be held June 23-27, 1952, at the New Hampton School, New Hampton, N.H. (The Gordon Conferences started in New Hampton in 1950.) We are writing this informal letter to several hundred people to explain the conference aims, since this is the first conference planned for Nuclear Chemistry and if it proves to be as successful as most of the others, it is likely that further meetings will be arranged in later years.

These conferences, under the sponsorship of the American Association for the Advancement of Science, are designed to bring together for a leisurely and friendly week specialists in the field from the universities, from industry, and from government, to cover in detail the problems at the front of the field of science. Sessions are held for 4.5 days mornings and evenings, with an invited discussion leader and several speakers, but all those in attendance participate in discussion in the informal sessions and in the free periods. The discussions are based on ideas and developments in progress, and neither abstracts nor written reports are required. A tentative and rough outline of the program is listed below, including the names of some of the people who have been specifically asked to report.

Informal reports by representatives of any foreign laboratories will be especially welcome.

New Hampton is in the middle of the vacation state of New Hampshire in a good place to use the afternoons for swimming, hiking, golf, or bull sessions. It is about 110 miles north of Boston, and is served by trains from North Station, Boston, to Franklin, N.H. Accommodations are available for wives and for children over six, and the food is excellent.

The whole list of Gordon Conferences will be announced February 18th in Science and in Chemical and Engineering News. Applications for attendance are to be submitted to Professor W. George Parks, Department of Chemistry, University of Rhode Island, Kingston, R.I. Attendance is regulated by committee action to keep the number present within limits of accommodations and to a figure consistent with maximal friendly interchange of ideas.

We hope very much that you will give this conference consideration, and that you will discuss it with other nuclear chemists who might not have heard of it.

(s) Glenn T. Seaborg and Charles D. Coryell

Tuesday, March 11, 1952 - Berkeley, California

Back on the hill I read a letter from W. George Parks (Director of the Gordon Conferences), suggesting that our conference be represented at a meeting of the Advisory Board of the Gordon Research Conference at 6 p.m. on Monday, March 24, 1952, in the Georgian Room of the Hotel Statler in Buffalo at the time of the ACS meeting. I had Doris copy the memorandum and send it to Coryell, along with a covering letter from me explaining that I won't be able to attend this meeting because that is the time for the meeting of the Executive Committee of the ACS Division of Physical and Inorganic Chemistry. I wrote that perhaps he (Coryell) will be willing to attend and, if so, he should get in touch with Parks directly.

Tuesday, May 6, 1952 - Berkeley, California

In a letter to Charles Coryell I asked if he would be willing to round up or cause to be rounded up a number of sets of golf clubs since practically the entire California contingent will be interested in this activity and the required implements are too bulky and heavy to transport all the way from California or Chicago. I added that I have the impression that our Gordon Conference is going to be oversubscribed, on the basis of the numerous reports I have heard of people wishing to attend. I said I presume that the handling of the applications by Parks is going smoothly.

Monday, June 23, 1952 - New Hampton School, New Hampton, New Hampshire

This is the first Gordon Research Conference on Nuclear Chemistry, sponsored by AAAS and being held in the relaxing setting of the New Hampton School--I am Chairman, and Charles D. Coryell is Vice-Chairman. Meetings are held in Meservey Hall (see program attached) at 9 a.m. and 7:30 p.m., with the afternoon free for conversation or relaxation (swimming, golf, tennis, side trips, etc.).

Maurice Goldhaber was the discussion leader at this morning's session on Nuclear Physics, and he and his wife Gertrude Scharff-Goldhaber spoke. Among the items he covered were K/L gamma ray conversion ratios, and she gave a summary of nuclear spin agreement with the shell model.

Those in attendance were: Dr. Parks, N. Sugarman, J. E. Willard, M. Goldhaber, I. Perlman, C. Coryell, G. T. Seaborg, G. Friedlander, J. W. Kennedy, Gertrude Scharff-Goldhaber, Michael A. Goldhaber, Joan Welker, Jerome Howland, Elizabeth D. Wilson, Clarence Heining, Carl R. Wilson, Bruce Dropesky, Alois Langer, A. Ghiorso, I. B. Whitney, W. Crane, K. Street, L. O. Morgan, L. B. Magnusson, Edgar F. Westrum, Jr., O. F. Hill, H. W. Alter, A. D. Kirshenbaum, G. W. Parker, John R. Bradford, L. S. Foster, Nathan E. Ballou, L. Zumwalt, William H. Beamer, A. F. Voigt, E. O. Wigg, R. W. Dodson, L. G. Stang, Jr., George Ford, C. S. Fisher, Raymond K. Sheline, Mrs. R. K. (Yvonne) Sheline, Luis Marquez, Marguerite Marquez, Jane Wagner, Marg Parker, Paul Fields, F. W. Melpolder, T. B. Novey, Rene J. Prestwood, Lionel S. Goldring, J. Cobble, John W. Barnes, Kathryn Johnston, H. L. Finston, John R. Huizenga, James W. Cobble, J. S. Gilmore, W. H. Johnston, R. R. Tomilson, Frank G. Young, S. E. Stephanou, L. B. Werner, S. Katcoff, Louise Clark, J. J. Mitchell, E. H. Fleming, Jr., T. P. Kohman, D. S. Salley, F. C. Mead, Jr., F. Albaugh, R. R. Edwards, R. A. Brightsen, A. W. Martin, James Arnold, L. Yaffe, John W. Jones, W. W. Meinke, Philip Shapiro, J. M. Miller, J. C. Miskel, C. J. Borkowski, R. W. Fink, R. R. Williams, A. L. Thompson, George K. Schweitzer, H. M. DeAngellis, B. C. Haldar, Dale L. Milhelm, L. E. Glendenin, A. DeHann, Jr. A. W. Adamson, H. Suess, J. P. Cali, R. P. Schuman, E. J. Fang, John P. Butler, R. Spence, Richard Wolfgang, P. R. O'Connor, and R. P. Epple.

I talked with a number of people in the afternoon on a variety of subjects. Ray Sheline, Ray Stoughton, and Rod Spence asked for a copy of my Ohio State address.

Before the evening session the group was photographed (Figure 1).

Nathan Sugarman and I were the discussion leaders for the evening session for the topic, "High Energy Nuclear Reactions." Scheduled speakers included A. L. Thompson and Iz Perlman, Jack Miller and Ed Wigg, Luis Marquez and Tony Turkevich. The topic is so large that it will be continued tomorrow.

GORDON RESEARCH CONFERENCES, AAAS

NEW HAMPTON SCHOOL
NEW HAMPTON, N.H.

CONFERENCE ON NUCLEAR CHEMISTRY

June 22-27, 1952

Glen T. Seaborg, Charles D. Coryell, Co-Chairmen

informal
names not
new names
Program spill over
stay within time
Notre Dame
This morning
target

Monday, June 23

1. Nuclear Physics for Nuclear Chemistry
Speakers, M. Goldhaber, G. Scharf-Goldhaber
2. High Energy Nuclear Reactions
Speakers, L. Markus, J.H. Miller, I. Perlman,
A. L. Thompson, A.L. Turkevich, E.O. Wieg

Discussion Leaders

- H. Goldhaber
G. T. Seaborg
M. Sugarman

Tuesday, June 24

3. High Energy Nuclear Reactions—continued
4. Decay Energetics and Systematics
Speakers, C. D. Coryell, G. T. Seaborg
T. P. Kohman, *Suess*

Berkeley
Chemical
Harvard
Carnegie Tech

Wednesday, June 25

5. Nuclear Fission
Speakers, L. E. Glendenin, R.W. Spence
N. Sugarman, A.L. Turkevich, *Balaban*, *Yaffee*
6. Tracers, Exchange Reactions (including report from the A.C.S.
Notre Dame Conference)
Speakers, James Cobble, A.W. Adamson, R. W. Dodson
Mrs Wilson

- C. D. Coryell
J.W. Kennedy

Thursday, June 26

7. Hot Atom Chemistry
Speakers, R. R. Edwards, W. H. Hamill, R.R. Williams, Jr.
8. Techniques
Speakers, C. J. Borjowski, A. Chiorso, *Fisher*

- J. E. Willard
G. Friedlander

Friday, June 27

9. Heavy Element Chemistry
Speakers, B. B. Cunningham, J. C. Hindman, S. G. Thompson,
E. F. W. *Sturman*, *Stephanian*

- J. J. Katz

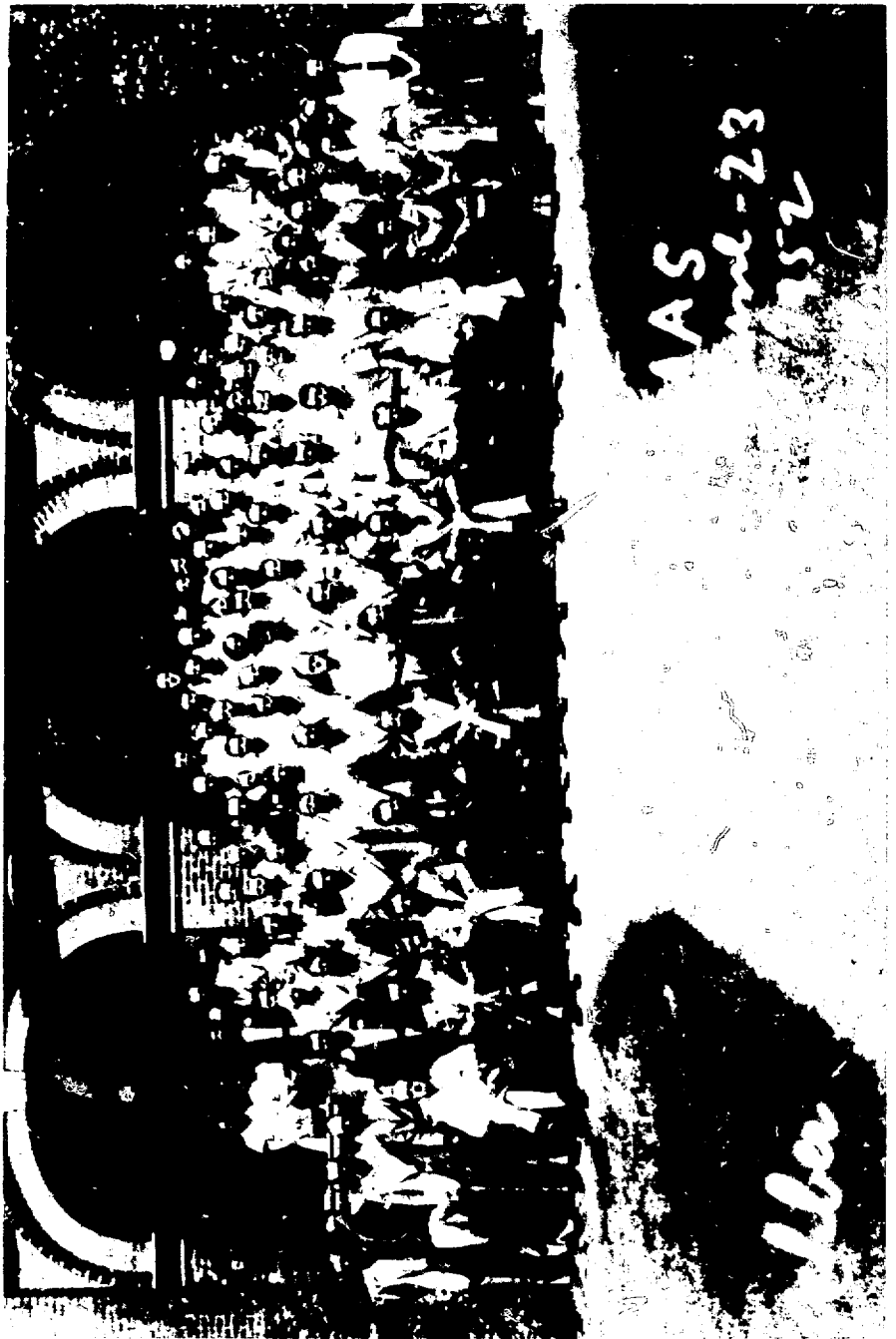
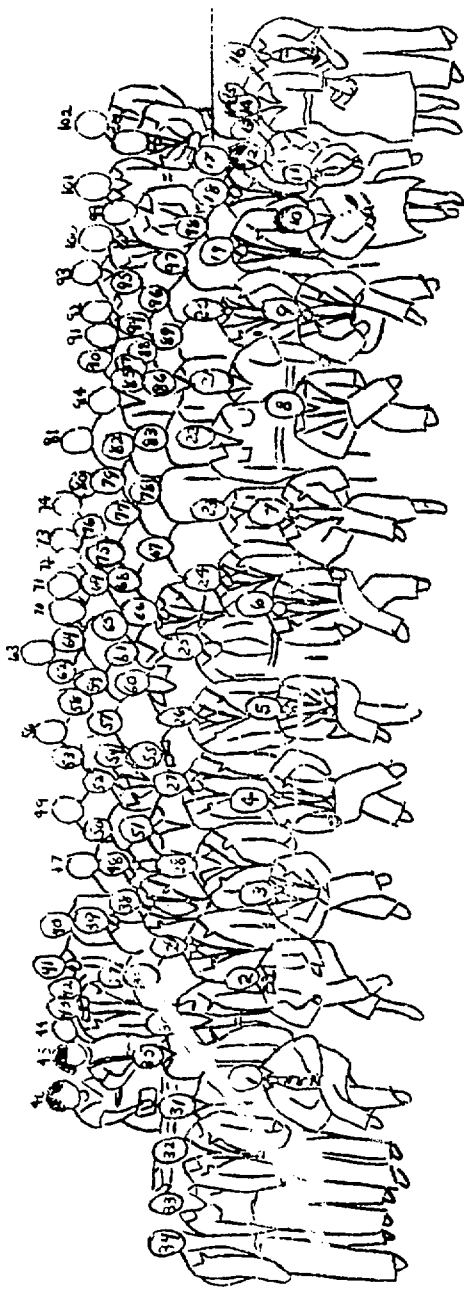


Figure 1

AAAS = Nuclear Chemistry



June, 23, to June 27, 1952

GORDON CONFERENCE
JUNE 23 to June 27, 1952

- 1) DR. PARKS
- 2) N. SUGARMAN
- 3) J. E. WILLARD
- 4) M. GOLDBABER
- 5) I PERLMAN
- 6) C. CORYELL
- 7) G. T. SEABORG
- 8) G. FRIEDLANDER
- 9) J. W. KENNEDY
- 10) GERTRUDE SCHARFF-GOLDBABER
- 11) MICHAEL A. GOLDBABER
- 12) JOAN WELKER
- 13) JEROME HOWLAND
- 14) ELIZABETH D. WILSON
- 15) CLARENCE HEININGER
- 16) CARL R. WILSON
- 17) BRUCE DROPENSKY
- 18) ALOIS LANGER
- 19) A. GHIORSO
- 20) I. B. WHITNEY
- 21) W. CRANE
- 22) K. STREET
- 23) L. O. MORGAN
- 24) L. B. MAGNUSSON
- 25) EDGAR F. WESTRUM, JR.
- 26) O. F. HILL
- 27) H. W. ALTER
- 28) A. D. KIRSHENBAUM
- 29) G. W. PARKER
- 30) JOHN R. BRADFORD
- 31) L. S. FOSTER
- 32) NATHAN E. BALLOU
- 33) L. ZUMWALT
- 34) WILLIAM H. BEAMER
- 35) A. F. VOIGT
- 36) E. O. WIG
- 37) R. W. DODSON
- 38) L. G. STANG, JR.
- 39) GEORGE FORD
- 40) C. S. FISHER
- 42) RAYMOND K. SHELINÉ
- 42) YVONNE SHELINÉ (MRS. R. K.)
- 43) LUIS MARQUEZ
- 44) MARGUERITE MARQUEZ
- 45) JANE WAGNER
- 46) MARG. PARKER
- 47) PAUL FIELDS
- 48) F. W. MELPOLDER
- 49) T. B. NOVEY
- 50) RENE J. PRESTWOOD
- 51) LIONEL S. GOLDRING
- 52) J. COBELE
- 53) JOHN W. BARNES
- 54) KATHRYN JOHNSTON
- 55) H. L. FINSTON
- 56) JOHN R. HUIZENGA
- 57) JAMES W. COBBLE
- 58) J. S. GILMORE
- 59) W. H. JOHNSTON
- 60) R. H. TOMLINSON
- 61) FRANK G. YOUNG
- 62) S. E. STEPHANOU
- 63) L. B. WERNER
- 64) S. KATCOFF
- 65) LOUISE CLARK
- 66) J. J. MITCHELL
- 67) E. H. FLEMING, JR.
- 68) T. P. KOHMAN
- 69) D. S. SALLEY
- 70) F. C. MEAD, JR.
- 71) F. ALBAUGH
- 72) R. R. EDWARDS
- 73) R. A. BRIGHTSEN
- 74) W. W. MARTIN
- 75) JAMES ARNOLD
- 76) L. YAFFE
- 77) JOHN W. JONES
- 78) W. W. MEINKE
- 79) PHILIP SHAPIRO
- 80) J. M. MILLER
- 81) J. C. MISKEL
- 82) C. J. BORKOWSKI
- 83) R. W. FINK
- 84) R. R. WILLIAMS
- 85) A. L. THOMPSON
- 86) GEORGE K. SCHWEITZER
- 87) H. M. DE ANGELIS
- 88) B. C. HALDAR
- 89) DALE L. MILHELM
- 90) L. E. GLENDENIN
- 91) A. DE HAAN, JR.
- 92) ?
- 93) A. W. ADAMSON
- 94) H. SUESS
- 95) J. P. CALI
- 96) R. P. SCHUMAN
- 97) E. J. FANG
- 98) JOHN P. BUTLER
- 99) R. SPENCE
- 100) RICHARD WOLFGANG
- 101) P. R. O'CONNOR
- 102) R. P. EPPLE

Tuesday, June 24, 1952 - New Hampton, New Hampshire

The morning session consisted of a continuation of the topic of High Energy Nuclear Reactions with the remainder of the scheduled speakers giving their talks.

The free afternoons allow time for a lot of discussion, both scientific and personal, among the participants. Among the people with whom I talked were Turkevich (on pi meson reactions), Kohman (he wants me to predict the alpha decay energy of Pb^{204} ; he also thinks that Ca^{48} and V^{50} are beta unstable), Miller (interested in the reactions products of cobalt + 340 Mev protons), Sugarman (on pi meson reactions), Coryell (on the mass equation), and M. Goldhaber (he questions the isotopic assignment of 2-hour γ^{88}).

The discussion leader for the evening session was Isadore Perlman, and the topic was Decay Energetics and Systematics. I was the first speaker, Hans Suess then spoke, followed by Charles Coryell and Truman Kohman. In Kohman's talk he suggested that Pb^{204} should have an alpha half-life of 5×10^{16} years and wondered if the approximately 3 Mev alpha particle could be detected by nuclear emulsions.

Wednesday, June 25, 1952 - New Hampton, New Hampshire

Charles Coryell led this morning's discussion on nuclear fission with several of the speakers talking about muon-induced fission. Speakers were Tony Turkevich, Larry Glendenin, Rod Spence, Nate Sugarman, Nate Ballou, John HuiZENga, and Leo Yaffe.

During the afternoon I managed to get out on the New Hampton School Golf Course for nine holes of golf with Al Ghiorso, Rod Spence, and Iz Perlman (AG-41, RS-45, IP-42, GTS-39).

Joe Kennedy, who was the discussion leader for the evening session on Tracers and Exchange Reactions, gave a report of the recent ACS Symposium at Notre Dame. Speakers were Dick (R. W.) Dodson, Arthur W. Adamson, Elizabeth D. Wilson, and James Cobble.

After the evening session I chatted for a while with Jim Cobble, who will be coming to Berkeley this fall in a postdoctoral position.

Thursday, June 26, 1952 - New Hampton, New Hampshire

John Willard led the morning session on Hot Atom Chemistry with speakers William H. Hamill and Russell R. Williams, Jr., Raymond R. Edwards, Arthur W. Adamson, and James Cobble.

The evening session on Techniques was led by Gert Friedlander and

had as speakers, C. S. Fisher, Casimer Borkowski, Maurice Goldhaber, Henry G. Thode, Bernard Harvey, Al Ghiorso, Earl Hyde, and others.

After the session I got together with Gert Friedlander and discussed the possibility of his visiting Berkeley for a couple of months to confer on work of mutual interest.

Friday, June 27, 1952 - New Hampton, New Hampshire

Joe Katz led the final session of the first Gordon Conference on Nuclear Chemistry this morning on the subject of Heavy Element Chemistry. Speakers were Burris Cunningham, Stan Thompson, Clark Hindman, Stephen E. Stephanou, and Ed Westrum.

Sunday, June 21, 1953 - Franklin/New Hampton, New Hampshire

The trip from Franklin to New Hampton was made by cab. I was assigned to Room 11, Berry Hall. After greeting some old friends, Iz (who is co-chairman with Charles Coryell this year for this second Gordon Conference on Nuclear Chemistry) and I played nine holes of golf on the New Hampton School Golf Course, a rather short (4,020 yards), par 66 layout in which the 18 hole normal round is achieved by playing the nine-hole course twice (IP-38, GTS-44).

There was much socializing after dinner. I talked with old acquaintances and former students, such as Karl-Erik Zimen of Göteborg, Bill Jenkins, and Norman Bonner, et al., (Figure 2).

Monday, June 22, 1953 - New Hampton School, New Hampton, New Hampshire

This morning's session was devoted to Nuclear Systematics and chaired by Katharine Way (Bureau of Standards). Speakers were L. W. Nordheim (Duke) and I. Talmi (Princeton).

In the afternoon I played nine holes of golf with Rod Spence and Iz (RS-49, IP-42, GTS-41). The programs at these conferences, with the afternoons free, are set up to allow ample time for relaxation and conversation.

I chaired the evening session, again on Nuclear Systematics, with John Huizenga and Frank Asaro as speakers. [I heard a rather amusing story about Frank Asaro, who has never been in New England during the summer and was concerned about the temperature. So, he arrived in Chicago, where the temperature was over 100°, wearing a heavy winter overcoat.]

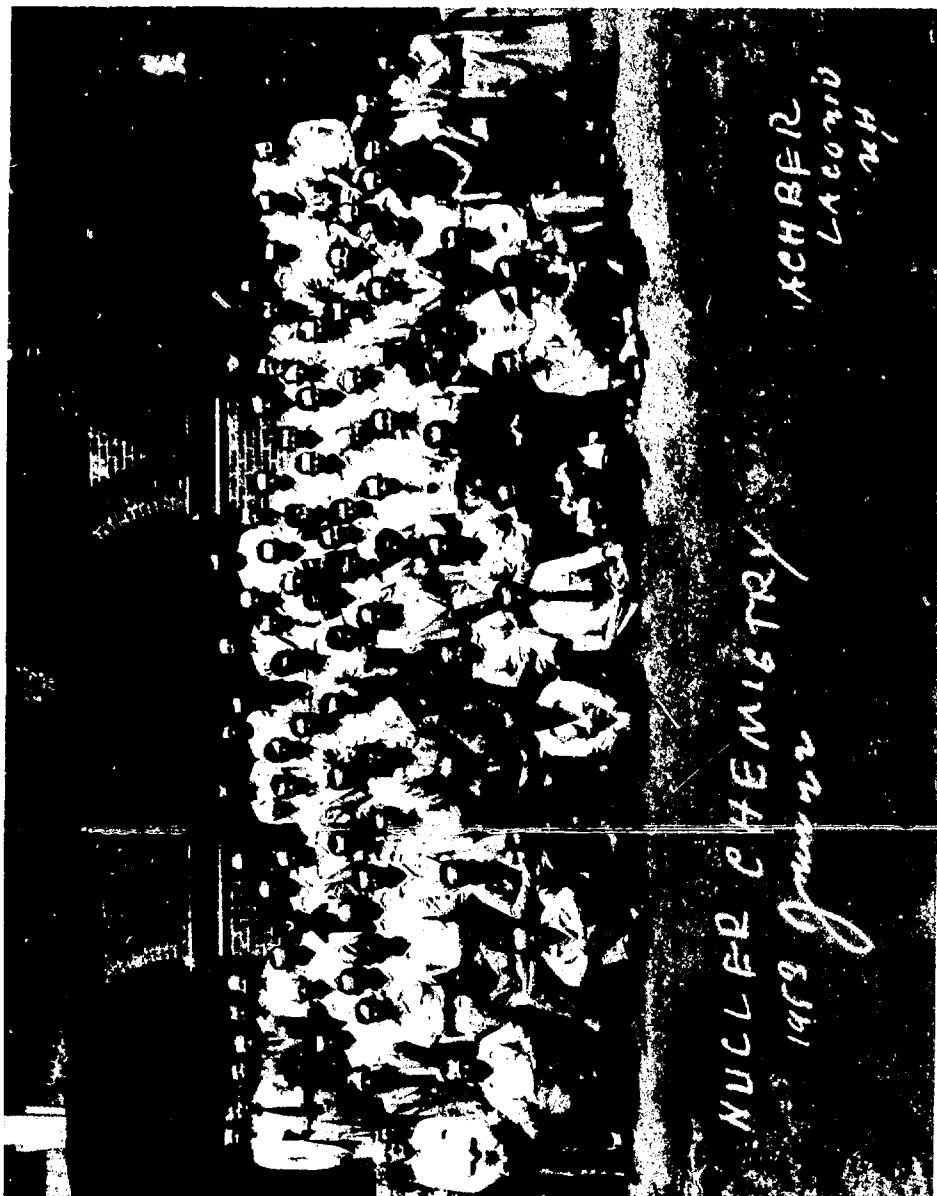
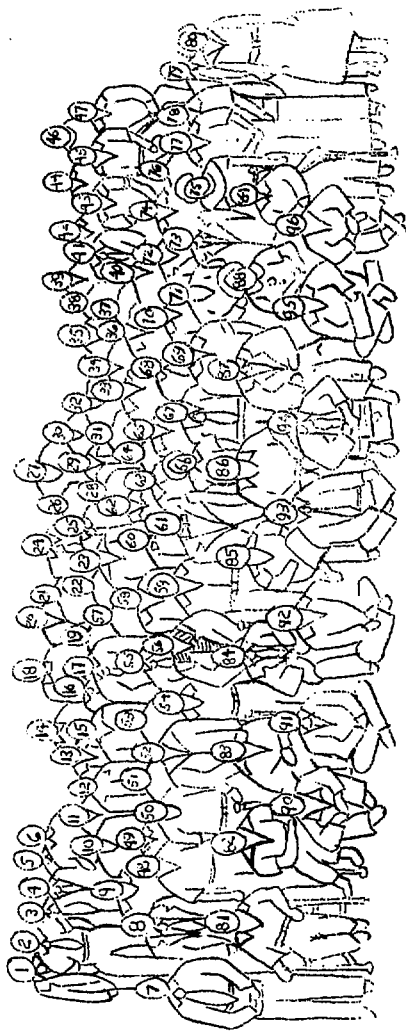


Figure 2

Nuclear Chemistry



June 21-26 1953

GORDON CONFERENCE
JUNE 21 to JUNE 26, 1953

- 1) J. W. KENNEDY
- 2) F. R. MACKENZIE
- 3) MANFRED LINDNER
- 4) L. O. MORGAN
- 5) R. H. TOMLINSON
- 6) R. HERBER
- 7) W. G. PARKS
- 8) G. B. COOK
- 9) LESTER WINSEBERG
- 10) A. R. BROSI
- 11) LEO YAFFE
- 12) R. B. LEACHMAN
- 13) W. W. MEINKE
- 14) A. W. FAIRHALL
- 15) R. E. BATZEL
- 16) E. O. WIG
- 17) H. E. MENKER
- 18) N. SUGARMAN
- 19) D. R. WILES
- 20) R. C. FIX
- 21) W. HECKKOTTE
- 22) R. A. JAMES
- 23) C. I. BROWNE
- 24) PETER KAFALAS
- 25) R. F. RIDER
- 26) GHOLAM W. BAZORGAN
- 27) SEERWOOD ROWLAND
- 28) R. W. FINK
- 29) PAUL FIELDS
- 30) PAUL M. LANTZ
- 31) E. K. HYDE
- 32) A. A. CARETTO
- 33) HENRY SELIG
- 34) JOHN R. HUIZENGA
- 35) BRUCE DROPEFSKY
- 36) J. W. COBBLE
- 37) J. S. GILMORE
- 38) T. P. KOHMAN
- 39) C. G. HEININGER
- 40) A. W. SCHARDT
- 41) T. V. IRVINE
- 42) R. M. DIAMOND
- 43) VAN GOETSENHAUEN
- 44) S. S. FRASER
- 45) N. E. BALLOU
- 46) T. ALEX EASTWOOD
- 47) R. A. NAUMANN
- 48) J. M. MILLER
- 49) M. L. PERLMAN
- 50) A. K. DAS GUPTA
- 51) S. N. WALTON
- 52) J. T. HORECZY
- 53) JOHN P. BALAGNA
- 54) JOHN W. WINCHESTER
- 55) THEODORE C. ENGELDER
- 56) ARTHUR KANT
- 57) E. H. FLEMING
- 58) NORMAN BONNER
- 59) H. L. FINSTON
- 60) L. G. STANG, JR.
- 61) L. S. GOLDRING
- 62) R. WOLFGANG
- 63) R. B. LEACHMAN
- 64) T. C. HOERING
- 65) J. HUDIS
- 66) H. L. SMITH
- 67) G. J. ATCHISON
- 68) S. A. REYNOLDS
- 69) T. SUGIHARA
- 70) R. J. PRESTWOOD
- 71) T. T. SHULL
- 72) J. M. HOLLANDER
- 73) NOBUFUSA SAITO
- 74) R. W. SPENCE
- 75) JOAN WELKER
- 76) GEORGE P. FORD
- 77) ELLIS P. STEINBERG
- 78) ALEX GREEN
- 79) R. K. SHELINE
- 80) MARION WOOD
- 81) G. FRIEDLANDER
- 82) FRED BROWN
- 83) L. E. GLENDENIN
- 84) E. SEGRE
- 85) I. PERLMAN
- 86) C. D. CORYELL
- 87) G. T. SEABORG
- 88) KATHARINE WAY
- 89) L. W. NORDHEIM
- 90) A. P. BAERG
- 91) P. FONG
- 92) F. ASARO
- 93) G. KAVANAGH
- 94) I. TALMI
- 95) R. A. BRIGHTSEN
- 96) A. ZUCKER

Tuesday, June 23, 1953 - New Hampton, New Hampshire

This morning's session was on Fission, chaired by Lawrence E. (Larry) Glendenin, and speakers included G. B. Cook (Harwell), H. G. Thode (McMaster University), Ellis P. Steinberg (Argonne), Nathan Sugarman (Argonne), and Manfred Lindner (Cal Research, Berkeley). The second part of the morning had J. S. Fraser (Chalk River), Robert B. Leachman (Los Alamos), and Peter Fong (University of Chicago) as speakers.

Truman Kohman chaired the evening session on Nuclear Systematics with Ron Brightsen (Westinghouse) and Alex E. S. Green (Florida State) as speakers. Brightsen spoke on isotope regularities that has occupied so much of his time recently. Green reported some new constants in the Weizsäcker mass equation. I learned that Kohman has found Nd^{144} with an alpha particle of about 1.9 Mev and a half-life of about 3×10^{16} years in natural neodymium, using photographic plates.

Wednesday, June 24, 1953 - New Hampton, New Hampshire

Emilio Segrè chaired the morning session on High Energy Transmutations and Photonuclear Reactions with Warren Heckrotte (Berkeley), J. M. (J. Malcolm) Miller (Columbia), and Gerhart Friedlander (Brookhaven) as speakers. Friedlander gave an interesting talk about their new "Cosmotron".

Rene Prestwood, Iz, Bill Jenkins, and I went out for nine holes of golf in the afternoon, but Iz had a terribly allergic reaction to a hornet sting and had to quit after one hole (RJP-35, WAJ-39, GTS-44).

Anthony L. (Tony) Turkevich chaired the evening session on High Energy Transmutations with speakers Isaac Halpern (MIT), Alexander Zucker (Oak Ridge), and Jack M. Hollander (Berkeley).

Thursday, June 25, 1953 - New Hampton, New Hampshire

Gerhart Friedlander chaired the morning session on Nuclear Techniques, Physical. The speakers were Morris L. Perlman (Brookhaven), Albert R. Brosi (Oak Ridge), and Alois W. Schardt (Oak Ridge). I spoke with Morris Perlman about fluorescence yields in the decay process.

Sunday, June 27, 1954 - New Hampton, New Hampshire

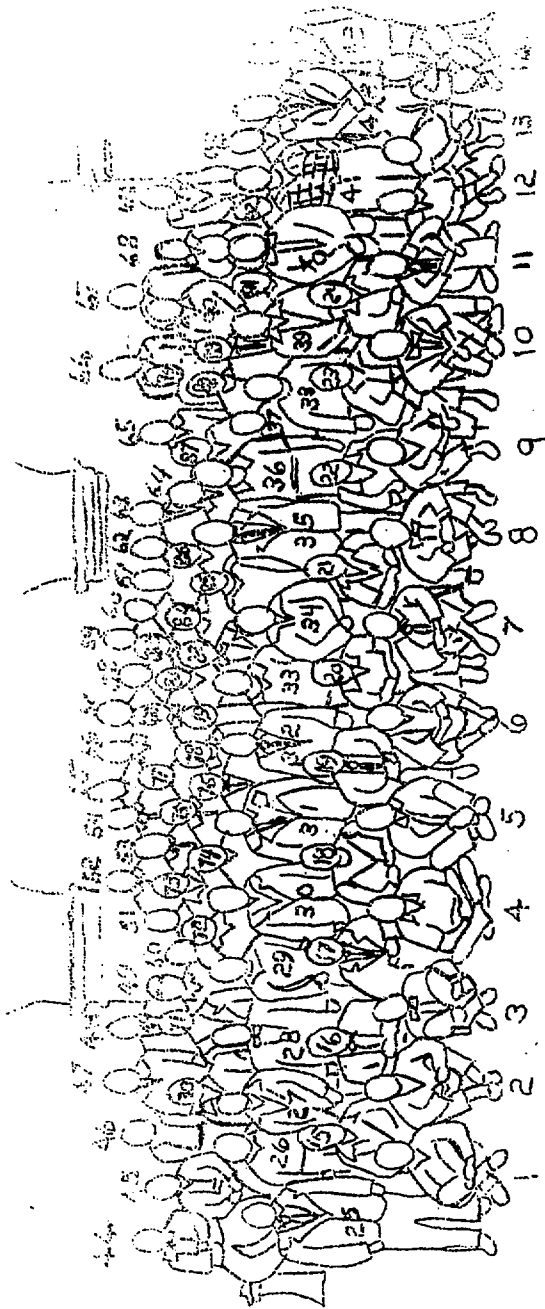
Gerhart Friedlander is Chairman and Truman P. Kohman is Vice-Chairman of this year's Gordon Conference. The group was photographed (Figure 3).



Figure 3

CORLON RESEARCH CO.
NEW HAVEN, CT.
NEW BRITAIN, CT.

Nuclear Chemistry



June 27- July 2, 1954

GORDON CONFERENCE
JUNE 17 to JULY 2, 1964

- 1) R. A. GLASS
- 2) L. T. ALDRICH
- 3) P. M. HURLEY
- 4) D. C. PEASLEE
- 5) R. C. HAWKINGS
- 6) J. R. ARNOLD
- 7) HANS SUESS
- 8) J. R. SIMANTON
- 9) R. W. FINK
- 10) R. WANIEK
- 11) G. E. BOYD
- 12) R. WOLFGANG
- 13) R. DIAMOND
- 14) B. C. HALDAR
- 15) J. O. RASMUSSEN
- 16) R. D. RUSSELL
- 17) J. RYDBERG
- 18) P. R. FIELDS
- 19) E. K. HYDE
- 20) G. FRIEDLANDER
- 21) T. P. KOHMAN
- 22) H. PRIMAKOFF
- 23) T. NOVEY
- 24) H. FRAUENFELDER
- 25) J. R. STEIN
- 26) R. A. SHARP
- 27) J. D. KNIGHT
- 28) H. L. FINSTON
- 29) GARY H. HIGGINS
- 30) L. R. BUNNEY
- 31) H. H. SELIGER
- 32) J. W. WINCHESTER
- 33) M. LOUNSBURY
- 34) R. H. GOECKERMANN
- 35) J. P. MARBLE
- 36) E. ALPERVICH
- 37) T. SUGIHARA
- 38) SOL WEXLER
- 39) R. K. SHELINE
- 40) L. R. ZUMWALT
- 41) CHARLES W. STANLEY
- 42) W. E. GRUMMITT
- 43) R. M. BROWN
- 44) N. SUGARMAN
- 45) M. WOLFSBERG
- 46) M. L. PERLMAN
- 47) R. W. DODSON
- 48) G. A. ESSIG
- 49) S. KATCOFF
- 50) M. FREDMAN
- 51) L. S. GOLDRING
- 52) J. W. KENNEDY
- 53) PETER KAFALAS
- 54) GEORGE P. FORD
- 55) F. S. ROWLAND
- 56) P. C. STEVENSON
- 57) R. H. TOMLINSON
- 58) E. O. WIG
- 59) J. A. PETRUSKA
- 60) D. GREENBERG
- 61) E. L. CHURCH
- 62) J. B. CUMMING
- 63) G. D. O'KELLEY
- 64) GEORGE A. COWAN
- 65) W. C. ORR
- 66) LE COUTEUR
- 67) J. A. MISKEL
- 68) JOAN WELKER
- 69) R. DAVIS
- 70) D. R. MILLER
- 71) L. A. WALL
- 72) J. M. MILLER
- 73) J. W. COBBLE
- 74) J. F. BLACK
- 75) W. S. BROECKE R
- 76) M. D'HONT
- 77) W. JOHNSTON
- 78) W. RUBINSON
- 79) P. KRUGER
- 80) S. G. ENGLISH
- 81) A. TURKEVICH
- 82) R. A. BRIGHTSEN
- 83) J. R. HUIZENGA
- 84) E. P. STEINBERG
- 85) L. LEVENTHAL
- 86) L. YAFFE
- 87) W. J. HEIMAN
- 88) H. F. NEFF
- 89) G. T. SEABORG
- 90) M. C. MICHEL
- 91) A. A. CARETTO
- 92) N. A. BONNER
- 93) B. DROPESKY
- 94) R. A. NAUMANN

Monday, June 28, 1954 - New Hampton School, New Hampton, New Hampshire

George E. Boyd was the discussion leader at this morning's session on Nuclear Structure and Radioactivity, with Victor F. Weisskopf speaking on "The Collective Model of the Nucleus" and David C. Peaslee speaking on "Beta Decay as a Tool in Nuclear Structure Studies." The discussion was lively and informative.

In the usual free afternoon I played nine holes of golf on the New Hampton School Golf Course with Dick Glass, Truman Kohman, Paul Kruger (General Motors), and James R. Simanton (Carnegie Tech) (RAG-46, TPK-48, GTS-44, PK-43, JRS-59). These conferences always bring together people of mutual interests in a relaxed and informal atmosphere.

I chaired the evening meeting, a second session on Nuclear Structure and Radioactivity, and John Rasmussen gave a fine talk on "Low-Lying Nuclear Energy Levels in the Heavy Element Region and the Applicability of Certain Nuclear Models." The second speaker was T. P. Kohman on "Long-Lived Radioactivities." Among other things Kohman predicted the alpha half-life of W^{180} to be 3×10^{14} years--Earl Hyde took notes on Kohman's predictions, which I will study when we get back to Berkeley.

Tuesday, June 29, 1954 - New Hampton, New Hampshire.

High Energy Nuclear Reactions was the subject of today's sessions, and Julian Malcolm (Jack) Miller was the morning's discussion leader. Speakers were K. L. LeCouteur (Liverpool) on "The Evaporation Phase of High-Energy Reactions" and Ralph W. Wanick (Harvard) on "Photographic Emulsion Data on High-Energy Reactions and their Relation with Radiochemical Evidence."

Nate Sugarman was the discussion leader for the evening session on High-Energy Nuclear Reactions, and Gerhart Friedlander spoke on "Yields of Nuclear Reactions in the Cosmotron." The second talk was given by Tony Turkevich on "Excitation Functions." Tony covered 100-350 Mev proton reactions on carbon, cobalt, copper, Zinc, yttrium, and cesium.

Wednesday, June 23, 1954 - New Hampton, New Hampshire

John P. Marble (National Research Council) was discussion leader for the morning session on Radiogeochronometry; speakers were Hans E. Suess on "Dating of Recent Geologic Events" and Lykman Thomas Aldrich on "Dating of Common Types of Rocks."

I got together with John Huizenga in the afternoon and talked about a number of things, including the spontaneous fission systematics. John said he believes that Argonne has spontaneous fission half-lives for Cf^{249} and 99^{253} . John, who is going to spend a sabbatical at the Nuclear Institute of Physics in Amsterdam shortly, gave me his address there.

The evening session was on Nuclear Cosmochemistry with Truman Kohman as discussion leader and James Arnold speaking on "Radioactivity and Cosmic History." Arnold said that cosmic rays should produce detectable yields (which he predicted) of C^{14} , H^3 , Be^7 , F^{18} , and Cl^{36} in nature. The largest yields are C^{14} from $N^{14}(n,p)$, and the measured yield of C^{14} in living wood is 15.5 dis/min/g of carbon.

Monday, June 27, 1955 - Kimball Union Academy, Meriden, New Hampshire

The third host site, Kimball Union Academy, opened in 1954. Before the meeting started, both Gerhart Friedlander and Adolf Voigt (Iowa State) approached me about their need for a post Ph.D. man; I said I will think about the matter.

Rene Prestwood, Roderick Spence, and Iz Perlman went with me to the Hanover County Club for some golf and conversation. We played nine holes (RJP-40, RWS-54, IP-56, GTS-54) and shot a couple of more holes.

The evening session was on Nuclear Reactions at Energies Below 100 Mev with Friedlander as discussion leader. James W. Cobble (Purdue) spoke on "Fission-Spallation Competition at Low Energies" (covering work done at Berkeley) and Richard Diamond (Cornell) talked about "Production of Isomers and Excitation Functions below 100 Mev."

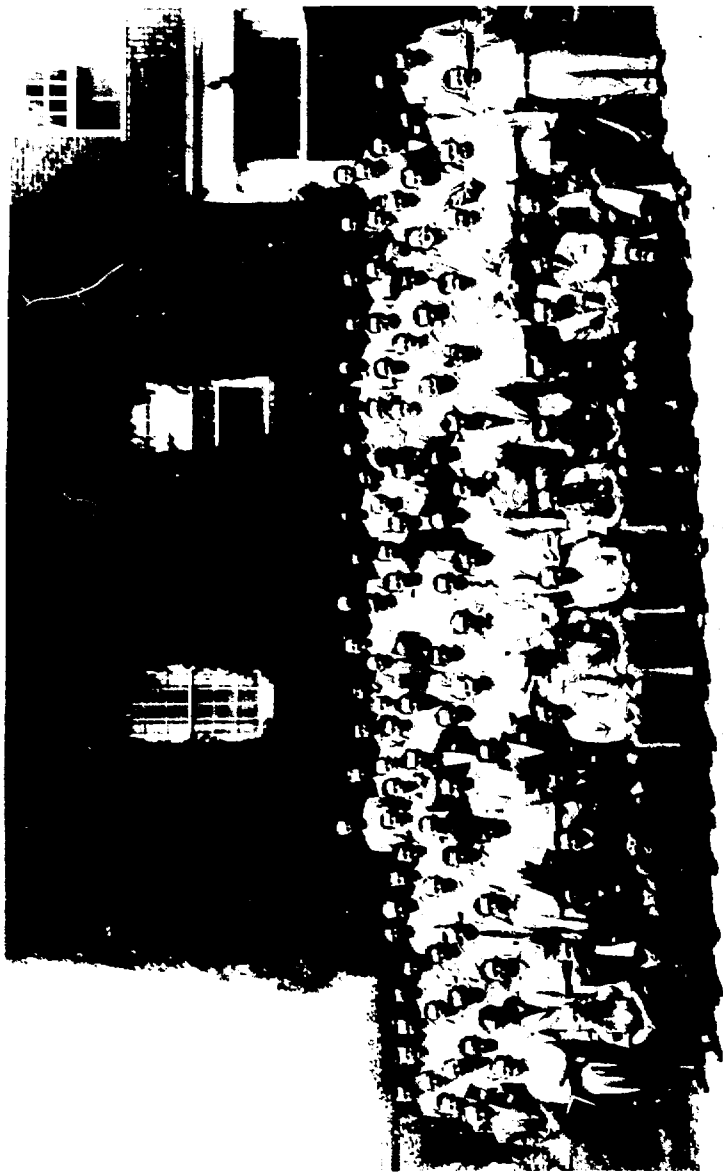
At one point the participants gathered in order to have an official photograph of the group taken (Figure 4).

Tuesday, June 28, 1955 - Meriden, New Hampshire

Nuclear Reactions Induced by Heavy Ions was the topic this morning with the discussion leader being G. Breit. Wilhelm Forsling of the Nobel Institut for Fysik in Stockholm spoke about their 90-cm cyclotron (internal target) with its capability to accelerate C^{12} , N^{14} , O^{16} , Ne^{20} , and Ne^{22} ions to about 12 Mev per nucleon, sufficient to exceed the potential barrier of uranium. He described the experiments of Hugo Atterling, Björn Aström, Lars Melander, and Forsling, who bombarded uranium with oxygen ions, produced, and chemically separated (fluoride precipitation, cation columns with lactate ion elution) a half-hour alpha emitter (7.7 ± 0.3 Mev), which they think may be due to 100^{250} .

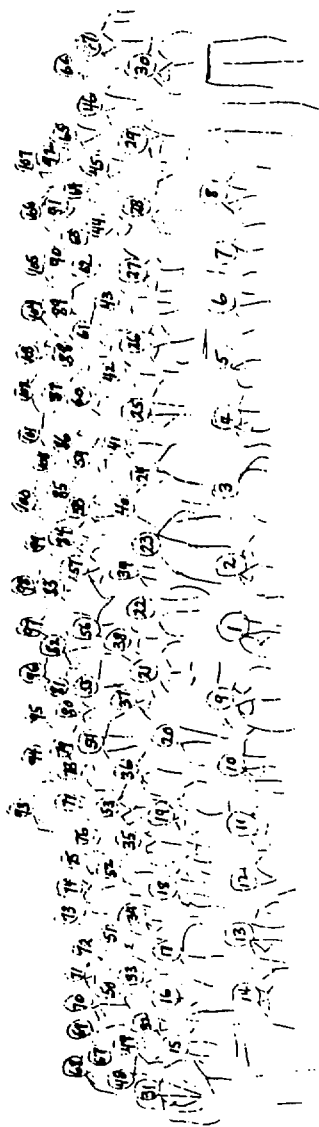
K. F. Chackett described their heavy ion work at Birmingham. They have bombarded uranium with C^{13} ions and observed the ratio of the yield of Cf^{246} to that of Cf^{244} to be 10. They plan to collaborate with Harwell in a program to attempt to synthesize new transuranium elements.

Other speakers this morning were Harry L. Reynolds of Oak Ridge on



NUCLEAR CHEMISTRY. JUNE 27, 1955

Figure 4



AAAS NUCLEAR CHEMISTRY JUNE 27, 1955

GORDON CONFERENCE
JUNE 17, 1965

- 1) A. TURKEVICH
- 2) L. YAFFE
- 3) H. G. HICKS
- 4) F. H. CRIPPS
- 5) J. C. ROY
- 6) A. P. BAERG
- 7) G. R. CHOPPIN
- 8) I. FERLMAN
- 9) W. H. BEAMER
- 10) G. OWENS
- 11) R. L. WOLKE
- 12) T. H. NORRIS
- 13) H. L. REYNOLDS
- 14) R. C. FEBER
- 15) R. J. PRESTWOOD
- 16) E. P. STEINBERG
- 17) B. L. COHEN
- 18) B. L. ROBINSON
- 19) J. HUDIS
- 20) H. B. MATHUR
- 21) J. L. HUSTON
- 22) G. E. BOYD
- 23) R. L. HAWKINGS
- 24) P. KRUGER
- 25) R. H. TOMLINSON
- 26) A. F. VOIGT
- 27) J. P. BUTLER
- 28) B. G. HARVEY
- 29) R. R. SMITH
- 30) W. S. LYON
- 31) G. BREIT
- 32) A. M. FRIEDMAN
- 33) N. E. BALLOU
- 34) H. P. ROBINSON
- 35) R. L. WOLFGANG
- 37) M. L. FERLMAN
- 38) J. B. CUMMING
- 39) R. E. NATHER
- 40) A. REID
- 41) G. B. ROSSI
- 42) E. L. FIREMAN
- 43) F. S. STEPHENS
- 44) W. H. FLEMING
- 45) J. R. ARNOLD
- 46) E. A. MARATELL
- 47) F. NELSON
- 48) L. KATZ
- 49) P. MORRISON
- 50) L. E. GLENDENIN
- 51) H. L. FINSTON
- 52) G. N. WALTON
- 53) R. M. DIAMOND
- 54) N. SUGARMAN
- 55) A. CARETTO
- 56) G. W. REED
- 57) G. D. O'KELLEY
- 58) R. K. SHELINE
- 59) H. A. TEWES
- 60) R. W. HOFF
- 61) B. F. RIDER
- 62) J. O'CONNOR
- 63) F. B. HARRISON
- 64) C. L. COWAN
- 65) F. REINES
- 66) S. BERKO
- 67) G. FRIEDLANDER
- 68) K. STREET
- 69) R. F. CHACKETT
- 70) R. A. NAUMANN
- 71) J. M. MILLER
- 72) D. H. GREENBERG
- 73) C. D. CORTYLL
- 74) E. A. ALPEROVITICH
- 75) R. W. SPENCE
- 76) T. P. KOHMAN
- 77) R. P. SCHUMAN
- 78) T. A. EASTWOOD
- 79) R. C. KOCH
- 80) S. KATCOFF
- 81) R. A. SCHMITT
- 82) G. T. SEABORG
- 83) F. S. ROWLAND
- 84) J. W. IRVINE
- 85) P. KAFALAS
- 86) E. R. BERINGER
- 87) D. A. HICKS
- 88) J. W. COBBLE
- 89) E. SHAPIRO
- 90) B. KETELLE
- 91) R. W. FINK
- 92) B. J. DROPSKY
- 93) G. P. FORD
- 94) J. S. GILMORE
- 95) W. W. CRANE
- 96) E. K. HYDE
- 97) C. WILSON
- 98) E. WIIG
- 99) R. E. BELL
- 100) J. M. ROBSON
- 101) C. E. CROUTHAMEL
- 102) R. C. FIX
- 103) R. DAVIS
- 104) S. THULIN
- 105) F. ASARO
- 106) L. S. GOLDRING
- 107) J. D. JACKSON
- 108) T. T. SUGIHARA

"Excitation Functions for Nitrogen-Induced Reactions," and Bernie Rossi, who described how the intensity of accelerated projectiles was increased (by a factor of 50-100) in the 60-inch cyclotron. E. Robert Beringer (in place of Breit, who was scheduled) spoke on "Yale Plans for a Heavy Ion Accelerator" and described the history of building a heavy ion accelerator at Yale. They chose a linear machine in order to maximize flexibility, plan for up to 10 Mev per nucleon, and hope to accelerate ions from neon up to argon. Beringer showed a line drawing of the planned machine. They will favor the heaviest ions and plan to accelerate more than one ion at a time. He added that they hope to confine 40% of the beam in an area of one cm² and said an optimistic time schedule for construction is one and one-half years.

The evening session, Nuclear Reactions in the Bev Region, had Nathan Sugarman (University of Chicago) as the discussion leader with speakers K. Chackett (Birmingham) on "Spallation Products Formed in Light Elements with Protons of Energy up to 0.95 Bev, G. Friedlander (Brookhaven) on "Radiochemical Studies at the Cosmotron". He spoke on spallation studies on carbon, aluminum, and lead and said the results can be explained by the classical Serber-Goldhaber knock-on cascade model (modified by a meson production model), and Earl K. Hyde on "Radiochemical Studies at the Bevatron."

Wednesday, June 29, 1955 - Meriden, New Hampshire

Leo Yaffe presided at this morning's session, whose topic was Nuclear Fission. I was the first speaker and talked about "Spontaneous Fission," beginning with the historical background, discussion of the data, the various systematics and explanations that have developed. I described the correlation of spontaneous fission rates published by Seaborg and by W. J. Whitehouse and W. Galbraith in 1951, and how this was modified by John Huizenga. (My slides--24 in total--used the symbols E and Fm for elements 99 and 100, and I admonished my audience that this is off-the-record and not yet an announcement). In the talk I predicted that spontaneous fission half-lives will drop to microseconds around element 108 and to 10⁻²⁰ seconds at Z = 112-116. I emphasized the stabilizing effect of 152 neutrons and used the shell model and Nilsson (Sven-Gösta) plots to describe the stabilizing effects of 152 and 184 neutrons and 126 protons.

Other speakers this morning included Ellis P. Steinberg (Argonne) on "Fission Yields and Fine Structure by Mass Spectrometry," R. H. Tomlinson (McMaster University) on "Thermal Neutron Fission Yields in U²³⁵," Sigvard Thulin on "Rare Gas Fission Products," and Grover (Dave) Davis O'Kelley (Oak Ridge) on "Short-Lived Fission Products."

Sunday, June 24, 1956 - Meriden, New Hampshire

Leo Yaffe is Chairman of this year's Gordon Research Conference on

Nuclear Chemistry at Kimball Union Academy, and Earl Hyde is Vice Chairman. I was given Room 20 in Dexter Richards Hall.

Monday, June 25, 1956 - Kimball Union Academy, Meriden, New Hampshire

Leo Yaffe opened the first session of the Conference with some introductory business, and then John Rasmussen chaired the morning session. The speakers were Benjamin R. Mottelson on "The Unified Nuclear Model," Iz Perlman on "Nuclear Spectra in the Heavy Elements," and F. K. McGowan on "Coulomb Excitation Studies."

After lunch there was a lot of renewing of old acquaintances and greeting of new friends; a photograph was taken of the group (Figure 5).

I also spoke with Samuel S. (Sam) Markowitz, whom Iz met last summer and with whom he was most impressed. Markowitz wants to come to Berkeley beginning in October 1957 in a postdoctoral position.

Rasmussen also chaired the evening session. At this session the speakers were A. E. Litherland (Chalk River) on "Rotational Levels in the Region $A=25$," J. M. Hollander on "Some Electron Spectroscopic Studies in the Heavy Element Region," Eugene L. Church on "Internal Conversion Coefficients," and Gertrude Scharff-Goldhaber on "Regularities in Heavy Even-Even Nuclei."

Tuesday, June 26, 1956 - Meriden, New Hampshire

J. Malcolm (Jack) Miller chaired the morning session, and George Igo (Los Alamos) spoke on "The Energy and Angular Distribution of Outgoing Particles in Low Energy Reactions." Igo reported that low energy neutrons, protons, and alpha particles on gold give too many high energy neutrons or protons, forward peaked, to be accounted for by the compound nucleus mechanism.

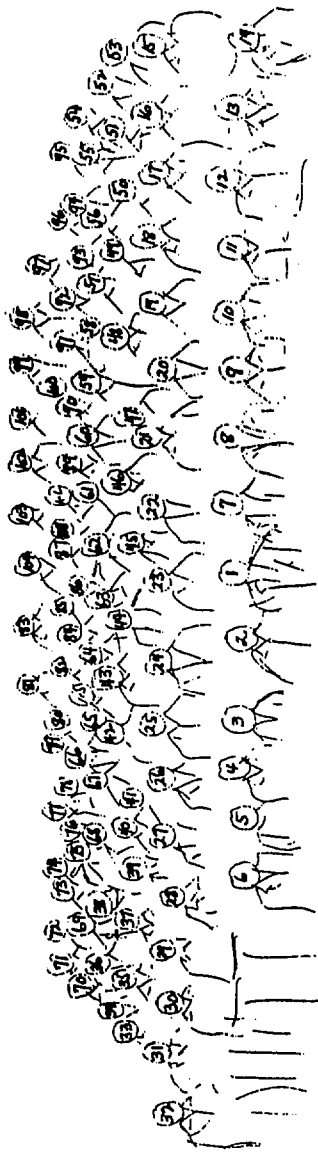
I then gave my talk on "Reactions of Alpha Particles with the Heavy Elements." I said that our group at Berkeley has been making a systematic investigation of the products and the mechanism of the reactions produced by helium ions on some 18 target nuclei, ranging from Th^{232} to E^{253} . The group consists of Stan Thompson, Al Ghiorso, Bernie Harvey, Greg Choppin, Alfred Chetham-Strode, Jim Cobble, Dick Glass, and Bill Wade. The graduate students involved are Bob Carr, Lt. Walter Gibson, Darrah Thomas, Bob Vandenbosch, Sue Vandenbosch, Bruce Foreman, Paul Donovan, and Jose Gonzalez-Vidal. I concluded with a description of the Heavy Ion Linear Accelerator that we have under construction (10 Mev/nucleon, 5-10% efficiency, 2% duty cycle) with the help of C. Van Atta and E. Hubbard. I noted that a duplicate is being built at Yale.

Following my talk, James W. Meadows (Harvard) spoke on "Proton Excitation Functions" and emphasized the observation of high energy tails



NUCLEAR CHEMISTRY
JUNE 25 1956

Figure 5



GORDON RESEARCH CONFERENCE, AAS
KIMBALL UNION. ACADEMY
MERIDEN, N. H.

NUCLEAR CHEMISTRY
JUNE 25, 1956

GORDON CONFERENCE
JUNE 25, 1956

- 1) L. YAFFE
- 2) E. K. HYDE
- 3) G. S. GOLDBERGER
- 4) M. GOLDBERGER
- 5) N. CARBONE
- 6) B. KARLIK
- 7) N. SUGARMAN
- 8) G. T. SEABORG
- 9) G. FRIEDLANDER
- 10) J. O. RASMUSSEN
- 11) J. M. MILLER
- 12) C. D. CORYELL
- 13) R. A. NAUMANN
- 14) W. Z. LEAVITT
- 15) L. R. BUNNEY
- 16) N. E. BALLOU
- 17) L. B. MAGNUSSEN
- 18) R. WOLFGANG
- 19) R. A. SHARP
- 20) H. HAMAGUCHI
- 21) W. OTVOS
- 22) H. EL-BADRY
- 23) R. L. WOLKE
- 24) H. C. UREY
- 25) T. P. KOHMAN
- 26) P. FONG
- 27) B. R. MOTTelson
- 28) A. GOLDBERGER
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- 40) E. EICHLER
- 41) T. SUGIHARA
- 42) S. C. CURRAN
- 43) W. H. BARKAS
- 44) W. D. EHMANN
- 45) A. S. GOLDIN
- 46) R. A. RIGHTMIRE
- 47) N. PORILE
- 48) H. DIAMOND
- 49) D. ENGELKEMEIR
- 50) B. F. RIDER
- 51) M. E. JONES
- 52) J. D. BUCHANAN
- 53) L. WINSBERG
- 54) R. A. GLASS
- 55) S. MARKOWITZ
- 56) B. D. PATE
- 57) T. A. EASTWOOD
- 58) M. P. HEYDENBURG
- 59) G. M. TEMMER
- 60) F. K. MCGOWAN
- 61) J. W. BORN
- 62) C. M. JUDSON
- 63) H. L. FINSTON
- 64) W. W. MEINKE
- 65) W. T. BEAMER
- 66) L. LINDNER
- 67) A. V. ZUBER
- 68) L. A. BEACH
- 69) A. P. BAERG
- 70) J. R. HUIZENGA
- 71) L. W. HOLM
- 73) V. L. SCHINDEWOLF
- 73) J. E. GINDLER
- 74) E. L. CHURCH
- 75) A. J. CRUIKSHANK
- 76) E. P. STEINBERG
- 77) S. KATCOFF
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- 80) A. W. FAIRHALL
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- 82) D. S. MARTIN
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- 89) A. R. BROSI
- 90) F. STEPHENS
- 91) G. PARKER
- 92) E. O. WIG
- 93) J. W. COBBLE
- 94) W. H. WADE
- 95) R. DAVIS, JR.
- 96) G. W. REED
- 97) M. PERLMAN
- 98) B. GORDON
- 99) J. C. SHEPPARD
- 100) R. B. REGIER
- 101) H. G. RICHTER
- 102) C. W. STANLEY
- 103) A. E. LITTLERLAND
- 104) P. J. CAMPION
- 105) G. N. WALTON
- 106) A. A. CARETTO

from p,n; p,2n; and p,pn reactions on Cu⁶³.

I spoke with a number of people during the afternoon: I learned that Sherry Rowland is at the University of Kansas. I agreed to send transuranium data to A. G. W. Cameron at Chalk River. Cameron told me that he likes the Levy mass formula. Gert Friedlander told me about his Monte Carlo calculations on Maniac with Miller, Turkevich, and Metropolis to determine the distribution in A and Z of the products from proton bombardments of a wide range of targets.

Speaking at the evening session were Jack Miller on "Apparent Anomalies in Low Energy Reactions," Walter H. Barkas on "Abundance and Energy Spectrum of Evaporated Particles," and A. W. Fairhall (University of Washington) on "Alpha Reaction Studies."

Wednesday, June 27, 1956 - Meriden, New Hampshire

Claire C. Patterson (Cal Tech) chaired the morning session and the speakers were Charles (C. D.) Coryell on "Neutron and Proton Shells in the Cosmic Abundance of the Elements," A. G. W. Cameron on "Nuclear Reactions in Stars and Nucleogenesis," Edward L. Fireman (Brookhaven) on "Cosmic Ray Spallation Products in Meteorites," George W. Reed (Argonne) on "Uranium in Meteorites," and Truman P. Kohman (Carnegie Tech) on "Long-Lived Cosmic Ray Induced Radioactivities in Meteorites." I found Cameron's talk especially interesting. He described the evolution of stars and said the heaviest elements are made in supernovae up to Cf²⁵⁴. Hence, elements in our solar system were formed in previous supernovae explosions five billion years ago. Cf²⁵⁴ may account for the observed light decay of supernovae with a half-life of 55 days.

Thursday, December 27, 1956 - New York, New York

The Silver Anniversary of the Gordon Research Conferences was celebrated with a black tie banquet in the Commodore Hotel. I sat at the head table with John A. Behnke (Silver Anniversary Committee), Dr. John R. Bowman (Silver Anniversary Committee), Dr. Arthur K. Doolittle (immediate Past Chairman, Board of Trustees, AAAS), Dr. Karl Folkers (Chairman, Section C, Vice-President, AAAS), Mrs. Neil Gordon, Dr. Robert S. Morison (Director, Biological & Medical Research, Rockefeller Foundation), Dr. Emil Ott (Toastmaster-Chairman, Silver Anniversary Committee), Dr. W. George Parks (Director, Gordon Research Conferences), Mrs. W. George Parks, Dr. Clifford F. Rassweiler (President-Elect, ACS), Dr. Robert W. Schiessler (Chairman, Board of Trustees, AAAS), Dr. Paul Sears (President, AAAS), Dr. Alan Waterman (Director, National Science Foundation, and Dr. Dael Wolfe (Silver Anniversary Committee). The program, during which my talk was broadcast nationwide over NBC, had Emil Ott as Toastmaster, who began with "Introductions," and then spoke on "Twenty-Five Years of the Conferences." In this he gave tribute to the memory of Neil E. Gordon,

saying:

This year, as the Conferences round out their twenty-fifth year of probing the frontiers of science, we might well strive to measure just what, or how great, their contributions have been to the furtherance of knowledge and human understanding. But the inception of an idea, the origin of a theory, the broadening of the perspective of a creative mind--the entire processes of creative thinking--do not permit of simple measurement.

However, some criteria of the present stature of the Conferences are evident--the annual scope of their discussions, for instance (36 topics); the international reputation of many conferees; the number (4,000) of scientists who attend from many (46) countries.

Such figures profile an impressive change from the seminars which Dr. Gordon began in so modest a fashion. But what is far more significant is that neither the inherent nature nor purpose of the Conferences has changed over the years. The emphasis is still, just as it was years ago, on small, informal gatherings of knowledgeable men--men who relish the opportunity to indulge in unhurried discussion and to explore the thinking and theories of their scientific peers.

I was then introduced. My talk (Figure 6) was precisely timed to go out over the NBC radio network at 9:31 plus 10 seconds and to be concluded at 9:59 plus zero seconds. Entitled "The Future Through Science," it is being published in the December 28th issue of Science, of which I was given an advance copy, and my remarks followed closely this somewhat edited and expanded version. Some excerpts follow:

As we consider the future of our country and of the world, we can perceive that our human resources of trained brainpower in all fields, including those of science and engineering, are foreordained to be of crucial importance to our destiny. It is my belief that we only dimly perceive the extent to which this is true, and that by no means are we taking the necessary steps to encourage the adequate development of this brainpower.

We may look forward to many wonders in the coming 50 years. Large earth satellites will continuously circle the earth and monitor the weather, making weather prediction a much more certain matter. We may even effect large-scale control of the weather itself in some areas. Manned satellites may be possible, and space travel to the moon may be achieved. Large ships will be propelled almost exclusively by nuclear power plants. Air travel to any part of the world will be a matter of a few hours. We shall have TV phone communication. Our knowledge of photosynthesis and the processes of the living cell and bodily functions will be enormously more complete, giving us greater control of disease. We shall exercise greater control over human



Figure 6

fertility. Problems of mental health, delinquency, and crime should yield to better understanding of biology and of mental processes and social behavior.

We cannot take it for granted that these things will come to pass, that our country will continue to prosper, that the continuing international crises can be overcome without disaster. We must recognize the hazards and prepare ourselves to meet them. The last 25 years have emphasized to any discerning person the importance of trained brainpower to our future--to our scientific future in which our economic prosperity and military security are by no means assured. It would be perilous indeed to neglect the discovery, training, and encouragement of the intellectual leaders of this generation and of the generations of the future.

Sunday, June 23, 1957 - Meriden, New Hampshire

We arrived, after having lunch on the road, at about 6 p.m. and greeted old friends. Earl Hyde, Chairman of this year's Conference, introduced us to some of our foreign visitors and our two Russian guests, N. A. Perfilov and V. I. Goldanskii. [My friend, A. P. Vinogradov, was invited but was not given permission to attend.]

Monday, June 24, 1957 - Kimball Union Academy, Meriden New Hampshire

After welcoming remarks by the Director of the Kimball Union Academy, Earl Hyde, as Chairman, began the Conference with some introductory business--Nathan Sugarman is Vice-Chairman this year. The morning program, "Recent Evidence on the Electronic Structure of the Actinide Elements," was chaired by C. A. Hutchison, Jr., with speakers Mark Fred on "Optical Spectra" and Dieter Gruen on "Absorption and Fluorescent Spectra."

After lunch, photographs of the group were taken (Figure 7), including a separate one of various organizers and foreign guests.

This evening session was a continuation of the morning program with talks by W. H. Zachariasen on "Crystal Structure" and C. A. Hutchison, Jr., on "Paramagnetism."

Tuesday, June 25, 1957 - Meriden, New Hampshire

Today's program covered "High Energy Nuclear Reactions," chaired by G. Friedlander. A. Turkevich spoke on "Monte-Carlo Calculations of High Energy Nuclear Cascades," Friedlander presented a paper by I. Dostrovsky on "Some Reactions of 3-Bev Protons with Heavy Elements and Their Interpretation," and G. Rudstam talked about "Spallation of Some Medium-

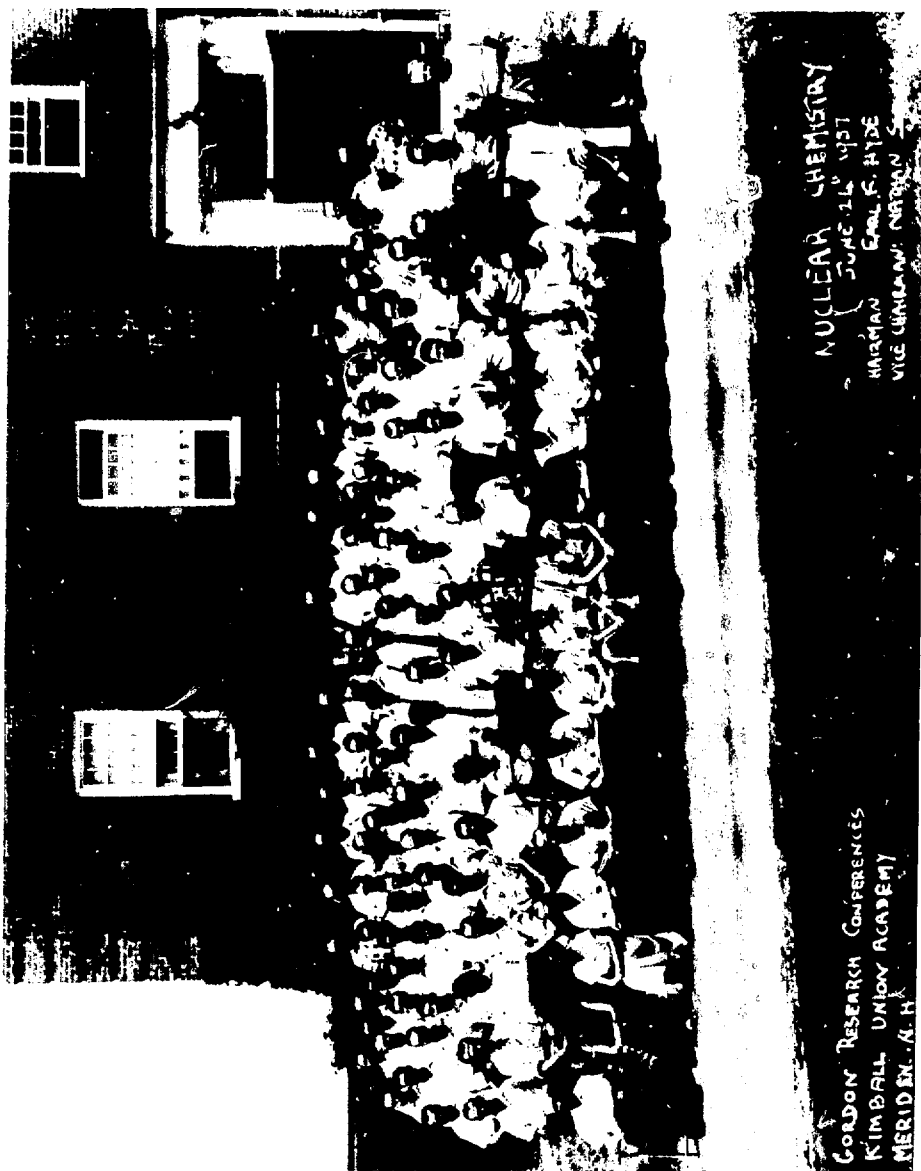
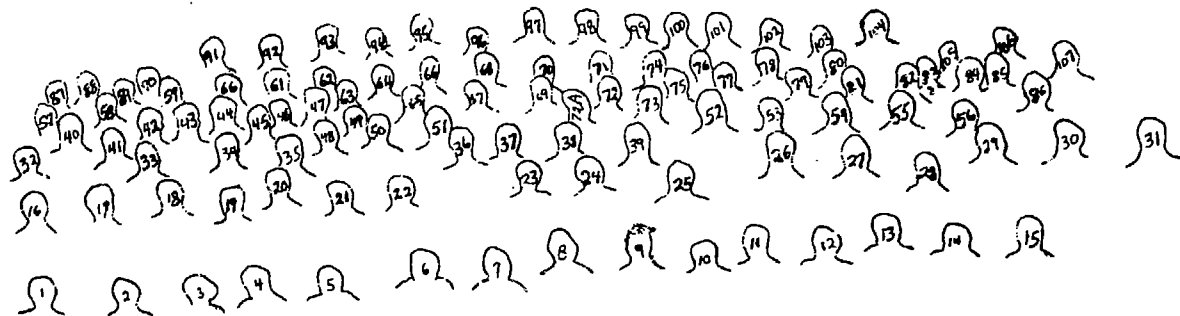


Figure 7



Gordon Research Conference
Kimball Union Academy
Meriden, New Hampshire

Nuclear Chemistry
June 24, 1957

GORDON CONFERENCE

JUNE 24, 1967

- 1) JERE D. KNIGHT
- 2) INGEBORG M. LADENBAUER
- 3) JEAN G. SMITH
- 4) GERHART FRIEDLANDER
- 5) LEO YAFFE
- 6) ANTHONY TURKEVICH
- 7) CLYDE A. HUTCHISON, JR.
- 8) NATHAN SUKGARMAN
- 9) EARL K. HYDE
- 10) W. J. SWIATECKI
- 11) GOSTA RUDSTAM
- 12) VITALI I. GOLDANSKII
- 13) GLENN T. SEABORG
- 14) NIKOLAY A. PERFILOV
- 15) LESTER WINSBERG
- 16) LLOYD A. CURRIE
- 17) NICHOLAS METROPOLIS
- 18) M. V. RAMANIAH
- 19) IRVING J. RUSSELL
- 20) GEORGE J. OWENS
- 21) THOMAS T. SUGIHARA
- 22) DEAN W. MAURER
- 23) RAYMOND GUNNINK
- 24) DONALD C. STUPEGIA
- 25) ABRAHAM S. GOLDIN
- 26) E. R. MERCER
- 27) LELAND R. BUNNEY
- 28) J. C. ROY
- 29) NATHAN E. BALLOU
- 30) RICHARD L. WOLFGANG
- 31) JAMES S. GILMORE
- 32) DIETER M. GRUEN
- 33) DON S. HARMER
- 34) BRIAN D. PATE
- 35) JEROME HUDIS
- 36) P. A. DEL MARMOL
- 37) H. P. MALAN
- 38) LEON LEVENTHAL
- 39) MENCHERO
- 40) E. A. MARTELL
- 41) LAWRENCE E. GLENDENIN
- 42) D. R. WILES
- 43) W. SEELMANN-EGGBERT
- 44) CHARLES M. JUDSON
- 45) BARRY M. GORDON
- 46) MARK S. FRED
- 47) ULRICH SCHINDEWOLF
- 48) BERNARD G. HARVEY
- 49) NORBERT T. PORILE
- 50) RAYMOND K. SHELINE
- 51) JOHN R. HUIZENGA
- 52) SAADIA AMIEL
- 53) WILLIAM D. EHMANN
- 54) RAYMOND DAVIS
- 55) MILLER
- 56) ELLIS P. STEINBERG
- 57) ANDREW F. STEHNEY
- 58) RICHARD W. LAMPHERE
- 59) R. H. TOMLINSON
- 60) WILLIAM A. RAINS
- 61) MC ISSAC
- 62) J. S. FRASER
- 63) JOHN G. CONWAY
- 64) NOAH JOHNSON
- 65) ARTHUR POZKANZER
- 66) SEYMOUR KATCOFF
- 67) JOHN M. ALEXANDER
- 68) G. DAVIS O'KELLEY
- 69) ALFRED CHETHAN-STRODE
- 70) J. MALCOLM MILLER
- 71) ROBERT A. NAUMANN
- 72) HARRY R. BOWMAN
- 72a) GERALD LANGE
- 73) MARCUS
- 74) GEORGE J. MARL
- 75) PAUL KRUGER
- 76) WILLIAM E. MOTT
- 77) KOCH
- 78) RONALD MACFARLANE
- 79) WALTER M. GIBSON
- 80) RIGHTMIRE
- 81) K. FRITZE
- 82) SHELDON KAUFMAN
- 83) WOLFGANG HENKEL
- 84) JAMES R. WHITE
- 85) JOSEPH ZAHRRINGER
- 86) EDWIN O. WIG
- 87) WILLIAM R. WARE
- 88) T. A. EASTWOOD
- 89) JAMES E. GINDLER
- 90) R. A. SCHMITT
- 91) W. H. BURGUSP
- 92) BRUCE DROPSKY
- 94) ALBERT A. CARETTO
- 95) HERRINGTON
- 96) A. J. CRUIKSHANK
- 97) T. DARRAH THOMAS
- 98) F. S. ROWLAND
- 99) FEDER J. ESTRUP
- 100) A. W. FAIRHALL
- 101) EDWARD ANDERS
- 102) WILLIAM H. ZACHARIASEN
- 103) T. D. NEWTON
- 104) JOHN C. HUBBS
- 105) MARVIN I. KALKSTEIN
- 106) GEORGE P. FORD
- 107) J. G. CUNINGHAME

Weight Elements with High Energy Protons."

After an afternoon of conversation, the evening session, again on "High Energy Reactions," began with a talk by L. Winsberg on "Studies of High Energy Nuclear Reactions Carried Out at the Berkeley Bevatron." N. Porile spoke on "Studies and Analysis of Nuclear Reactions of Bismuth and Tantalum with High Energy Protons," and I. Russell talked about "Radiochemical Studies of meson Induced Fission of U^{235} ."

Wednesday, June 26, 1957 - Meriden, New Hampshire

The morning session of the Conference, chaired by Anthony Turkevich, was devoted to "Research in the USSR on High Energy Reactions" with reports by N. A. Perfilov and V. I. Goldanskiĭ. Goldanskiĭ's English is much superior to Perfilov's, and Tony Turkevich helped with translation problems.

I again spent the afternoon conversing with the participants. Then, R. B. Leachman chaired the evening session on "Fission" with papers by R. Stokes on "d,p Fission; Fission Thresholds and Cross Sections," I. Halpern on "Angular Correlation of Fission Fragments," and E. P. Steinberg on "Mass Distribution in Neutron Resonance Fission from 1-10 Mev."

Thursday, June 27, 1957 - Meriden, New Hampshire

There was another business meeting this morning, at which time John Huizenga was elected Chairman and Morris Perlman Vice-Chairman of the 1958 Gordon Conference on Nuclear Chemistry. Preferences for Colby Junior College as a site for our Conference was expressed.

Then the Conference continued with the discussion of "Fission." R. Pyle spoke on "Neutron Multiplicities," L. Glendenin talked about "Relative Yields of Nuclear Isomers," and W. J. Swiatecki covered "Fission Theory".

Sunday, June 22, 1958 - Meriden, New Hampshire

We got into Meriden, New Hampshire, about 4 p.m. in ample time to have supper with participants in the Gordon Research Conference in Nuclear Chemistry at Kimball Union Academy. [Unfortunately, the Conference was unsuccessful in arranging for this year's Conference to be held at Colby Junior College, which the attendees decided last year would be preferable to Kimball Union Academy.] This year John R. Huizenga (Argonne) is Chairman while Morris L. Perlman (Brookhaven) is Vice-Chairman.

Monday, June 23, 1958 - Kimball Union Academy, Meriden, New Hampshire

This morning began with a business meeting, followed by the scientific program on Coulomb Excitation, which was chaired by Morris Perlman. Speakers were Kurt Alder on "Theoretical Aspects of the Study of Nuclear Structure by Coulomb Excitation" and Paul H. Stelson on "Some Recent Experimental Coulomb Excitation Results." A picture was taken later (Figure 8).

Kurt Alder chaired the evening session on Nuclear Spectroscopy. Franz R. Metzger spoke on "Recent Progress in the Determination of Short Gamma-Lifetimes with the Resonance Fluorescence Method," and John O. Rasmussen talked about "Understanding the Properties of Odd-Mass Spheroidal Nuclei."

Tuesday, June 24, 1958 - Meriden, New Hampshire

This morning's program was on Photonuclear Reactions, chaired by H. W. Koch. Speakers were Michael Danos on "Splitting of the Giant Resonance for Deformed Nuclei" and Leon Katz on "Angular Distribution of Photofission Fragments."

The evening program was chaired by James J. Griffin, and the topic was Fission, Neutron, and Gamma Widths. My former graduate student, Robert Vandenbosch gave a fine talk on "A Study of the Competition Between Fission and Neutron Emission as a Function of Nuclear Type and Excitation Energy," covering work of our group at UCRL. The other speaker was John A. Wheeler on "Theoretical Interpretation of Reaction Widths."

Wednesday, June 25, 1958 - Meriden, New Hampshire

There was another business meeting this morning before the regular program, which was Nuclear Reactions and Geochemistry, chaired by Nathan Sugarman.

I was the first speaker and spoke on "Reactions Induced by Heavy Ion Bombardment." After generally talking about the Hilac, I covered (with slides) the broad range of our programs including the work of E. Goldberg and H. L. Reynolds on "Elastic Scattering (C^{12} from gold)"; E. L. Hubbard, R. M. Main, and R. V. Pyle on "Neutron Yields from Heavy Ion Reactions"; E. L. Hubbard and G. Merkel on "Neutron Transfer Reactions"; and J. O. Newton and F. S. Stephens (also attending the Conference) on "Coulomb Excitation".. I also spoke about "Several Aspects of Fission," including J. Alexander's recoil experiments, Muga and Thompson's fission mass distribution studies, and my group's work on excitation functions, and spallation-fission competition. After discussing "production of Neutron Deficient Isotopes," such as the work of R. W. Hoff, I went on to talk about "New Transuranium Elements."



GORDON RESEARCH CONFERENCES
KIMBALL UNION ACADEMY
MERIDEN, N. H.

NUCLEAR CHEMISTRY
CHAIRMAN: DR. JOHN R. HOYLE
MEMBERS: DR. MARRS, L. K. MAN
JUNE 23RD - 27TH 1958

Figure 8

Handwritten text, possibly bleed-through from the reverse side of the page. The text is arranged in approximately 12 vertical columns, starting from the left side of the page and moving towards the right. The characters are dense and difficult to decipher due to the cursive style and potential bleed-through.

GORDON RESEARCH CONFERENCE
ON NUCLEAR CHEMISTRY
JUNE 23-27, 1958. KIMBALL UNION ACADEMY
MERIDEN, N. H.

GORDON CONFERENCE
JUNE 26, 1958

- 1) G. T. SEABORG
- 2) N. SUGARMAN
- 3) S. WEKLER
- 4) H. W. KOCH
- 5) L. KATZ
- 6) J. J. GRIFFIN
- 7) J. R. HUIZENGA
- 8) H. C. UREY
- 9) A. G. W. CAMERON
- 10) W. A. FOWLER
- 11) K. ADLER
- 12) M. DANOS
- 13) F. R. METZGER
- 14) J. O. RASMUSSEN
- 15) M. L. PERLMAN
- 16) H. SUESS
- 17) R. VANDENBOSCH
- 18) O. SCHAEFFER
- 19) J. WING
- 20) F. W. WALKER
- 21) D. W. MAURER
- 22) J. ROY
- 23) G. WAGNER
- 24) W. D. EHMANN
- 25) J. WARREN
- 26) R. A. JAMES
- 27) D. S. HARMER
- 28) W. HENKES
- 29) E. SPRENKEL
- 30) K. KIGOSHI
- 31) C. JOHNSON
- 32) R. NAUMANN
- 33) N. E. BALLOU
- 34) W. J. SWIATECKI
- 35) R. G. MONK
- 36) K. SCHMUDE
- 37) T. CARLSON
- 38) E. EICHLER
- 39) I. DOSTROVSKY
- 40) E. HYDE
- 41) T. NISHI
- 42) L. YAFFE
- 43) L. SALTER
- 44) H. YULE
- 45) R. SCHMITT
- 46) R. L. WOLKE
- 47) P. STROHAL
- 48) G. W. REED
- 49) D. ENGELEMEIR
- 50) W. HERR
- 51) C. W. COOK
- 52) M. A. TAMERS
- 53) N. PORILE
- 54) G. D. O'K'FLEY
- 55) C. E. GLEIT
- 56) L. BOWEN
- 57) N. JOHNSON
- 58) R. M. BROWN
- 59) E. CHURCH
- 60) H. E. GOVE
- 61) D. STROMINGER
- 62) M. KALKSTEIN
- 63) P. DEL MARMOL
- 64) G. CHOPPIN
- 65) P. H. STELSON
- 66) T. SUGIHARA
- 67) S. KAUFMAN
- 68) A. CHESNE
- 69) J. E. SIMMONS
- 70) J. KOOI
- 71) G. LANGE
- 72) ?
- 73) W. GRUMMITT
- 74) H. MUNZEL
- 75) A. CARETTO
- 76) W. E. MOTT
- 77) N. J. MEYER
- 78) A. P. BAERG
- 79) A. F. VOIGT
- 80) E. K. HULET
- 81) E. O. WIG
- 82) R. W. HOFF
- 83) B. GORDON
- 84) F. ASARO
- 85) E. ANDERS
- 86) F. S. STEPHENS
- 87) F. S. ROWLAND
- 88) J. R. GROVER
- 89) P. KAFALAS
- 90) G. LEVEY
- 91) W. R. PIERSON
- 92) D. THOMAS
- 93) C. WEICK
- 94) R. A. SHARP
- 95) H. M. EILAND
- 96) P. DREVINSKY
- 97) J. BUCHANAN
- 98) T. SIKKELAND
- 99) S. VANDENBOSCH

Other speakers this morning were A. H. W. Aten, Jr. on "Comments on Element Formation," and W. Herr on "Application of Re^{187} and Lu^{176} to Dating of Iron Meteorites and Minerals."

ACKNOWLEDGEMENT: This work was supported in part by the Director, Office of Energy Research, Division of Nuclear Physics of the Office of High Energy and Nuclear Physics of the U.S. Department of Energy under Contract No. DE-AC03-76SF00098.