

11/10/30
Engineering
Physics
Donald W. Kerst Papers, 1937-59

Box 1:

Collected letters and original sealed letters, 1942-44

Correspondence with F. Wheeler Loomis, P. Gerald Kruger, Melvin L. Enger, Arthur C. Willard and William D. Coolidge about betatron development during World War II, diligence, Serber's 1939-40 energy loss by radiation calculations, notes on improvements in efficiency of induction accelerator (1/28/42), General Electric's plans for development of a 100 MEV betatron (1/20/42), Betatron laboratory location (2/28 and 3/17/42) and research activity (5/12 and 7/22/42).

Correspondence, 1937 to May 1940

With G. E. X-Ray Corporation offices and laboratories, Eastman Kodak, W. F. Schulz, Winston L. Hole, Loomis, Breit, Radium Institute (of London), Kruger, Coolidge and Carmichael about kenotron equipment (1/18/40), photographic emulsion and plates (11/16/39), course content (8/8/39), properties of uranium (7/21/39), directions and blueprints for Victor Bedside X-Ray Unit (6/30/39), public lecture on X-Rays in Indianapolis (7/10/39), description of Kerst activities at the U. of I. during the 1938-39 school year (5/8/39), medical research with X-Rays (9/22/38), academic appointment of Kerst, acceptance of G. E. offer (2/2/37) and (1/27/37) and a job offer from Westinghouse (5/6/40).

Induction Accelerator Correspondence, February - June 9, 1941

With O. H. Marshall, Kruger, Gregory Breit, Loomis, George C. Baldwin, R. D. Carmichael, Bob Serber, Coolidge and Enger when Kerst was at General Electric in Schenectady, New York, about coating a vacuum tube with a conducting surface, power consumption of induction accelerator, Kerst's transition from G. E. to U. of I. (5/28/41), possibilities for World War II defense use, Kerst's leave of absence from the U. of I., attempts to get outside aid for the betatron project at Illinois, aid from the Carnegie Institution, transferring Kerst's accelerator from New York to Urbana (5/7/41), problems concerning the location of the betatron on campus, floor plans and cost for the betatron (4/26/41), Serber's corrections of a Kerst paper, betatron staff hiring, possible relationships between cyclotron and betatron experiments, a "thyatron" (3/24/41) and circumstances at G. E. (2/18/41)

Correspondence, September 1941 to December 1941

Letters between Kerst and his Illinois colleagues while he was working at the G. E. Laboratory. Correspondence with Almy, Kruger, J. Reginald Richardson, W. W. Hinshaw, George C. Baldwin, Loomis, E. L. Stouffer, C. S. Havens, Adams, R. D. O'Neal, Serber, Enger, Arthur S. Davis, L. W. Phillips and A. J. Janata, about the induction accelerator including the naming of the betatron, its location in the power plant, and its pending transferral to the U. of I.

Correspondence, December 1941 to April 1, 1942

Letters between Kerst and his Illinois colleagues: Kruger, Davis, Serber, Loomis and Havens about construction of a larger betatron, details on setting it up at the power

plant and staff list (1/6/42). Also letters to other people and organizations: with Robert S. Mulliken, Ed C. Creutz, Robert J. Vande Graaff, Coolidge, E. E. Charleton, W. F. Westendorp, J. F. Bechtel, H. R. Mayers, Alpheus W. Smith, Alexander A. Petruskas, Howard Brackney about requests for speak at the U. of Chicago, recruiting researchers for the physics department, Kerst's request to G. E. to return to the U. of I. with his 20 MEV betatron (12/16/41), problems with U. of I.-G. E. relations (1/14/42), an Ohio State University request for blueprints. Letters concerning the possibilities of articles on the betatron, for Journal of Applied Physics, Time, The Scientific Monthly and Electronics.

Correspondence, April 1 to July 1, 1942

With Willard, Howard Brackney, F. R. Moulton, Coolidge, Mayers, Hewlett Scudder, S. W. Stewart, W. van der Grinten, Karl Lark-Horovitz and Loomis concerning naming the betatron, the betatron staff, Kerst's membership in the A.A.A.S., permission from G. E. to publish articles, patent priority, Kerst's honorary degree from Lawrence College, giving a colloquium at the U. of Iowa, a speech at Purdue, and a letter reviewing the past months lab work (6/27/42). Letters concerning publishing articles on betatron with the Scientific Monthly, Modern Medicine, Handbook of Medical Physics (including a list of contributors), American Journal of Physics and Review of Scientific Instruments, a letter from Charles H. MacDowell concerning the possible use of the betatron for nitrogen fixation, and German research on the same matter (4/6/42), L. G. Grimmett and Robert S. Landauer on medical applications and R. Hubner concerning the production of luminescent paint for wartime use using a betatron (4/27/42).

Correspondence, July 1, 1942 - 1943

With Scudder, Duane Roller, Grimmett, Lloyd C. Bush, H. B. Wahlin, R. B. Allen, A. A. Hartung, H. W. Koch, K. E. Corrigan, Jerome Alexander, L. I. Bockstahler, Herman Teshbach, L. S. Skaggs, M. S. Agruss, Julian K. Knipp, N. F. Ramsey, S. C. Godejahn, Lowell S. Goin, MacDowell E. Segre, Kruger, Carmichael, L. Marton, S. Winston Cram, Raymond Ellickson, Van der Grinten, Wang, Breit concerning foreign patents, sending papers to the N.D.R.C., procuring uranium and thorium for use as betatron targets and source of X-Rays, use by Kerst of an X-Ray machine at the Medical School in Chicago, a speech for a Radiological Society meeting and the Physics Club of Chicago, possible uses of betatron in colloid-chemistry research, hiring for the betatron staff, a speech for the Inorganic Group of the Chicago Chapter of the American Chemical Society and the Radiological Society, experimental results of betatron research (10/7/42) and (10/12/42) and an offer to work at Aberdeen Proving Grounds on anti-aircraft technology (3/25/42).

Letters concerning commercial applications, with the Kelley-Koett Mfg. Co., Inc. (7/1/42) and 7/6/42) and medical application, with L. S. Skaggs (8/27/42) and (10/22/42), C. R. Witmer, K. E. Corrigan (1/28/43) and Marion B. Crowell (1/21/43).

Letters concerning publication of articles on betatron technology, Journal of Applied Physics, Review of Scientific Instruments, Tech Engineering News (M.I.T.), American Journal of

Physics, an abstract of the article "A 20 Million Volt Betatron or Induction Accelerator", a contribution to the Handbook of Medical Physics and to the anthology Colloid Chemistry, Theoretical and Applied, article for Radiology, Transactions of the Illinois State Academy of Science, "Cenco News Chats," and America Clinica.

Correspondence with James B. Conant, Robert Oppenheimer, I. Melville Stein, Major P. C. Cunnick, Loomis, S. Failla, George E. Beggs, Almy and A. C. Willard concerning possible release of Kerst to work on wartime projects under General Groves and subsequent denial of permission by U. of I. officials, the Rock Island Arsenal's interest in building a betatron for wartime use and N.D.R.C. approval (February and March 1943) and an OSRD contract to further the betatron project.

Correspondence, April 1943 - 1946

Copy of agreement between Kerst's representatives (the U. of I., Board of Trustees) and Rolf Wideroe's representatives resolving the patent-interference case of 1946; copies of hearings held concerning the case, September 3, 1953.

With Park Livingston, L. Marinelli, Ken E. Corrigan, Mr. Bartling, A. L. Hughes, F. L. Hopwood, J. W. Boag and W. E. Stephens about radiology, the application of the betatron in hospitals, the therapeutic values of X-Ray beams and electron beams and research into medical application at Washington U. (St. Louis).

With M. I. Schnebly, G. M. Almy, Kruger, L. Marton, Loomis, G. Francis Nauheimer, Carl Kling, James B. Conant, Warren Smith, T. D. Carmichael, Arthur Wildhagen, Gail D. Adams, G. F. Hull, Ted Want and Breit about patents, relationship between the U. of I. and Allis-Chalmers and General Electric concerning the development and use of the betatron; about the betatron (10/4/45) and (11/6/43), laboratory plans (9/17/45) and (11/1/43); hiring for the U. of I. physics staff and Ohio State University's betatron (9/13/45) and (2/13/45); cosmic rays (10/6/45); physics department: budget and appointments; glass-blowing; concerning patents and possible financial gain for Kerst (3/30/44), the relative importance of Kerst war time work in New Mexico and the betatron project at the U. of I. (2/24/44), the relative merits of a betatron and a linear accelerator (1/11/44), post-war support for a large betatron (1/4/44) and (10/18/43) and other betatron projects at other institutions (12/2/43) and (12/10/43).

A letter of recommendation written by Kerst for J. C. Slater (9/16/45) for Aaron Yalow to Lewis Balamuth (10/27/44), for John R. Zimmerman, Jr., to Lt. Robert J. Williams (4/20/44), F. D. Kelly (4/6/44) and L. P. Graner (5/18/43).

Response to requests from Jack B. Greene (6/6/45) and Henry Semat (6/6/45), S. B. Ingram (5/29/45), David G. Frey (5/16/45), Bowen C. Dees (5/16/45), R. F. Plott (5/9/45), Lt. Presley Flowers, Jr., Gerhart Groetzinger (10/27/44), Walter Evans (8/21/44); J. A. Gray (4/23/44) and 3/27/44, Arthur C. Willard (5/19/44) and (4/18/44), T. E. Allibone (2/1/44) and A. W. Smith (1/24/44).

Copy of a confidential paper titled "Relations with the General Electric Company" with note signed Robert D. Carmichael.

Correspondence concerning the Comstock Prize of the National Academy of Sciences to be awarded to D. W. Kerst.

Box 2:

Betatron materials and orders, 1939-40

Financial records, letters, requisition orders, packing slips, blueprints and catalogs dealing with Anaconda Wire and Cable Co.; Westinghouse; Aerovox Corp.; General Electric; Aladdin Radio Industries; P. R. Mallory & Co.; Corning Glass Works; Specialty Glass Co.; Carnegie-Illinois Steel Corp.; The Indium Corp. of America; Baker & Co.; and Solar Manufacturing Corp.

Betatron equipment, 1939

Equipment records, directions for use, data, graphs, blueprints, catalogs involving materials such as electroscope and "Coolidge tube", with companies such as Mallory, Alladin, Vilter Manufacturing Co., General Electric and Trester-Service Electric Co., including Kerst's estimate of expenses, correspondence with Robert D. Carmichael (10/25/39 and 11/21/39), the Physical Plant Department and 13 photographs of accelerator components.

Copy of article "Properties and Alloys of Beryllium" by Louis L. Stott.

Betatron shipment and installation, 1941-42

Correspondence with Kruger (11/28/41), Davis (11/18/41 and 12/9/41), Hinshaw (11/23/41, 1/2/42), Phillips (12/5/41, 12/9/41 and 12/15/41) and Baldwin (12/7/41) about betatron equipment and construction and the shipment from G. E. laboratories in Schenectady, New York, and installation of the machine at Abbott Power Plant in Champaign. Notes and lists on materials for betatron installation at U. of I., estimate of costs for installation, plus blueprints of the Electron Induction Accelerator Laboratory in the Abbott Power Plant and dealings with the Trester-Service Electric Co.

Betatron Reports, 1943-45 (Restricted documents of the Office of Scientific Research and Development, National Defense Research Committee)

"Three to Twenty Million Volt Radiography," Progress report of January 1, 1945; of Sept. 1, 1944; June 1, 1944; March 1, 1944; Jan. 1, 1944; March 1, 1943; June 30, 1945: "Final Report."

Manuscript entitled "20 MEV Betatron Progress," dated "June 1944, and two reports of Sept. 7, 1943 and 10/25/43.

Correspondence with G.M. Almy and Gail Adams concerning betatron experimentation (3/16/44) and (10/27/43), and with G.W. Clothier of Allis-Chalmers Manufacturing Corp.

Betatron staff and recruiting records, 1943-45

Correspondence with Kruger concerning the recruitment, application procedure, fellowships, salaries and prospective research of Ben Diven, Gerhart Friedlander, Lindsay Helmholz, Edward R. Schatz, Harry Palevsky, Chaim Richman, Kenneth Greisin, Bruno Rossi, Harold Hammel, Thomas N. Snyder, Robert E. Carter, Sidney Dancoff, L.H. Lanzl, William E. Ogle, Leon J. Brown, Joan Hinton, A.O. Hanson, Grant Koontz, James Allen, Matthew Sands, Robert Thompson, John Williams,

Boyce McDaniel and Richard Conklin.

Physics department newsletters: Series 4, nos. 1,2,6,7; mailing list for Physics department newsletter; handout entitled "Information about the physics department of the University of Illinois," dated 10/3/44

Personal correspondence of Don and Dorothy Kerst, 1943-45

Correspondence with S.M. Dancoff, W.S. Robinson, Frank B. Geode, J.R. Oppenheimer, Kruger, Eduardo Amaldi, Loomis, C.D. Shane, Phillip D. Johnson, L.R. Ingersoll, Almy, Ray G. Herb, Willard, L.R. Groves, Enrico Fermi, Loomis, Chester R. Davis, Henry L. Stimson, Serber, I.M. Stein, James B. Conant, G. Failla, Irvin Stewart, George A. Works, Director of the Wartime National Roster of Scientific and Specialized Personnel and with the National Academy of Sciences, concerning housing in Champaign-Urbana, the status of the atom bomb during peacetime (9/7/45), Kerst's salary, scientific research in Italy, the end of his stay in New Mexico (4/27/45), speaking engagements, possible return to U. of Wisconsin, the conditions for the release of Kerst from his NDRC project in New Mexico (7/23/43), the Photo-fission of thorium (7/12/43), the University notifying the War Department of Kerst's release (6/1/43), the relative importance of the betatron project and the New Mexico project (4/8/43), the contribution of the U. of I. physics department to the war effort (3/15/43), a letter of 2/25/43 from Conant and Groves to J.R. Oppenheimer explaining policies of organization and responsibilities at the New Mexico laboratories and a request from Oppenheimer for Kerst's services (2/5/43).

Box 3:

National Defense Research Committee (N.D.R.C.) correspondence, 1943

Correspondence with Almy, Clothier, Adams, Failla, Koch, George E. Beggs, W.H. Smith, Stein, A.I. Andrews, R.W. Dole, J.H. Bly, H.F. Kaiser and Loomis concerning betatron design and experiments, tasks for the staff, Allis-Chambers Manufacturing CO., a copy of "Specifications on Betatron for U.of I.," procedural advice between the researchers, the departure to New Mexico, Pratt and Whitney Aircraft laboratories, and the Rock Island Arsenal.

N.D.R.C. Correspondence, 1944

Correspondence with Almy, Adams, General Groves, W.D. Coolidge, A.R. Greatbatch, Koch, Beggs, Kruger, Loomis and F. Nagler while Kerst was in New Mexico concerning specifications for the electron orbit in the accelerator, betatron design, plans, experiments, data, equipment, staff, restrictions on the publication of Betatron results during wartime, Allis Chalmers, an Australian physicist named Hill, a work itinerary for the staff during the summer of 1944, a paper entitled "The Betatron and New Developments in Physics," a betatron for use in England, the Physical Plant department and relations with G.E. The folder includes 2 photographs of betatron equipment; one is entitled "First Sealed-off 20 Donut".

N.D.R.C. Correspondence, 1945

Correspondence with Willard, Almy, Adams, H.H. Lester, John W. Boag, Thomas H. Johnson, Breit and W.E. Hennig, concerning betatron policies and design, experiments, list of people and institutions interested in acquiring a betatron, advice from Kerst concerning betatron matters, medical applications of betatron, a meeting of the American Society for Testing Materials, use of betatron for armaments development and the Clark Supply Co.

Betatron Laboratory operation, 1947-57

Correspondence with Loomis, George D. Stoddard, Almy, R.F. Flora and H.M. Edwards, concerning proposed use of betatron funds, staff salaries, permission to use the 22 mev betatron for therapy on C.T. Kenniston, requisitions, lists of expenditures, memoranda on staff: (11/18/47), (9/4/47), (9/10/47), (12/15/47), (11/1/54), (12/1/47), (7/18/56), and many undated memos. Most originated from R.F. Flora, Business Manager of the Laboratory and concerns work schedules and job priority lists.

Manuscripts entitled "Office Procedures for Physics Research Laboratory, Effective October 1, 1947," graphs outlining research problems and experimental tasks, August 1, 1948.

Physics Department Staff Directories, 1956-57, 1955-56.

Betatron Design Notes, 1938

Notes, calculations, graphs, blueprints, component's dimensions and derivations of formulas by Kerst relating to the physical design of the betatron, the electron orbit in the accelerator, the Sternbeck Patent and original ideas on betatron design; a letter to the Graduate School Research Board, requesting funds and outlining ideas about "a new type of apparatus for the acceleration of electrons...", (10/5/38).

New Accelerator, 1941

Plans and drawings made in 1941 while Kerst was with G.E. concerning the betatron core, cable specifications and "transfer processes in conduits."

"Plans for Research Laboratory and Program at Illinois", 1941

Correspondence while Kerst was in New York, with Kruger, J.A. Van Allen, R.D. O'Neal, Loomis, Ingersoll, John A. Reynolds, Enger, Willard, Hinshaw, E.L. Stouffer, Almy, Coolidge and Joseph L. Weiner, concerning plans for terms transfer of the betatron from the G.E. lab to the U. of I., budgets, the Physical Plant department, "civilian allocations" and blueprints for the research laboratory.

"Revised Large Betatron Plans," 1943-45

Correspondence with Almy, Kruger, Albert J. Harno, Willard, Walter Geist, A.J. Janata, G.H. Bucher, M.L. Enger, Adams, Nagler, Roger Adams, Zay Jeffries, Loomis, Oppenheimer and Carmichael concerning funds for betatron work, help sought from Allis-Chalmers and Westinghouse, betatron equipment, publicity policies with the War Department's Office of Censorship, budgets and advice on experimental procedure from Kerst while he was in New Mexico.

Notes on "Wideroes 200 mev machine," manuscripts entitled "The Betatron: Principle of Operation, Its History, Accomplishments and Possibilities," "Report on Need for New Betatron Laboratory," patents, betatron design, General Electric's efforts in the betatron field (after Kerst's departure), Illinois Legislature's action on funding the project and blueprints for new

Betatron lab.

Dean Robert D. Carmichael's file on the Betatron project, 1943-46

Correspondence of Kerst with Kruger and correspondence of Carmichael with Kruger and Kerst concerning betatron patents, sources of money for the project, and popular histories of betatron development. The folder includes an agenda for a conference on the project with President Willard, Oct 9, 1943; "Report on Need for New Betatron Laboratory" (9/30/43); "preface to Dean Carmichael's General Discussion" (2/8/44), "A popular Description of the Betatron Project" and "Relations with the General Electric Company (Confidential)".

Box 4:

Betatron, 1938

Manuscripts and blueprints on original electron accelerator dated April 12, August 1 and April 15, 1938.

Betatron blueprints, N.D.R.C., 1943

Allis-Chalmers, 1943

Allis-Chalmers, "Certified Test Report, 8/11/44"

Correspondence July 1940 to Nov. 1940 on accelerator patent information.

Sveinbjorn Johnson, Carl J. Hedberg, Loomis Enger, W. Kendricks, M.J. Gross, Z.J. Atlee, J.H. Clough, Howard A. Poillon, William D. Coolidge, Lewis Tonks, H.R. Mayers, Carmichael, Warren Weaver, H.B. Johnson and Breit concerning additional devices for accelerator for patenting, results of work on the betatron, General Electric Company, Kerst's transition from Illinois to New York and diagrams and manuscripts concerning betatron patents.

Registered letters, 1940-42

Correspondence with Kruger concerning betatron design and materials; Post Office registration receipts; seven unopened (five still sealed) registered letters from Kerst to himself, postmarked (2/7/42), (2/7/42), (7/20/40), (8/9/40), (8/4/40), (9/13/40), (9/13/40), (9/13/40).

Improvements on Betatron, 1941

Correspondence with G.E. laboratory concerning electron beam and target of the induction accelerator and judgement on patentability.

Support of Large Betatron, 1941

Draft of letter to F.B. Geode, President of National Academy of Sciences, concerning National Science Fund. Manuscripts entitled "Proposed Agreement between the General Electric Company and the University of Illinois in relation to the Development of the Induction Accelerator," (11/26/41).

General patent Correspondence, 1941-45

Correspondence with Jules L. Brady, M.I. Schnably, Caperton B. Horsley, Almy, Adams,

L.R. Thiesmeyer, Albert M. Orme, Dienner, Cunningham, Clothier, John W.M. Bunker, Lloyd C. Bush, Schudder, Mayers, Gartner and Bechtel concerning patent manuscripts and drawings, German work on electron acceleration, Allis-Chalmers, O.S.R.D., foreign patents, patent examiner documents, the patent policy of M.I.T. and G.E. patents.

War Department - Patents, 1944

Copy of patent document for "Magnetic Induction Accelerator" - first draft of that document. Correspondence with Almy, Sveinbjorn Johnson, John A. Dienner, A.E. Donnelly, C.P. Coe, H.E. Cunningham, L.E. Bratton, Francis H. Vander Werker and W.G. Gartner concerning the administration of patents, foreign patents, secrecy restrictions during World War II and glass blowing.

Patent Description, 1945

Description and diagrams of betatron for patenting. Correspondence with Kruger, and Howard H. Frank of the War Production Board concerning new designs worthy of patenting, and captured German x-ray equipment and patent information.

Box 5:

Publications Correspondence, 1940-42

Betatron publications, correspondence with the Physical Review (a letter to the editor: "the first publication of my development"), The American Magazine, notes for a speech in Chicago at a meeting of the American Physical Society; a press release of the Science Service, Nov. 22, 1940, Dec. 16, 1941 and Jan. 10, 1942, Manuscripts entitled "Electron Acceleration" for internal G.E. bulletin, Feb. 1941), and "Radiation from the Induction Accelerator"; notes for a talk given at U. of I on April 19, 1941; Manuscripts entitled "A new induction accelerator, generating 20 MEV." and "The History of the Betatron."

Letters from Serber to Kerst with news about U of I physics department and with calculations relating to the theory of the betatron and U of I press release.

Publications Correspondence, 1942-45

Correspondence with Luigi Rizzoli, Myron A. Greenland and other physicians, George A. Baitzell, John E. Flynn, J.W. Boag, Wildhagen, Geode, Wang, Benjamin F. Affleck and Duane Roller concerning requests for information from Kerst about medical application of betatron, the Sigma Xi lecture, nomenclature and definition "betatron" being an abstractor for Biological Abstracts, betatron press releases and publicity, a N.Y. Times article by William D. Coolidge and articles and letters appearing in Nature, Electronics, Radiology, Who's Who in the Western Hemisphere, Biographical Directory of American Men of Science, American Journal of Roentgenology and Radium Therapy, The Physical Review, Colloid Chemistry, theoretical and Applied, Vol. 5, Handbook of Medical Physics, Radio News, The Tech Engineering News, The Review of Scientific Instruments, The Journal of

Applied Physics, The Scientific Monthly and American Journal of Physics.

Honorary Degree, University of Illinois, May 24, 1987

Manuscripts of Kerst, entitled "The History of the Betatron," dated July 1, 1942; a masse. of a similar article (untitled) by A. R. Wildhagen for Scientific American; a transcript of a slide-show speech given by Kerst at a symposium at Purdue University (8/14/42); a press release of the Science Service, Nov. 28, 1942 and a draft of the article "The betatron" that appeared in the M.I.T. Tech Engineering News.

Photographs

Including data taken from betatron (Jan. 7, 1943), group pictures with Kerst, Charleton, Loomis, Adams and others; pictures of betatron equipment and components, and diagrams of a cross-section of the vacuum tube.

1946, 1948

Pictures taken at the ground breaking ceremonies for the Physics Research Laboratory (1946) and for the betatron building at the University of Illinois Medical Center (Chicago, 1948).

Midwest Accelerator Conference meeting, Oct. 10, 1953

Kerst's notes on meeting agenda, on technical topics and a copy of Big 10 Football schedule, 1953.

Midwest Accelerator Conference, 1953-57

MURA telephone directories; Minutes of meetings, Jan 27, 1954; MURA_reports distribution lists; Notes on accelerator theory (7/7/53); notes on meeting-agenda; correspondence with Alan Waterman concerning request for NSF funds for MURA work (7/20/54) and from Ragnar Rolleson in Copenhagen to Kerst when he had moved to Madison.

First Midwest (MURA) meeting and early thoughts, 1953-54

Kerst's handwritten notes on April 17-18, 1953 meeting; primarily technical topics such as the "cosmotron"; notes for his own talks, on "time transients" (fields) and stable orbits in accelerators such as the Betatron; outline for an article; notes for MURA conference talk at Madison on Sept 3, 1953; notes on "ion pipe magnet" paper; elementary particles properties table; notes for April 10, 1953 conference and notes for January 8-9, 1954 meeting in Minneapolis.

MURA development, "MURA obituary", 1956-57

Memos covering MURA by-laws (9/20/54); correspondence with Kruger and Senator Clinton P. Anderson concerning the necessity to start building an accelerator at Madison before "momentum and enthusiasm" of MURA dissipates (2/18/57), (6/4/50); an historical account of the goals of MURA (4/18/56); report of the N.S.F. Advisory Panel on High Energy Accelerators (Sept. 10, 1956), Board Meeting minutes (4/10&21/56), a report arguing against the Atomic Energy Commission's wish to locate the MURA accelerator site at Argonne National Laboratory (undated) and a report entitled "Historical Sketch of the Midwest Universities Research Association; Madison, Wisconsin, Feb. 14, 1957"

The report includes:

	<u>Pages</u>
Body of Report	12
Exhibit	
A List of Board of Directors	1
B Minutes of sub-committee meeting on securing funds with representatives of the AEC, Washington, D.C., June 10, 1954	6
C Minutes of sub-committee meeting on securing funds with representatives of the AEC< Washington D.C., Aug. 3, 1955	11
D Minutes of sub-committee..., Nov 8, 1955	10
E Summary of meeting of mid-western university presidents, MURA and AEC representatives in Chicago, Nov 13, 1955	7
F Letters between Theodore Hesburgh and Lewis Strauss concerning the MURA, Argonne rivalry	8
G Minutes of sub-committee on securing funds, with representatives of the AEC, Washington, D.C., May 25, 1956	11
H Letter from H.S. Vance of Aec to John Williams, MURA president	3

MURA correspondence, notes and graphs, 1954

Correspondence with J. Jackson Laslett, Lawrence W. Jones, Ernest D. Courant, R. O. Haxley and with Brookhaven National Laboratory about MURA meetings and agenda, "MURA technical group meetings", "technical problems" list, computations of the technical group on accelerator problems, conference notes (4/23/54); "Stability diagram for A.G.S.", "Tolerable Energy Spread at Injection" and "Possible damping of Phase Oscillations."

MURA Strategy, 1955-59

Correspondence with Alexander Wiley, William Proxmire, Kruger, Clinton P. Anderson, John H. Williams, James N. Snyder, Ragnar Rollefson, George Capsis, W.F. Libby and Keith R. Symon, about Senate approval of MURA projects, the "Syncroclash" proposal, competition with Russian scientists, loss of "momentum" of the mURA staff due to lack of AEC approval and government funding, the Computer Division of MURA, the MURA site for new research and accelerator buildings and Kerst's resignation from MURA (5/29/57).

Manuscripts: "Remarks on the progress of mURA during the past year" by H.R. Crane (10/19/59); copy of 20 page letter from Luis W. Alvarez to Edwin M. McMillan on the "usefulness of high intensity accelerators" and MURA; "Some Remarks on the Status of High-Energy Instruments" by W.K.H. Panofsky (10/24/57); copy of the Congressional Record, Feb 28, 1957, with article on Wisconsin Senator Alexander Wiley's remarks about MURA; copies of a series of articles in The Milwaukee Journal (November 24-26, 1957) by Harry S. Pease on MURA plans and problems, (especially with the AEC); press releases (May 19, 1958) concerning the formation of the Associated Midwest Universities; copy of Illinois Alumni News (April 1956) with MURA stories, p.1 and 5; Supplement to the Report of the Advisory

Panel on High Energy Accelerators to the National Science Foundation (10/11/58); Report of the Advisory Panel on High-Energy accelerators to the N.S.F.(10/25/56); notes on MURA's budget for 1956-57; memorandum concerning MURA to Governor Vernon Thompson of Wisconsin (Mar. 18, 1957); "memorandum to myself" (D. W. Kerst) following discussion with J.H> Williams after the Board of Directors meeting on SEpt. 19, 1956; report: "The MURA-AEC Controversy" by J. Earl Thomas (10/22/57); two memoranda to MURA for expenses (August, 1955) and letters to John L. Powell and James Cochrane concerning meeting locations and research problems.

Box 6:

Laboratory notebooks, 1939-42

Book 1: March 1, 1939-Sept 19, 1941

The Computation Book is titled "D.W. Kerst and R. Jones: Research"

Samplings from notebook:

March 1939: testing of "Malloy Dust Core"

p. 6: see Terry(/) electricity and magnetism plot

p. 7: data for laminated iron sheets used in the core diagram of the original 3-MEV betatron

p. 8: description and data on coils

p. 11: July 19,1939: "Resonance obtained w/o pole faces..."

p. 12: experiment repeated with pole faces

p. 15: glass doughnut from G.E. X-ray Corp. installed...

p. 16: September 11, 1939: "Electron injector installed"

p. 29: January 1940

p. 30-45: data-graphs from March to June

p. 49: working with equilibrium orbit

p. 51: "New circular flux coil made"

p. 53: new parameter found to describe slope of flux graph

p. 54-insert: diagram of doughnut used in betatron

p. 56: June 17, 1940: (note:) "France Capitulates"

p. 58: problem with wall-charges along inside of glass doughnut

p. 61: July 6, 1940: Looking for gamma-ray emissions from target inside doughnut; with Geiger counter, results are negative

p. 62-3: July 15, 1940: Betatron electron beam hits target; detector reveals x-rays. Data and graph of Kerst; testimony and signature of J.H. Manley and Leland J. Haworth

p. 64: July 16, 1940: "It would be good to have more injection and grid voltage."

p. 65: Speculation on why electrons leave equilibrium orbit and hit target at "peak field."

p. 67: Calculation of Energy involved: 2 MEV

Signature for July 17, 1940, of P. Gerald Kruger

- p. 69: "Machine works perfectly."
- p. 70: problems with silver coating
- p. 71: July 29, 1940: electrons hitting target before peak field
- p. 73: July 31, 1940: description of betatron experiments; Kerst is still exploring the new phenomenon at his disposal.
- p. 76: August 6, 1940: new doughnut, Voltage up to 3 MEV
- p. 82: August 20, 1940: "I have looked over and read this data book and have understood the work herein described." (signed:) F.W. Loomis
- p. 85: September 23, 1940: discussion of radius-of-orbit and saturation relationship
- p. 92: October-December: Injection voltages discussed
- p. 95: January 9, 1941
- p. 102: January 22, 1941: injector collimator diagram
- p. 105: February
- p. 108-119: March, 1941, new coils: calculations, diagrams, and graphs
- p. 120: May 24, 1941: Problems with lost-current and the fields it sets up
- p. 121: June 4, 1941: new silvering technique
- p. 122-125: new pilings dimensions
- p. 129: new injector dimensions
- p. 132: July 8, 1941: further problems with inductance
- p. 138: August, 1941
- p. 140: "induction accelerate: design and successes
- p. 145: September, 1941
- p. 148: "orbit expander circuit"
- p. 151: September 19, 1941- last entry in this book

Book 2: September 20, 1941- December 12, 1941

This Computation Book is titled: "Donald W. Kerst; #2; Research"

Summary of the entries:

- p. 3: September 20, 1941: experiment-description
September 23, 1941: circuitry diagram for injector
- p. 5: October 3, 1941
- p. 7: October 7, 1941: description of radiation distribution
- p. 9: October 9, 1941: Injector-filament breakdown
- p. 12: October 11, 1941: 30-minute test of betatron
- p. 13: October 24, 1941: Tests of x-ray beams, using rabbits
- p. 15: "Rabbits (sic) were well October 27"
- p. 16: November 6, 1941: description of beam-orbit
- p. 17: November 21, 1941: "Variable INjector experiment"
- p. 20: December 1, 1941: circuit test
- p. 23: December 12, 1941: silvering solution
- p. 24: "March 8, 1941" entry (?): "reworking of voltage callibration" to get a higher MEV

- p. 27: (inserts): Blueprints and rough drawings, plus "cost estimate and promise sheet" dated "5/6/41." Also letter to Kerst from V.E. Goodwin (of G.E.) dated March 7, 1941. Blueprints date is December 24, 1941.

Book 3: January 25, 1942- February 5, 1947

Book is titled: "Designs Book; Donald William Kerst; Btron [betatron]"

Samplings from notebook entries:

- p. 1: January 25, 1942: Comments on cost considerations and design of "induction accelerator" (betatron). Signed in margins; "Witnessed Jan. 25, 1942, Dorothy Birkett Kerst," and "These ideas are in a registered letter of Jan. 28, 1942, witnessed by L. W. Phillips."
- p. 3: February 2, 1942: continued description of alternative designs
- p. 5: July 3, 1942: refinements of past two descriptions
- p. 8: July 9, 1945: "The Mushroom-Magnet Btron"
- p. 9: figure-eight vacuum tube
- p. 13: August 1, 1945
- p. 17: August 18, 1945: news of German (Wideroe) plans Betatron and Kerst's case for priority
- p. 22: September 16, 1945
- p. 33: Last of 19 conclusions formalized by Kerst
- p. 34: December 17, 1945
- p. 35: positive feedback circuits (alternative diagrams)
- p. 36: January 18, 1946: flux and laminations
- p. 37: signed: "read and understood on 1/19/45; G.M. Almy"
- p. 39: February 1, 1946
- p. 40: February 5, 1946: "Calculation of field and flux linkages with pole-less Btron"
- p. 47: March 30, 1946: beginning of a series of general formulas for "F.F. (flux-forcing(?)) currents and harmonics"
- p. 57: last of 56 formulas, (started on p. 47)
- p. 57: April 11, 1946: diagram of cross-section of Btron
- p. 59: May 20, 1946: saturation (of alactron orbit) Btron
- p. 60: June 1, 1946: decision to build large Betatron of "450 MEV"
- p. 62: June 18, 1946: "Allowable bumps in magnetic field"
- p. 63: July 25, 1946: "draftsman working on type "C" core"
- p. 65: August 10, 1946: in margin: notes for a "new brochure"
- p. 66: August 16, 1946: "System for producing radiation compensation, eliminating D.C. bias and retaining flux-forcing."
- p. 67: September 10, 1946: "Method of exciting Betatron to give long x-ray pulses of 1/360 sec."
- p. 68: insert - worksheets and graphs
- p. 71: October 2, 1946: "Expansion system"; yoke cross-section
- p. 72: November 5, 1946: "Rescaling Btron"

- p. 75: November 7 & 8, 1946: "Discussed designs with Sealey of Allis Chalmers and told them to go ahead."
- p. 77: "Radiation for 122 cm orbit and 300 MEV"
- p. 81: November 20, 1946: "Time for penetration of flux into iron"
- p. 82: November 28, 1946: "vacant-lot" B-tron (?)
- p. 84: December 1946
- p. 85: February 4, 1947: shielding
- p. 86: August, September 1948: notes on yields from 75 MEV Btron
- p. 90: inserts: graphs

Book 4, April 9-September 29, 1953

Title: Midwest Strong Focusing Proton Synchrotron

Covers work with P. Gerald Kruger