

**McKee Library
Southern Adventist University
P.O Box 629 Collegedale, TN 37315**

McKee Library Special Collections

**Ray Hefferlin Collection
1935-2015**

Summary Information

Creators: Various

Title: Ray Hefferlin Collection 1935-2015

Inclusive dates: 1935-2015

Languages: English, Russian, French

Abstract: This collection consists of notes, articles, journals, newspapers, and correspondence that involve Ray Hefferlin. The collection also contains physics related items such as photographs, event programs, postcards, posters, maps and manuscripts.

Size: 65 boxes, 2 oversized boxes, 31.694 linear feet

Storage: Offsite Storage: Physics and Engineering Department; Hickman Science Center, Room 1408

Repository: McKee Library
Southern Adventist University
Phone: 423-236-2788
Fax: 423-236-1788
Email: dbravo@southern.edu

Processed by: Micaela Myers, 2017-2019

Administrative Information

Provenance: McKee Library acquired the Ray Hefferlin Collection in 2015 from the Hefferlin family.
The Ray Hefferlin Collection is comprised of physics related materials collected by Dr. Ray Hefferlin of Collegedale, Tennessee. Included in the Ray Hefferlin Collection are newspapers, periodicals, photographs, posters and correspondence.

Access: Archival papers are available to readers for consultation by appointment only. Please fill out [this form](#) in advance.

Access Restriction: The collection is unrestricted to readers.

Preferred Citation: Item description, McKee Library: Ray Hefferlin Collection, Series #, box #, and folder #, McKee Library Special Collections at Southern Adventist University, Collegedale

Biography

Dr. Hefferlin was born in Paris, France in 1929 and moved to California with his father at the age of seven. He attended Pacific Union College and received his bachelor's degree in 1951. He received his doctorate from the California Institute of Technology. He married Inelda Phillips in 1954 and shortly thereafter, in 1955, became professor at Southern. Hefferlin's passion for physics has been evident throughout the entirety of his professional life. During the 1960s, Hefferlin received his first research grant and focused on experimental spectroscopy, studying the interaction between matter and radiated energy. Later on, into the 1970s, he switched to more theoretical work and began working with others to create a chart (similar to the periodic table of elements) that organized diatomic molecules in a way that highlighted their similar properties. The end result was a definitive work that continues to be used today by students and scientists internationally. Dr. Hefferlin passed away on March 7, 2015.

Collection Scope and Content Note

- **Series 1: Correspondence, 1258-2015 (10 boxes, 5.34 linear ft.)**
This series includes personal correspondence of Ray Hefferlin and his colleagues and associates.
- **Series 2: Research Materials, 1935--2015 (1 OS* box, 31 boxes, 16.51 linear ft.)**
This series contains materials used for research by Ray Hefferlin.
- **Series 3: Journal Articles, 1963-2015 (6 boxes, 2.502 linear ft.)**
This series contains articles written by and contributed to by Ray Hefferlin.
- **Series 4: Expense Reports, 1867-2014 (1 OS* box, 10 boxes, 4.84 linear ft.)**
This series contains receipts, invoices, and budgets of Ray Hefferlin
- **Series 5: Ephemera, 2004-2013 (1 box, .417 linear ft.)**
This series contains CDs, projector slides, stickers and a cassette tape used by Ray Hefferlin in research presentations.
- **Series 6: Maps, 1966-1996 (2 boxes, .834 linear ft.)**
This series contains maps used in by Ray Hefferlin in his travels.
- **Series 7: Photographs, 1955-2013 (3 boxes, 1.251 linear ft.)**
This series contains photographs of Ray Hefferlin, his classroom, his research and his travels.

*Oversized

Processing

Materials have been rearranged from their original order. Staples were removed from materials as needed, and folded items were flattened. Materials were placed in new acid-free folders and boxes.

Contents list

Series 1: Correspondence, 1958-2015

Series	Box	Folder	Contents
1	1	1	Letters between Ray Hefferlin and others associated with the Research Corporation of Atlanta, Georgia (1958-1985)
1	1	2	Letter to Ray Hefferlin from the Society of Physics Students (December 28, 1972) See Research Materials (Series 2, Box 12, Folder 3) : "Diatomic Molecular Band Intensity Constants" proposal to the Society of Physics Students (November 6, 1972)
1	1	3	Letters between Ray Hefferlin, Ronald R. Hegstad, and S.A. Kaplan (1972)
1	1	4	Letters between Ray Hefferlin and others about applying for and receiving research grants (1972-1978) See Research Materials (Series 2, Box 12, Folder 5) : Applications for Grant-In-Aid from the Research Committee of the Tennessee Academy of Science, Inc. (1972-1977)
1	1	5	Letters between Ray Hefferlin and the president of Southern College (1972-1996)
1	1	6	Letters between Ray Hefferlin and offices at Southern College about expense accounts and payments (1972-2001)
1	1	7	Letter to Ray Hefferlin from Les Livres Etrangers (January 1, 1973) See Expense Reports (Series 4, Box 49, Folder 8) : Invoice from Les Livres Etrangers (January 1, 1973)
1	1	8	Letters from Ray Hefferlin about changes to insurance policy (1975-1977) See Expense Reports (Series 4, Box 49, Folder 3) : Receipts and policy descriptions from Insurance companies (1972-1976)
1	1	9	Letter from Ray Hefferlin to Universal Insurance, Inc (September 13, 1977)
1	1	10	Letters between Ray Hefferlin and others about receiving a grant from the Research Corporation (1977-1978)
1	1	11	Letter from Frank Knittel to Ray Hefferlin (October 26, 1978) See Expense Reports (Series 4, Box 49, Folder 13) : Invoices from Pergamon Journals (October 20, 1978)
1	1	12	Letter from Dr. Hefferlin to Kieran Doherty (October 12, 1980) See Research Materials (Series 2, Box 13, Folder 7) : Research presented at conferences (1980-1984); See Journal Articles (Series 3, Box 43, Folder 11) : Published articles by Ray Hefferlin and others presented at conferences (1977-1983);

- [See Photographs \(Series 7, Box 65, Folder 5\)](#): Photo of "On Ground, at Potential Minima, of Neutral Quasi-Molecules formed from Neutral Atoms or Ions" presentation (1983)
- 1 1 13 Letter from Ray Hefferlin to Lawrence Hanson (September 6, 1981)
- 1 1 14 Letters between Ray Hefferlin and Edwin C. Godbold (1982)
- 1 1 15 Correspondence about submitted papers (1982-2006)
- 1 1 16 Letter to Ray Hefferlin from Daniel Mort (June 17, 1983)
- 1 1 17 Letter to Ray Hefferlin from Harold of the University of Tennessee (June 24, 1983)
- 1 1 18 Letters to Ray Hefferlin from Daniel Mort (1983)
[See Research Materials \(Series 2, Box 38, Folder 2\)](#) : Research sent to Ray Hefferlin from Daniel Mort (1983)
- 1 1 19 Letters between Ray Hefferlin and others about constructing periodic systems for small molecules (1983-1984)
[See Research Materials \(Series 2, Box 14, Folder 5\)](#) : Description of and welcome to Inorganic Crystal Structure Database (1983)
- 1 1 20 Letters between Ray Hefferlin and the Southern College Alumni Association (1984-1987)
- 1 1 21 E-mails, letters, and postcards between Dr. Hefferlin and Huang De-Yun (1984-2000)
[See Photographs \(Series 7, Box 67, Folder 22\)](#) : Proofs of pictures of notes from Huang De-Yun;
[See Research Materials \(Series 2, Box 33, Folder 18\)](#) : Notes and article draft from Huang De-Yun
- 1 1 22 Letters and e-mails between Dr. Hefferlin and Fanao Kong (1984-2014)
[See Research Materials \(Series 2, Box OS42, Folder 4\)](#) : Research Notes from the China University of Science and Technology (1984)
- 1 2 1 Letter from Ray Hefferlin to the Jefferson Symphony Orchestra (April 11, 1985)
- 1 2 2 Letters between Ray Hefferlin and others concerning publication and presenting at seminars (1985-1987)
[See Photographs \(Series 7, Box 65, Folder 8\)](#): Photo of Periodic Chart of Molecules presentation (December, 1987);
[See Research Materials \(Series 2, Box 14, Folder 10\)](#) : Notes and articles prepared for publication and presentation (1985-1987)
- 1 2 3 Letters, e-mails and postcards between Ray Hefferlin and Maurice Kibler (1985-2014)
[See Research Materials \(Series 2, Box 20, Folder 15\)](#) : Articles by Maurice Kibler (2001-2007)
- 1 2 4 Correspondence with and about Dr. Fet (1986-1992)
[See Research Materials \(Series 2, Box 38, Folder 1\)](#): Research and paper by Dr. Fet
- 1 2 5 Letter to Ray Hefferlin from Lyle H. Jensen (February 4, 1987)
- 1 2 6 Letter from Ray Hefferlin to Springer-Verlag Journals Editorial Division (August 6, 1987)

[See Research Materials \(Series 2, Box OS42, Folder 12\)](#) : Atom cube diagrams;
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| 1 | 2 | 8 | Letters and notes between Ray Hefferlin and others about accounts and expenses of the Physics Chair (1987-1988)
See Expense Reports (Series 4, Box 51, Folder 7) : Invoices and time card statements charged to Physics Chair (1987-1988) |
| 1 | 2 | 9 | Letters between Ray Hefferlin and Floyd Greenleaf (1987-1995)
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| 1 | 2 | 10 | Letters and e-mails between Ray Hefferlin and Carl E. Wulfman (1987-2010) |
| 1 | 2 | 11 | Note to Ray Hefferlin from John Phillips of the University of California, Berkeley (March 17, 1988) |
| 1 | 2 | 12 | Letter from Floyd Greenleaf to Ray Hefferlin about 1988-1989 Budgets (July 19, 1988)
See Expense Reports (Series 4, Box 52, Folder 3) : Physics Chair Budget Worksheet (July 1, 1988-June 30, 1989) |
| 1 | 2 | 13 | Letter about the proposed collaboration of Professors Fanao Kong and Ray Hefferlin on studies of molecular periodicity (October 25, 1988) |
| 1 | 2 | 14 | Letters between Ray Hefferlin and Milo Anderson (1988)
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| 1 | 2 | 15 | Letters between Steve Warren and Ray Hefferlin (1988)
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| 1 | 2 | 20 | Letter from Jack J. Blanco to Louesa Peters (March 27, 1989)
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- 1 2 21 Letter to Ray Hefferlin from Lawrence Bogorad (April 14, 1989)
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- 1 2 22 Note from Ray Hefferlin to Henry about obtaining the HP Laserjet printer (May 3, 1989)
[See Expense Reports \(Series 4, Box 52, Folder 10\)](#) : Receipt from Hewlett Packard Laserjet Series II printer purchase (May 5, 1989)
- 1 2 23 Letter from Floyd Greenleaf to Claude Villeneuve, President of Saleve Adventist Institute (June 7, 1989)
- 1 2 24 Letters preparing for and about Arseny Berezin's visit (1989)
- 1 2 25 Correspondence between Ray Hefferlin and others about payment for international conference on group theoretical methods in physics (1989-1990)
- 1 2 26 Letters and notes about monetary gifts to the physics department fund (1989-1990)
[See Expense Reports \(Series 4, Box 52, Folder 17\)](#) : Supply Lists and notes on amounts received for Physics Fund (1989-1990)
- 1 2 27 Letters between Ray Hefferlin and Gary Burdick (1989-1991)
- 1 2 28 Letters between Ray Hefferlin and Dennis and Joan Taylor (1989-1998)
- 1 2 29 E-mails and letters between Ray Hefferlin and Alexander Gorban (1989-2003)
- 1 3 1 Letter from Bernard J. Laurenzi to Ray Hefferlin (May 21, 1990)
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- 1 3 2 Letters from Ray Hefferlin to Louesa Peters about difficulties in knowing whereabouts of funds (July 8, 1990)
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- 1 3 3 Letters between Ray Hefferlin and Word Perfect Corporation (September 11, 1990)
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- 1 3 5 Letters between Ray Hefferlin and others about James Robertson's trip to the Seventh International Congress of Quantum Chemistry (1990-1991)
- 1 3 6 Letters to Ann Ford from Ray Hefferlin (1990-1992)
- 1 3 7 Letters between Ray Hefferlin and Staff at the University of Tennessee at Chattanooga (1990-1993)
- 1 3 8 Letters and e-mails between Ray Hefferlin and Gary Burdick (1990-1995)
- 1 3 9 E-mails and letters between Ray Hefferlin and George V. Zhuvikin (1990-2011)

- 1 3 10 Letter from Ray Hefferlin to Arseny Berezin and Helena Chedova-Berezin (January 29, 1991)
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- 1 3 13 Notes between Ray Hefferlin and others about payments for subscriptions (1991)
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- 1 3 19 Letters between Ray Hefferlin and Eugeny V. Babaev (1992)
- 1 3 20 E-mails and letters between and related to Ray Hefferlin and Ludmila A. Kuznetso (1992-1999)
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- 1 4 14 Note from Ray Hefferlin to Jan Wittenberg (March 24, 1994)
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- 1 4 23 E-mails from Ray Hefferlin to services about canceling GlasNet and PeaceNet services (1995)
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- 1 5 14 Letter to Ray Hefferlin from Tatiana Allen on his presentation at UTC (February 13, 1998)
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- 1 5 24 E-mail from Victor Gerkasij to the Faculty at Southern Adventist University (September 15, 1999)
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- 1 6 6 Letters and e-mails between Ray Hefferlin and Madurai Kamaraj University (2001-2007)
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- 1 6 7 Cards and e-mails between Ray Hefferlin and Danail Bonchev (2001-2011)
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[See Research Materials \(Series 2, Box 38, Folder 14\)](#) : "Stable Isotopes of Chemical Elements Are Related to Specific Symmetry of Atomic Nuclei" by Lee Hock Cheong and Danail Bonchev
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- 1 6 9 E-mail from Ray Hefferlin to Haruo Hosoya (January 16, 2002)
- 1 6 10 Letters and e-mails between Ray Hefferlin and Tony A Ford (December 8, 2002)

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- 2 18 3 Research notes on Periodicity and Monotonicity of Molecules $N > 2$ at Southern College (March 2, 1993-January 21, 1997)
- 2 18 4 Journal Report #1 of the Physics Departments at Southern College "Symmetry principles for periodic systems of molecules" by G.V. Zhuvikin and Ray Hefferlin (September 11, 1994)
- 2 18 5 Report #1 of the Physics Department at Southern College "Periodic Systems of Molecules: Physical and Chemical" by Ray Hefferlin, Evgeny V. Babaev and Gary W. Burdick (November 17, 1994)
- 2 18 6 Joint Report #2 of the Physics Department at Southern College "Analysis of group theoretical periodic systems of molecules using tabulated data" by C. M. Carlson, R. A. Hefferlin, and G. V. Zhuvikin (March 1995)
- 2 18 7 Journal of Chemical Information and Computer Sciences "An Efficient Symplectic Integration Algorithm for Molecular Dynamics Simulations" by Dusanka Janezic and Franci Merzel (1995)
[See Correspondence \(Series 1, Box 5, Folder 10\)](#) : E-mails and letter between Ray Hefferlin and Dusanka Janezic (1997-2001)

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| 2 | 18 | 8 | Article and membership paper from International Society for Mathematical Chemistry (1995-1997) |
| 2 | 18 | 9 | Neural Net N=2 Ha (copies) (1996) |
| 2 | 18 | 10 | Neural Net N=2 IP (1996) |
| 2 | 18 | 11 | Neural Net N=2 log Q (1996) |
| 2 | 19 | 1 | Neural Net N=2 re (1996) |
| 2 | 19 | 2 | Neural Net N=2 SO 298 (1996) |
| 2 | 19 | 3 | IVB N=2 squares and data (>ions, nucl) transparencies (1996) |
| 2 | 19 | 4 | VIII N=2 All plots transparencies (1996) |
| 2 | 19 | 5 | Neural Net N=2 We (1996-1997) |
| 2 | 19 | 6 | Articles and notes prepared for presentations (1996-1998)
See Correspondence (Series 1, Box 5, Folder 14) : Letter to Ray Hefferlin from Tatiana Allen on his presentation at UTC (February 13, 1998);
See Research Materials (Series 2, Box 19, Folder 6) : Printout of New Developments on Invariance in Series of Adjacent-DIM molecules |
| 2 | 19 | 7 | IA Math Chem, topics and people transparencies (1997) |
| 2 | 20 | 1 | Research notes on periodicity and other behaviors found in molecular data at Southern Adventist University (January 31, 1997 – January 20, 2000) |
| 2 | 20 | 2 | Preliminary Proposal for Joint Research with Subhash C. (January 26, 1998)
See Correspondence (Series 1, Box 5, Folder 20) : Letters and e-mails between Ray Hefferlin and Subhash C. Basak (01/98-05/13);
See Research Materials (Series 2, Box 20, Folder 12) : Journal Article by Subhash C. Basak (2001);
See Research Materials (Series 2, Box 33, Folder 13) : "My tortuous journey from biochemistry to mathematical chemistry" by Subhash C. Basak |
| 2 | 20 | 3 | Journal article by Alexander Boldyrev and Jack Simons (1998)
See Expense Reports (Series 4, Box 58, Folder 6) : Check Request fro Dr. Alexander Boldyrev's visit (27 April 2004);
See Correspondence (Series 1, Box 5, Folder 21) : E-mails between Ray Hefferlin and Alexander I. Boldyrev (1998-2014) |
| 2 | 20 | 4 | Notes on definition of dimension=d (1998)
See Journal Articles (Series 3, Box 44, Folder 13) : Journal of Physical Chemistry A (1998) "On the Electronic Structure of NLi ₂ and PLi ₂ , Ground and Low-Lying Excited States" by Demeter Tzeli, Aristotle Papakondylis and Aristides Mavrides;
See Correspondence (Series 1, Box 5, Folder 23) : Note from Ray Hefferlin to colleagues (September 14, 1999) |
| 2 | 20 | 5 | Notes on Mathematical Chemistry (1998-2014)
See Research Materials (Series 2, Box OS42, Folder 9) : Diagram of connections in mathematical chemistry (May 4, 2001) |

- 2 20 6 Bietz Byline (September 1999)
[See Expense Reports \(Series 4, Box 52, Folder 7\)](#) : Endowment Fund account balances and access for research expenses (1988-2001);
[See Correspondence \(Series 1, Box 5, Folder 9\)](#) : Letters from Ray Hefferlin to Dale Bidwell, Gary Babcock and colleagues (1977-1999)
- 2 20 7 Research presented at conferences (1999-2001)
[See Correspondence \(Series 1, Box 5, Folder 27\)](#) : Letters and e-mails between Ray Hefferlin and others obtaining permissions and information regarding presentations (1999-2001);
[See Journal Articles \(Series 3, Box 45, Folder 5\)](#) : Published articles by Ray Hefferlin and others presented at conferences (2000-2002);
[See Research Materials \(Series 2, Box 20, Folder 7\)](#) : Present RADII (A) data
- 2 20 8 "Emergence of order from chaos by cooperative non-biased learning between random bit-strings" by J. Fayos (March 1, 2000)
[See Correspondence \(Series 1, Box 5, Folder 11\)](#) : Correspondence from Pepe Fayos to Ray Hefferlin (1997-2005)
- 2 20 9 Research notes on periodicity and other behaviors found in molecular data at Southern Adventist University (January 20, 2000-November 8, 2004)
- 2 20 10 Web search printout and article on Supersymmetry (2000-2009)
- 2 20 11 Linear Molecule Diagrams (August 2001)
- 2 20 12 Journal article by Subhash C. Basak (2001)
[See Correspondence \(Series 1, Box 5, Folder 20\)](#) : Letters and e-mails between Ray Hefferlin and Subhash C. Basak (01/98 - 08/13);
[See Research Materials \(Series 2, Box 20, Folder 2\)](#) : Preliminary Proposal for Joint Research with Subhash C. Basak (January 26, 1998);
[See Research Materials \(Series 2, Box 33, Folder 13\)](#) : "My tortuous journey from biochemistry to mathematical chemistry" by Subhash C. Basak
- 2 20 13 List of whom Ray Hefferlin sent photos of 2001 Dubrovnik visit (2001)
- 2 20 14 Profile of Alexandru T. Balaban (2001)
[See Correspondence \(Series 1, Box 4, Folder 11\)](#) : Letters and e-mails between Ray Hefferlin and Alexandru T. Balaban (1993-2014);
[See Journal Articles \(Series 3, Box 44, Folder 3\)](#) : Match no. 29 "Confessions and reflections of a graph-theoretical chemist" by Alexandru T. Balaban (1993)
- 2 20 15 Articles by Maurice Kibler (2001-2007)
[See Correspondence \(Series 1, Box 2, Folder 3\)](#) : Letters, e-mails and postcards between Ray Hefferlin and Maurice Kibler (1985-2014)
- 2 20 16 Autobiography and article by Milan Randic (2002)
[See Correspondence \(Series 1, Box 4, Folder 12\)](#) : Letters and e-mails between Ray Hefferlin and Milan Randic (1993-2014)
- 2 20 17 Journal Articles written by K. Balasubramanian (2002)
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- 2 20 18 Notes and sketches by Vladimir Mastryukov (2002)

- [See Correspondence \(Series 1, Box 5, Folder 4\)](#) : Letters and e-mails between Ray Hefferlin and Vladimir Mastryukov (1996-2008)
- 2 21 1 Notes on and Drafts of Zhuvikin's paper on group-theoretical approach in atomic and molecular periodicity (2002-2003)
- 2 21 2 Notes for presentation on "Research on dating and marriage in atomic theory" (September 8, 2003)
[See Correspondence \(Series 1, Box 6, Folder 22\)](#) : Note from Ray Hefferlin to Ruth Williams-Morris (September 8, 2003)
- 2 21 3 American Institute of Physics' Physics and Astronomy Classification Scheme (2003)
[See Correspondence \(Series 1, Box 6, Folder 19\)](#) : Letter from Safia Hameed to Ray Hefferlin (February 2003)
- 2 21 4 Analytical and Bioanalytical Chemistry "Determination of siloxanes, silicon, and platinum in tissues of women with silicone gel-filled implants" by Daniel Flassbeck, Bettina Pfeleiderer, Patrick Klemens, Klaus G. Heumann, Elke Eltze and Alfred V. Hirner (2003)
- 2 21 5 Arabic Cartoons (2003)
[See Photographs \(Series 7, Box 66, Folder 5\)](#) : Photos of Arabic Cartoons (2003)
- 2 21 6 Octahedral N=4 (2003)
- 2 21 7 Profile of Norton Starr (2003)
[See Correspondence \(Series 1, Box 4, Folder 9\)](#) : Letters and e-mails between Ray Hefferlin and Norton Starr (1993-2009)
- 2 21 8 HF (JANAF) work 2@6@ (digitizer); 2@6+2@7 (data); 5@6ox (Date); Uranium oxides (2003-2004)
- 2 21 9 Outline for lectures on "Mathematical Chemistry: Periodicity", University of Pamplona (July 12, 2004-July 16, 2004)
- 2 21 10 Research notes on periodicity and other behaviors found in molecular data at Southern Adventist University (November 9, 2004-February 14, 2006)
- 2 21 11 Articles by Varvara A. Latysheva (2004-2006)
[See Correspondence \(Series 1, Box 5, Folder 29\)](#) : E-mails, letters and postcards between Ray Hefferlin and Varvara A. Latysheva (1999-2007)
- 2 21 12 Research presented at conferences (2004-2007)
[See Correspondence \(Series 1, Box 5, Folder 31\)](#) : Letter and e-mails between Ray Hefferlin and others about presenting and past presentations at conferences (1999-2012);
[See Photographs \(Series 7, Box 66, Folder 9\)](#) : Photo and pictures of Ray Hefferlin presenting at institutions (2004);
[See Journal Articles \(Series 3, Box 46, Folder 1\)](#) : Published Articles presented at conferences (2004-2007);
[See Ephemera \(Series 5, Box 62, Folder 1\)](#) : CDs of presentations given at conferences and schools (2004-2008)
- 2 22 1 String Theory Articles (2004-2007)

- 2 22 2 List of Chemistry Faculty at the University of Tennessee at Chattanooga (November 18, 2005)
- 2 22 3 Origins No. 57 "Visualizing Baraminic Distances Using Classical Multidimensional Scaling" by Todd Charles Wood (2005)
[See Research Materials \(Series 2, Box 27, Folder 1\)](#) : Atom period drawings and sketches of isoelectrons;
[See Correspondence \(Series 1, Box 10, Folder 3\)](#) : E-mails between Ray Hefferlin and others on Atom period drawings and sketches of isoelectrons (2014-2015);
[See Ephemera \(Series 5, Box 62, Folder 3\)](#) : CDs of Technical Drawings by Nels Angelin (2013)
- 2 22 4 Notes and graphs on Schukarev Indices (2005-2007)
- 2 22 5 Algebra of transition metals transparencies (June 14, 2006)
- 2 22 6 Baryon Periodic Table printout (October 27, 2006)
[See Correspondence \(Series 1, Box 5, Folder 19\)](#) : E-mails between Ray Hefferlin and others about the Periodic Table of Baryons (1998-2006)
- 2 22 7 Articles on a periodic table of nanoparticles (2006)
- 2 22 8 Industrial and Engineering Chemistry Research 45 "Detailed Composition Based Model for Predicting the Cetane Number of Diesel Fuels" by Prasenjet Ghosh and Stephen B. Jaffe (2006)
- 2 22 9 Notes of Zenkevich research (2006)
[See Correspondence \(Series 1, Box 7, Folder 29\)](#) : E-mail from Ray Hefferlin to Igor Zenkevich (June 18, 2007)
- 2 22 10 Vector Index I (2006)
- 2 22 11 Chemical and Engineering News - Various Fuel Articles (2006-2007)
- 2 22 12 Various articles on the Baryon Periodic Table (2006-2008)
- 2 22 13 Research notes on periodicity and other behaviors found in molecular data at Southern Adventist University (February 13, 2006-September 11, 2013)
- 2 23 1 Moebius strip transparencies (April 16, 2007)
- 2 23 2 Transparencies on Ray Hefferlin's "Through the Element Chart Into Periodic Systems of Molecules" presentation (December 2007)
- 2 23 3 Foundations of Chemistry 9 "The chemical 'Knight's Move' relationship: what is its significance?" by Geoff Rayner-Canharn and Megan Oldford (2007)
- 2 23 4 Sketches of the correct stacking of blocks of the 3-d periodic system (July 27, 2008)
[See Photographs \(Series 7, Box 67, Folder 2\)](#) : Correct stacking of blocks of the 3-d periodic system
- 2 23 5 Academic Research Committee Fund and Grant Applications (2008-2009)
- 2 23 6 Research presented at conferences (2008-2010)
[See Journal Articles \(Series 3, Box 47, Folder 4\)](#) : Published articles presented at conferences (2008-2012);

- [See Ephemera \(Series 5, Box 62, Folder 5\)](#) : CD of Canada AAS poster;
[See Correspondence \(Series 1, Box 8, Folder 8\)](#) : E-mails between Ray Hefferlin and others about presenting at conferences (2008-2010)
- 2 23 7 American Chemical Society Leadership in Chattanooga papers (2008-2012)
[See Correspondence \(Series 1, Box 9, Folder 15\)](#) : E-mails between Ray Hefferlin and Gretchen Potts (2013)
- 2 23 8 Islamic Republic of Iran Electronic Visa Service (March 26, 2009)
[See Correspondence \(Series 1, Box 8, Folder 9\)](#) : E-mails between Ray Hefferlin and Seyed Ashrati (2008-2014)
- 2 23 9 Article and report on meson hadronic molecules (2009)
- 2 23 10 Articles and studies from Madurai Kamaraj University (2009)
[See Correspondence \(Series 1, Box 6, Folder 6\)](#) : Letters and e-mails between Ray Hefferlin and Madurai Kamaraj University (2001-2007)
- 2 23 11 Google search results and article associated with D. Weise research (2009)
[See Correspondence \(Series 1, Box 5, Folder 28\)](#) : Letters and e-mails between Ray Hefferlin and Wolfgang L. Weise (1999-2004)
- 2 23 12 International Journal of Quantum Chemistry, vol. III "Spin-Free Quantum Electronic Structure: Its Second Quantization and Para-Fermionics" by D.J. Klein (2009)
- 2 23 13 Notes on Danail Bonchev's article (2009)
[See Research Materials \(Series 2, Box 38, Folder 14\)](#) : "Stable Isotopes of Chemical Elements Are Related to Specific Symmetry of Atomic Nuclei" by Lee Hock Cheong and Danail Bonchev;
[See Correspondence \(Series 1, Box 6, Folder 7\)](#) : Cards and e-mails between Ray Hefferlin and Danail Bonchev (2001-2011)
- 2 23 14 Notes on drafts of Zhuvikin's book on group-theory and dynamics (2009)
- 2 23 15 Rama K. Mishra's CV (2009)
[See Correspondence \(Series 1, Box 6, Folder 17\)](#) : E-mails and letters between and for Ray Hefferlin and Rama K. Mishra (2002-2013)
- 2 23 16 Notes on exclusion principal exclusions (February 2010)
[See Correspondence \(Series 1, Box 8, Folder 22\)](#) : E-mails from Ray Hefferlin to himself (February 11, 2010)
- 2 24 1 Notes and research for "Group-Theoretical Periodic Systems of Small Gas-Phase Molecules" by G.V. Zhuvikin and Ray Hefferlin (August 25, 2010)
[See Research Materials \(Series 2, Box OS42, Folder 10\)](#) : Table of Manuscript figures (August 25, 2010)
- 2 24 2 Notes on and Drafts of "Group Theoretical Periodic Systems of Small Gas-Phase Molecules" by Ray Hefferlin and G.V. Zhuvikin (October 25, 2010)
- 2 24 3 Chemical and Engineering News, "2010 ACS National Award Winners" (2010)
[See Correspondence \(Series 1, Box 8, Folder 26\)](#) : E-mails between Ray Hefferlin and the office of Dr. A. Welford Castleman (2010)
- 2 24 4 Chemical and Engineering News - Various Articles (May 2011)

- 2 24 5 Assorted web searches and definitions (2011)
- 2 24 6 Lambert Academic Publishing "Molecular Taxonomy" by Ray Hefferlin (2011)
[See Research Materials \(Series 2, Box 15, Folder 9\)](#) : Articles on research used in Ray Hefferlin's book "Molecular Taxonomy" (1987-2011);
[See Correspondence \(Series 1, Box 7, Folder 3\)](#) : E-mails between Ray Hefferlin and others about editing and revising his book "Molecular Taxonomy" (2003-2011)
- 2 24 7 Paul Scherrer Institut "Physicists observe the splitting of an electron inside a solid" (April 18, 2012)
- 2 24 8 Various articles on Neutrino Physics (2012)
- 2 24 9 Articles and society constitution/by-laws from the European Physical Society (2012-2013)
[See Expense Reports \(Series 4, Box 60, Folder 3\)](#) : Invoices from the European Physical Society (2013-2014)
- 2 24 10 Information on publishing in the International Journal of Quantum Chemistry (2012-2013)
[See Journal Articles \(Series 3, Box 48, Folder 1\)](#) : International Journal of Quantum Chemistry "Why Do Molecules Echo Atomic Periodicity?" by Ray Hefferlin, Jonathan Sackett, and Jeremy Tatum (2013);
[See Research Materials \(Series 2, Box 36, Folder 4\)](#) : Notes on molecules echoing atomic periodicity;
[See Correspondence \(Series 1, Box 9, Folder 3\)](#) : E-mails between Ray Hefferlin and others on research for and the publication of "Why Do Molecules Echo Atomic Periodicity" (2011-2013)
- 2 24 11 Research notes and papers by Mohamed El Tani (2012-2014)
[See Correspondence \(Series 1, Box 8, Folder 21\)](#) : E-mails between Ray Hefferlin and Mohamed El Tani
- 2 25 1 Triatomic Worksheets and Diagrams (2013)
- 2 25 2 Articles and papers associated with American Chemical Society membership (2013-2014)
[See Expense Reports \(Series 4, Box 60, Folder 5\)](#) : Membership and Subscription Renewal to American Chemical Society (2014);
[See Research Materials \(Series 2, Box OS42, Folder 11\)](#) : ACS Membership Pamphlet
- 2 25 3 Isoelectronic Sequences and Molecule Diagrams (2013-2014)
- 2 25 4 Notes on research project in small molecular systematics at Southern Adventist University (September 12, 2013-February 10, 2015)
- 2 25 5 Journal of Applied Statistics "A multidimensional view on poverty in the European Union by partial order theory" by Paola Annoni, Rainer Bruggeman and Lars Carlsen (November 17, 2014)
[See Correspondence \(Series 1, Box 7, Folder 27\)](#) : Letters and e-mails between Ray Hefferlin and Rainer Bruggeman (2006-2014)
- 2 25 6 Article and evaluation form of article evaluated by Ray Hefferlin (2014)
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2	27	1	Atom period drawings and sketches of isoelectrons See Research Materials (Series 2, Box 22, Folder 3) : Origins No.57 "Visualizing Baraminic Distances Using Classical Multidimensional Scaling" by Todd Charles Wood (2005); See Correspondence (Series 1, Box 10, Folder 3) : E-mails between Ray Hefferlin and others on Atom period drawings and sketches of isoelectrons (2014-2015); See Ephemera (Series 5, Box 62, Folder 3) : CDs of Technical Drawings by Nels Angelin (2013)
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2	36	4	Notes on molecules echoing atomic periodicity See Correspondence (Series 1, Box 9, Folder 3) : E-mails between Ray Hefferlin and others on research for and the publication of "Why Do Molecules Echo Atomic Periodicity?" (2011-2013); See Journal Articles (Series 3, Box 48, Folder 1) : International Journal of Quantum Chemistry "Why Do Molecules Echo Atomic Periodicity?" by Ray Hefferlin, Jonathan Sackett, and Jeremy Tatum (2013); See Research Materials (Series 2, Box 24, Folder 10) : Information on publishing in the International Journal of Quantum Chemistry (2012-2013); See Research Materials (Series 2, Box OS42, Folder 14) : Data on Red behavior
2	36	5	Notes on parabola equations See Correspondence (Series 1, Box 9, Folder 27) : E-mails between Ray Hefferlin and Joshua Barrow (2014)
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[See Ephemera \(Series 5, Box 62, Folder 4\)](#) : Cassette Tape of Arseny at Southern College

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2	36	11	Notes on Orthogonal Transformation
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2	37	2	Overview on periodicity among molecules and presentation materials for Dobereiner Pentads See Correspondence (Series 1, Box 9, Folder 26) : E-mails between Ding-Yu Chung and Ray Hefferlin on publishing a collaborative article in viXra (2014); See Journal Articles (Series 3, Box 47, Folder 10) : Published collaborative articles by Ray Hefferlin and others (2011-2013)
2	37	3	P and Log *K, (L=10, ch=50, JCICS=8)
2	37	4	P and V1 (L=9, ch=49, JCICS=7)
2	37	5	P and V1 (JCICS 7a-7d)
2	37	6	Periodicity (L=5, ch=55, Br1=13, Br2=9)
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2	37	9	Periodic System of Molecules and Systematic Prediction of Data
2	37	10	Periodic tables for diatomic molecules
2	37	11	Phosphones (Br2=1)
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2	37	13	Planes in sp block (was Br=3) reject
2	37	14	Properties vs. $C_1 + 2C_2 + C_2$ and vs. C_2
2	37	15	Properties vs. functions of R1, R2, R3

2	37	16	Properties vs. Kong number, two graphs each log PK only one each
2	37	17	Properties vs Ne and $C1 + 2C2 + C3$ for sets of data with +-
2	37	18	Property correlations $N=2,3,4$ transparencies
2	37	19	Quotations from and articles on chemical models and molecular periodicity
2	38	1	Research and paper by Dr. Fet See Correspondence (Series 1, Box 2, Folder 4) : Correspondence with and about Dr. Fet
2	38	2	Research sent to Ray Hefferlin from Daniel Mort See Correspondence (Series 1, Box 1, Folder 18) : Letters to Ray Hefferlin from Daniel Mort (1983); See Research Materials (Series 2, Box OS42, Folder 3) : Program for calculating radius from vertex placed at origin of an orthogonal coordinate system (5/31/1983)
2	38	3	ReWe See Photographs (Series 7, Box 67, Folder 6) : Photos of D* dimes and oxide figures
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2	38	5	R1=3, R2=2 (was Br1=2) reject
2	38	6	Schulz Figures
2	38	7	Separation and Cluster Indices
2	38	8	S, F, P atom stacks and diagrams See Photographs (Series 7, Box 66, Folder 18) : Photo of Ray Hefferlin with atom diagram
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2	38	12	Some Observations on R1, R2, R3
2	38	13	SO(3) "x SU (2)" Atom Test
2	38	14	"Stable Isotopes of Chemical Elements Are Related to Specific Symmetry of Atomic Nuclei" by Lee Hock Cheong and Danail Bonchev See Research Materials (Series 2, Box 23, Folder 13) : Notes on Danail Bonchev's article (2009); See Correspondence (Series 1, Box 6, Folder 7) : Cards and e-mails between Ray Hefferlin and Danail Bonchev (2001-2011)
2	38	15	S, U Methanes notes and diagrams
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2	39	5	Triatonics on isoelectron planes
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2	39	8	Vector index SWTCC 710ic transparencies
2	40	1	Vectors and Notes Homologous Multiplets
2	40	2	Vectors Multiplets SO (2,1) Triatomic
2	40	3	Vectors Multiplets, Triatomic, SO(3)xSU(2)s
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2	40	5	V1 vs. Molecular Spring Diagrams
2	40	6	Walters Computer Graphics Cubes See Photographs (Series 7, Box 67, Folder 17) : Photos of Walter Computer Graphics Cubes
2	40	7	Wiener Indexes
2	40	8	Wikipedia Articles
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2	41	1	118 = Atom Diagrams and notes
2	41	2	238 U decay (Br2 = 4)
2	41	3	III Shchukarev supermatrix transparencies
2	41	4	IVA Diners + Oxides transparencies
2	41	5	IV N=2 Least descent, Vectors transparencies
2	41	6	VA Cur and Stack SAU transparencies
2	41	7	Vb Monyokin Transparencies
2	41	8	VD Matrix product transparencies
2	41	9	VE Fundamental particles transparencies
2	41	10	VF Matrix for circle, 2D transparencies

2	41	11	VI B,C N=3 cubes and data transparencies
2	41	12	VI D DIM evidence and theory transparencies
2	41	13	VI E, F N=3 LS fitting transparencies
2	41	14	VI Kunik surfaces transparencies
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2	41	16	VII B-D Clark, Syrkim, Kashin transparencies
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2	41	22	XII A Laplace transparencies
2	41	23	XII B Lattices transparencies
2	OS42	1	Research Logbooks on Diatomic Molecular Systematics (1979-1984) See Research Materials (Series 2, Box 14, Folder 8) : Research Logbooks on N-Atomic Molecular Systems (July 1985)
2	OS42	2	Periodic System dependencies (July 28, 1980) See Research Materials (Series 2, Box 12, Folder 6) : Planning Direction of Research Lab Notebooks (1972-2010)
2	OS42	3	Program for calculating radius from vertex placed at origin of an orthogonal coordinate system (May 31, 1983) See Research Materials (Series 2, Box 38, Folder 2) : Research sent to Ray Hefferlin from Daniel Mort
2	OS42	4	Research Notes from the China University of Science and Technology (1984) See Correspondence (Series 1, Box 1, Folder 22) : Letters and e-mails between Ray Hefferlin and Fanao Kong (1984-2014)
2	OS42	5	Research and information for National Conference at University of North Carolina at Asheville (April 23, 1987-April 26, 1987) See Research Materials (Series 2, Box 14, Folder 10) : Notes and articles prepared for publication and presentation (1985-1987)
2	OS42	6	Chattanooga Times, Articles on Health and Vaccination (January 24, 1991)
2	OS42	7	Research on Molecular Periodic Systems and additive diatomic data (1992-2000) See Research Materials (Series 2, Box 16, Folder 3) : Research Logbooks on N-Atomic Molecules and notes on research on molecular periodic systems (1989-2000)

- 2 OS42 8 Physics, Quote Poster (1995)
- 2 OS42 9 Diagram of connections in mathematical chemistry (May 4, 2001)
[See Research Materials \(Series 2, Box 20, Folder 5\)](#) : Notes on Mathematical Chemistry (1998-2014)
- 2 OS42 10 Table of Manuscript figures (August 25, 2010)
[See Research Materials \(Series 2, Box 24, Folder 1\)](#) : Notes and research for "Group-Theoretical Periodic Systems of Small Gas-Phase Molecules" by G.V. Zhuvikin and Ray Hefferlin (August 25, 2010)
- 2 OS42 11 ACS Membership Pamphlet
[See Research Materials \(Series 2, Box 25, Folder 2\)](#) : Articles and Papers associated with American Chemical Society membership (2013-2014)
- 2 OS42 12 Atom cube diagrams
[See Research Materials \(Series 2, Box 26, Folder 8\)](#) : Atom cube diagrams, atom scatter plots and graphs;
[See Correspondence \(Series 1, Box 2, Folder 6\)](#) : Letter from Ray Hefferlin to Springer-Verlag Journals Editorial Division (August 6, 1987)
- 2 OS42 13 Block Periodic Chart for the Diatomic Molecules
[See Research Materials \(Series 2, Box 29, Folder 7\)](#) : Diagrams of stacking of blocks-H
- 2 OS42 14 Data on Red behavior
[See Research Materials \(Series 2, Box 36, Folder 4\)](#) : Notes on molecules echoing atomic periodicity
- 2 OS42 15 Figure 4.2
[See Research Materials \(Series 2, Box 30, Folder 2\)](#) : Figures and justification of Fixed-Row graphs of molecular graphs
- 2 OS42 16 Fig. 1 and materials for Russian presentation
[See Research Materials \(Series 2, Box 13, Folder 7\)](#) : Research presented at conferences (1980-1984)
- 2 OS42 17 Holifield Radioactive Ion Beam Facility Pamphlet
[See Research Materials \(Series 2, Box 15, Folder 9\)](#) : Articles on research used in Ray Hefferlin's book "Molecular Taxonomy" (1987-2011)
- 2 OS42 18 Induction in teaching the study of physics
[See Research Materials \(Series 2, Box 11, Folder 4\)](#) : Iron Arc Thesis and Research (1955)
- 2 OS42 19 Large Ionization Diagrams
[See Research Materials \(Series 2, Box 27, Folder 5\)](#) : Binding Energy and Ionization Diagrams
- 2 OS42 20 Periodic Chart for the Diatomic Molecules
[See Research Materials \(Series 2, Box 13, Folder 2\)](#) : Research presented at conferences (1978)
- 2 OS42 21 Periodic System of Atoms and Associated Molecules

[See Research Materials \(Series 2, Box 35, Folder 11\)](#) : Notes and Tables on Rotation Group-subgroup chains and homonuclear atoms

- 2 OS42 22 Present A2 RADII (A) data
[See Research Materials \(Series 2, Box 20, Folder 7\)](#) : Research presented at conferences (1999-2001)
- 2 OS42 23 Printout of New Developments on Invariance in Series of Adjacent - DIM molecules
[See Research Materials \(Series 2, Box 19, Folder 6\)](#) : Articles and notes prepared for presentations (1996-1998)

Series 3: Journal Articles, 1963-2015

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- 3 43 1 Published articles by Ray Hefferlin and others presented at conferences (1959-1968)
[See Photographs \(Series 7, Box 65, Folder 2\)](#) : Photograph of Conference on Plasma Jet Diagnostics at Southern Missionary College (January 3, 1963);
[See Research Materials \(Series 2, Box 11, Folder 6\)](#) : Research presented at conferences (1961-1965)
- 3 43 2 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 4 "Laboratory High Excitation Relative f-values for Manganese 1*" (1964)
- 3 43 3 Journal of Quantitative Spectroscopy and Radiative Transfer vol. 5 "Seven Density Determinations in an Atmospheric Manganese ARC*"
- 3 43 4 Journal of the Optical Society of America Vol. 57, No. 7 "Oscillator Strengths in Isoelectronic Sequences*" (July 1967)
- 3 43 5 Progress in High Temperature Physics and Chemistry "Diagnostics in Field-Free Plasmas with Medium-Dispersion optical-spectrographic and Source-Monitoring Equipment*" – copy (1969)
- 3 43 6 Published articles by Ray Hefferlin and others presented at conferences (1969-1976)
[See Research Materials \(Series 2, Box 11, Folder 7\)](#) : Research presented at conferences (1966-1968);
[See Photographs \(Series 7, Box 65, Folder 4\)](#) : Photograph of Plasma Diagnostics Research (1974);
[See Research Materials \(Series 2, Box 11, Folder 8\)](#) : Research presented at conferences (1969-1976)
- 3 43 7 "Chemical Srodstvo" by Karapetyants (1972)
[See Correspondence \(Series 1, Box 7, Folder 19\)](#) : E-mail to Ray Hefferlin from L.G. Bolshakova (January 2, 2006)
- 3 43 8 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 12 "Anomalous Excitation of N₂⁺ in a Seeded Argon Free Plasma Jet" (1972)
- 3 43 9 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 13 "Level Populations in Plasmas. RF Discharges and Sonic Channel" – copy (1973)
- 3 43 10 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 16 "Systematics of Diatomic Molecular Transition Moments: Encouraging Progress - II" (1976)

- 3 43 11 Published articles by Ray Hefferlin and others presented at conferences (1977-1983)
[See Correspondence \(Series 1, Box 1, Folder 12\)](#) : Letter from Ray Hefferlin to Kieran Doherty (October 12, 1980);
[See Photographs \(Series 7, Box 65, Folder 5\)](#) : Photo of "On Ground, at Potential Minima, of Neutral Quasi - Molecules formed from Neutral Atoms or Ions" presentation (1983);
[See Research Materials \(Series 2, Box 13, Folder 7\)](#) : Research presented at conferences (1980-1984)
- 3 43 12 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 19 "Further Progress in Systematics of Free Diatomic- Molecule Electronic-Transition Intensity Constants" – copy (1978)
- 3 43 13 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 21 "The Periodic Table of Diatomic Molecules - I + II " (1979)
- 3 43 14 Journal of Optics and Spectroscopy vol. 48 (In Russian) " The Lifetimes of the Excited Levels of the Oscillator Strength of the Spectral Lines" (1980)
- 3 43 15 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 24 "The Periodic System for Free Diatomic Molecules - III. Theoretical Articulation" – copy (1980)
- 3 43 16 The Journal of Chemical Physics Vol. 75 No. 2 "Systematics of Ground-State Potential Minima Between Two Main-Group Atoms or Ions" (July 15, 1981)
- 3 43 17 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 29, No. 2 "The Differential Coefficient (APlan)_{nc} for Properties of Diatomic Molecules and Atoms" (1983)
- 3 43 18 Messenger No. 16 (In Russian) "Periodic System of Two-Atomic Molecules: Group Theoretic Approach" (1983)
- 3 43 19 Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 32, No. 4 "Periodic Systems of N-Atom Molecules" – copy (1984)
- 3 43 20 International Chemical Congress of Pacific Basin Societies "The Systematic Prediction of Diatomic Molecular Properties" (1984)
- 3 44 1 McGraw-Hill Yearbook of Science and Technology "Molecule" – copy (1989)
- 3 44 2 International Conference on Group-Theoretical Methods in Physics "Bosonic Symmetry and Periodic Systems of Molecules" (June 28, 1992-July 3, 1992)
- 3 44 3 Match no. 29 "Confessions and reflections of a graph-theoretical chemist" by Alexandru T. Balaban (1993)
[See Research Materials \(Series 2, Box 20, Folder 14\)](#) : Profile of Alexandra T. Balaban (2001);
[See Correspondence \(Series 1, Box 4, Folder 11\)](#) : Letters and e-mails between Ray Hefferlin and Alexandru T. Balaban (1993-2014)
- 3 44 4 Joint Report #1 of the Physics Departments of Southern College "Symmetry principles for periodic systems of molecules" (September 11, 1994)
- 3 44 5 Journal of Chemical Information and Computer Sciences 34 "Matrix-Product Periodic Systems of Molecules" – copy (1994)

- 3 44 6 Russian Journal of General Chemistry, Vol. 64, No. 11. Part 2 "Periodic Systems of Molecules: Physical and Chemical" by Ray Hefferlin and Gary W. Burdick (Russian and English) (1994)
- 3 44 7 Southern Scholars Journal "The 50th Anniversary of Work on Molecular Periodic Systems: Broad Scientific and Human Interest Aspects" – copy (1994)
- 3 44 8 Joint Report #2 of the Physics Departments of Southern College "Analysis of group theoretical periodic systems of molecules using tabulated data" (March 1995)
- 3 44 9 Journal of Chemical Information and Computer Sciences 36 "Molecular Multiplets of Alkaline Atoms" – copy (1996)
- 3 44 10 Journal of Molecular Structure "Adjacent DIM Isoelectronic Molecules and Chemical Structure 382 "Adjacent DIM Isoelectronic Molecules and Chemical Similarity Among Triatomics" – copy (1996)
- 3 44 11 Croatica Chemica Acta 70 "Estimation of Properties of Triatomic Molecules from Tabulated Data using Least-squares Fitting" – copy (1997)
- 3 44 12 Articles by Dr. George Zhuvikin presented at the International Artic Seminars: Physics and Math (1998)
[See Correspondence \(Series 1, Box 4, Folder 10\)](#) : Letters and e-mails about Dr. George Zhuvikin and between Ray Hefferlin and Dr. Zhuvikin (1993-2013);
[See Photographs \(Series 7, Box 66, Folder 17\)](#) : Photograph of Dr. George Zhuvikin
- 3 44 13 Journal of Physical Chemistry - A "On the Electronic Structure of NLi₂ and PLi₂, Ground and Low-Lying Excited States" by Demeter Tzeli, Aristotle Papakondylis and Aristides Mavrides (1998)
[See Correspondence \(Series 1, Box 5, Folder 23\)](#) : Note from Ray Hefferlin to colleagues (September 14, 1999);
[See Research Materials \(Series 2, Box 20, Folder 4\)](#) : Notes on definition of dimension=d
- 3 45 1 Journal of Quantitative Spectroscopy and Radiative Transfer 62 "Systematics of diatomic molecular transition moments" – copy (1999)
- 3 45 2 Journal of Mathematical Chemistry Vol. 28 Nos. 1-3 "On the Use of Laplace's equation for global predictions of internuclear separation and dissociation energy" – copy (2000)
- 3 45 3 Journal of Molecular Structure (Theochem) 506 "The textures of chemical spaces" – copy (2000)
- 3 45 4 Series in Discrete Mathematics and Theoretical Computer Science Vol. 51 "Numerical Solutions of the Laplace Equation in Chemical Spaces" (2000)
- 3 45 5 Published articles by Ray Hefferlin and others presented at conferences (2000-2002)
[See Correspondence \(Series 1, Box 5, Folder 27\)](#) : Letters and e-mails between Ray Hefferlin and others obtaining permissions and information regarding presentations (1999-2001);
[See Research Materials \(Series 2, Box 20, Folder 7\)](#) : Research presented at conferences (1999-2001)
- 3 45 6 Journal of Chemical Information and Computer Sciences Vol. 41 No. 3 "Molecular Similarity for Small Species: Redefining the Isoelectronic Index" – copy (2001)

- 3 45 7 Croatica Chemica Acta 75 "Global Molecular Identification from Graphs, Main-group Triatomic Molecules*" – copy (2002)
- 3 45 8 Journal of Chemical Information and Computer Sciences Vol. 42 No. 1 "Global Molecular Identification from Graphs. Neutral and Ionized Main-Group Diatomic Molecules" (2002)
- 3 45 9 Journal of Chemical Information and Computer Sciences "An Atlas of Forecasted Molecular Data. 1. Internuclear Separations of Main-Group and Transition-Metal Neutral Gas-Phase Diatomic Molecules in the Ground State" by Ray Hefferlin, W. Bradford Davis and Jason Iletto (2003)
[See Correspondence \(Series 1, Box 6, Folder 6\)](#) : E-mails and letters between Ray Hefferlin and others obtaining permissions for Atlas of Forecasted Molecular Data 1 Paper (2002-2005)
- 3 45 10 Croatica Chemica Acta 77 "Global Molecular Identification from Graphs. IV. Molecules with Four Closed p-Shell Atoms and beyond *" – copy (2004)
- 3 45 11 Journal of Chemical Information and Computer Sciences 44 "Periodic Systems of Molecules as Elements of Schukarev's 'Supermatrix', ie. the Chemical Element Periodic System" – copy (2004)
- 3 46 1 Published Articles presented at conferences (2004-2007)
[See Ephemera \(Series 5, Box 62, Folder 1\)](#) : CDs of presentations given at conferences and schools (2004-2008);
[See Research Materials \(Series 2, Box 21, Folder 12\)](#) : Research presented at conferences (2004-2007);
[See Correspondence \(Series 1, Box 5, Folder 31\)](#) : Letter and e-mails between Ray Hefferlin and others about presenting and past presentations at conferences (1999-2012);
[See Photographs \(Series 7, Box 66, Folder 9\)](#) : Photo and pictures of Ray Hefferlin presenting at institutions (2004)
- 3 46 2 WSEAS Transactions on Information Science and Applications Issue 7 Vol. 2 "Neural Networks in Mining Molecular Properties from Tabulated Data" – copy (July 2005)
- 3 46 3 WSEAS 9th CSCC Multiconference "How Deep in Molecular Space can Periodicity be Found?" – copy (July 11, 2005-July 16, 2005)
- 3 46 4 Croatica Chemica Acta 79 "A Periodicity-Sensitive Vector Index for Small Molecules" – copy (2006)
- 3 46 5 Journal of Chemical Information and Modeling "An Atlas of Forecasted Molecular Data. 2. Vibration Frequencies of Main-Group and Transition-Metal Neutral Gas-Phase Diatomic Molecules in the Ground State" by W. Bradford Davis and Ray Hefferlin (2006)
[See Correspondence \(Series 1, Box 7, Folder 17\)](#) : Letters and e-mails between Ray Hefferlin and others regarding obtaining permissions and editing the Atlas of Forecasted of Molecular Data 2 paper (2005-2013)
- 3 46 6 Partial Order in Environmental Sciences and Chemistry "Hasase Diagrams and their Relation to Molecular Periodicity" – copy (2006)

- 3 46 7 Philosophy of Chemistry, Boston Studies in the Philosophy of Science Vol. 242 "The Periodic Systems of Molecules: Presuppositions, Problems, and Prospects" – copy (2006)
- 3 46 8 Croatica Chemica Acta 80 "Algebraic Characterization of Simple Transition-Metal Molecules*" – copy (2007)
- 3 46 9 MATCH Communications in Mathematical and in Computer Chemistry 57 "A graph-theory approach to global determination of octet molecules" - copy (2007)
- 3 47 1 Journal of Mathematical Chemistry Vol. 43 No. 1 "Discrete vector calculus on periodic systems of atoms and molecules" -copy (January 2008)
- 3 47 2 Combinatorial Chemistry and High Throughput Screening 11 "Kronuclear-Product Periodic Systems of Small Gas-Phase Molecules adn the Search for Order in Atomic Ensembles of Any Phase" – copy (2008)
- 3 47 3 Combinatorial Chemistry and High Throughput Screening 11 "Kronecker-Product Periodic Systems of Small Gas-Phase Molecules and the Search for Order in Atomic Ensembles of Any Phase" – copy (2008)
- 3 47 4 Published articles presented at conferences (2008-2012)
[See Research Materials \(Series 2, Box 23, Folder 6\)](#) : Research presented at conferences (2008-2010);
[See Ephemera \(Series 5, Box 62, Folder 5\)](#) : CD of Canada AAS poster;
[See Correspondence \(Series 1, Box 8, Folder 8\)](#) : E-mails between Ray Hefferlin and others about presenting at conferences (2008-2010)
- 3 47 5 Foundations of Chemistry "Charles Janet: unrecognized genius of the periodic system" by Philip J. Stewart (January 10, 2009)
- 3 47 6 Croatica Chemica ACTA 82 "Two Descriptions for Series of Congeneric Molecules" – copy (2009)
- 3 47 7 International Journal of Chemical Modeling Vol. 1 Issue 314 "Mapping Out PQ= QP Redundancies in NXN Data Arrays" (2009)
- 3 47 8 Journal of Quantitative Spectroscopy and Radiative Transfer 111 "Vibration frequencies using lease squares and neural networks for 50 news s and p electron diatomics" – copy (2010)
- 3 47 9 Chemical Information and Computational Challenges "Data Location in a Four-Dimensional Periodic System of Diatomic Molecules" – copy (2011)
- 3 47 10 Published collaborative articles by Ray Hefferlin and others (2011-2013)
[See Correspondence \(Series 1, Box 9, Folder 26\)](#) : E-mails between Ding-Yu Chung and Ray Hefferlin on publishing a collaborative article in viXra (2014);
[See Research Materials \(Series 2, Box 37, Folder 2\)](#) : Overview on periodicity among molecules and presentation materials for Dobereiner Pentads
- 3 47 11 International Journal of Chemical Modeling Vol. 4 No. 1 "Internuclear separations using lease squares and neural networks for 46 new main-group diatomics" – copy (2012)
- 3 48 1 International Journal of Quantum Chemistry "Why Do Molecules Echo Atomic Periodicity:" by Ray Hefferlin, Jonathan Sackett, and Jeremy Tatum (2013)

[See Research Materials \(Series 2, Box 24, Folder 10\)](#) : Information on publishing in the International Journal of Quantum Chemistry (2012-2013);
[See Research Materials \(Series 2, Box 36, Folder 4\)](#) : Notes on molecules echoing atomic periodicity;
[See Correspondence \(Series 1, Box 9, Folder 3\)](#) : E-mails between Ray Hefferlin and others on research for and the publication of "Why Do Molecules Echo Atomic Periodicity?" (2011-2013)

3	48	2	Journal of Modern Physics 4 "The Higgs Boson in the Periodic System of Elementary Physics" – copy (2013)
3	48	3	Quantum Systems in Chemistry and Physics "Systematic and Prediction in Franck-Condon Factors" (2013)
3	48	4	Advances in Mathematical Chemistry and Applications "Molecular Taxonomy" (2014)
3	48	5	Journal of Physics: Conference Series 548 "Vibration Frequencies For Searches of Free Triatomic Molecules In Circumstellar Space" (2014)
3	48	6	Published articles presented at conferences (2014) See Correspondence (Series 1, Box 9, Folder 17) : E-mails between Ray Hefferlin and others about publishing and presenting at conferences (2013-2014)
3	48	7	viXra "Do Triatomic Molecules Echo Atomic Periodicity?" – copy (2014)
3	48	8	"Error Checking of Computed Values used in the Construction of a Large Data Base" Series 3: Journal Articles (January 2015)
3	48	9	"Mining Molecular Data from Tabulations and Computation to Search for Periodicity in free Triatomic Molecules" (January 29, 2015)

Series 4: Expense Reports, 1867-2014

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4	49	1	Processed checks and receipts (1967-1968)
4	49	2	Check Request and invoice for Government Report Topical Announcement Physics renewal (August 9, 1972)
4	49	3	Receipts and policy descriptions from Insurance companies (1972-1976) See Correspondence (Series 1, Box 1, Folder 8) : Letters from Ray Hefferlin about changes to insurance policy (1975-1977)
4	49	4	Travel Expense Reports and budget (1972-1978)
4	49	5	Time Cards and Check Requests (1972-1987)
4	49	6	Check Requests and receipts (1972-1989)
4	49	7	General Ledgers (1972-2004)
4	49	8	Invoice from Les Livres Etrangers (January 1, 1973) See Correspondence (Series 1, Box 1, Folder 7) : Letter to Ray Hefferlin from Les Livres Etrangers (February 13, 1973)

4	49	9	Receipts, Invoices, and Purchase Orders (1974-1988)
4	49	10	Check Request and invoices from Les Livres Etrangers (Foreign Books) (1975-1980)
4	49	11	Budget notes, receipts, and monthly records of long distance calls (1977-1982)
4	49	12	Southern College Academic Research Fund Grant Applications and Research Reports (1977-1997)
4	49	13	Invoices from Pergamon Journals (October 20, 1978) See Correspondence (Series 1, Box 1, Folder 11) : Letter from Frank Knittel to Ray Hefferlin (October 26, 1978)
4	49	14	Notes, receipts, and statements on STN International (1978-1992)
4	50	1	Monthly Expense Reports (1979-1983)
4	50	2	Expenditures purchase orders (1979-1985)
4	50	3	Summaries and invoices of campus shop purchases (1980-1989)
4	50	4	Invoices from Les Livres Etrangers (1982)
4	50	5	Packaging and receipts of photograph purchases (1982-1998)
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4	51	4	Quick Print orders and receipts (1986-2000)
4	51	5	Monthly Travel and Miscellaneous Expense Reports and receipts (1987-1988)
4	51	6	Student Employment Departmental Weekly Reports (1987-1988)
4	51	7	Invoices and time card statements charged to Physics Chair (1987-1988) See Correspondence (Series 1, Box 2, Folder 8) : Letters and Notes between Ray Hefferlin and others about accounts and expenses of the Physics Chair (1987-1988)
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