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|  |  | **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](mailto: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. | | |
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| Access: | Archival papers are available to readers for consultation by appointment | | |
|  | only. Please fill out [this form](http://southern.libsurveys.com/Request-for-Special-Collections-Item) 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,**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page4) **5.34** [**linear ft.)**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page4)

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.)**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page8)

This series contains materials used for research by Ray Hefferlin.

* [**Series 3: Journal Articles, 1963-2015 (6 boxes, 2.502 linear ft.)**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page9)

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.)**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page15)

This series contains receipts, invoices, and budgets of Ray Hefferlin

* [**Series 5: Ephemera, 2004-2013 (1 box, .417 linear ft.)**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page18)

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.)**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page25)

This series contains maps used in by Ray Hefferlin in his travels.

* [**Series 7: Photographs, 1955-2013 (3 boxes, 1.251 linear ft.)**](file:///C:\Users\josef\Downloads\FindingAidRHC.doc#page25)

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**

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| **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)](#series2box12folder3): "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)](#series2box12folder5): 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)](#series4box49folder8): 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)](#series4box49folder3): 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)](#series4box49folder13): 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)](#series2box13folder7) : Research presented at conferences (1980-1984);  [See Journal Articles (Series 3, Box 43, Folder 11)](#series3box43folder7) : Published articles by Ray Hefferlin and others presented at conferences (1977-1983);  [See Photographs (Series 7, Box 65, Folder 5)](#series7box65folder5): Photo of "On Ground, at Potential Minima, of Neutral Quasi-Molecules formed from Neutral Atoms or Ions" presentation (1983) |
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| 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)](#series2box38folder2) : 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)](#series2box14folder5) : 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)](#series7box67folder22) : Proofs of pictures of notes from Huang De-Yun;  [See Research Materials (Series 2, Box 33, Folder 18)](#series2box33folder18) : Notes and article draft from Huang De-Yun |
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| 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)](#series7box65folder8): Photo of Periodic Chart of Molecules presentation (December, 1987);  [See Research Materials (Series 2, Box 14, Folder 10)](#series2box14folder10) : Notes and articles prepared for publication and presentation (1985-1987) |
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| 1 | 2 | 4 | Correspondence with and about Dr. Fet (1986-1992)  [See Research Materials (Series 2, Box 38, Folder 1)](#series2box38folder1): Research and paper by Dr. Fet |
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| 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)](#series2box42folder12) : Atom cube diagrams;  [See Research Materials (Series 2, Box 26, Folder 8)](#series2box26folder8) : Atom cube diagrams, atom scatter plots and graphs |
| 1 | 2 | 7 | Letters sent by Ray Hefferlin to others requesting permissions for his 1989 book (1987) |
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| 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)](#series4box52folder3) : 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)  [See Expense Reports (Series 4, Box 60, Folder 6)](#series4box60folder6): Salary and payment descriptions for part-time faculty at Southern College |
| 1 | 2 | 15 | Letters between Steve Warren and Ray Hefferlin (1988)  [See Expense Reports (Series 4, Box 52, Folder 1)](#series4box52folder1) : Check request for check made to Steve Warren (July 18, 1988) |
| 1 | 2 | 16 | Letters from Carl E. Wulfman to Ray Hefferlin (1988)  [See Correspondence (Series 1, Box 2, Folder 21)](#series1box2folder21) : Letter to Ray Hefferlin from Lawrence Bogorad (April 14, 1989) |
| 1 | 2 | 17 | Letters between Ray Hefferlin others about the disbursement of endowment funds (1988-1989) |
| 1 | 2 | 18 | Letters and e-mails between Ray Hefferlin and A. Jacques Sauval (1988-2014)  [See Research Materials (Series 2, Box 14, Folder 7)](#series2box14folder7) : "Ciel et Terre" Bulletin for the Belgian Royal Society for Astronomy, Meteorology and Physics of the world (in French)(1984) |
| 1 | 2 | 19 | Letter from Alice Rivers to Ray Hefferlin (January 27, 1989)  [See Expense Reports (Series 4, Box 52, Folder 8)](#series4box52folder8) : Check Request for check to Mellen Book Design (January 30, 1989) |
| 1 | 2 | 20 | Letter from Jack J. Blanco to Louesa Peters (March 27, 1989)  [See Expense Reports (Series 4, Box 52, Folder 9)](#series4box52folder9) : Journal Voucher for purchase of ribbons and printer (March 23, 1989) |
| 1 | 2 | 21 | Letter to Ray Hefferlin from Lawrence Bogorad (April 14, 1989)  [See Correspondence (Series 1, Box 2, Folder 16)](#series1box2folder16) : Letters from Carl E. Wulfman to Ray Hefferlin (1988) |
| 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)](#series4box52folder10) : 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) |
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| 1 | 3 | 11 | Letter from Ray Hefferlin to Mark A. Johnson and Gerald M. Maggioria (August 1, 1991) |
| 1 | 3 | 12 | Letters to Brad Davis from Ray Hefferlin (1991) |
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| 1 | 4 | 14 | Note from Ray Hefferlin to Jan Wittenberg (March 24, 1994)  [See Expense Reports (Series 4, Box 55, Folder 6)](#series4box55folder6) : Invoices from Computer Connection (September 16, 1993) |
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| 1 | 5 | 8 | Letter to Wendell and Betty Joan from Ray Hefferlin (November 4, 1997) |
| 1 | 5 | 9 | Letters from Ray Hefferlin to Dale Bidwell, George Babcock and colleagues (1997-1999)  [See Expense Reports (Series 4, Box 52, Folder 7)](#series4box52folder7) : Endowment Fund account balances and access for research expenses (1988-2001);  [See Research Materials (Series 2, Box 20, Folder 6)](#series2box20folder6) : Bietz Byline (September 1999) |
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| 1 | 5 | 13 | E-mails to Ray Hefferlin from Physics News (1997-2008) |
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| 1 | 5 | 15 | Letter to Ray Hefferlin from B. Battrick, Head of ESA Publications Division (April 14, 1998) |
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| 1 | 5 | 17 | Letters and memos associated with the Academic Dean's Fund (1998-1999)  [See Expense Reports (Series 4, Box 56, Folder 8)](#series4box56folder8) : Reports and applications associated with the Academic Dean's Fund (1998-1999) |
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| 1 | 5 | 20 | Letters and e-mails between Ray Hefferlin and Subhash C. Basak (January 1998 – August 2013)  [See Research Materials (Series 2, Box 20, Folder 12)](#series2box20folder12) : Journal article by Subhash C. Basak (2001);  [See Research Materials (Series 2, Box 20, Folder 2)](#series2box20folder2) : Preliminary Proposal for Joint Research with Subhash C. Basak (January 26, 1998);  [See Research Materials (Series 2, Box 33, Folder 13)](#series2box33folder13) : "My tortuous journey from biochemistry to mathematical chemistry" by Subhash C. Basak |
| 1 | 5 | 21 | E-mails between Ray Hefferlin and Alexander I. Boldyrev (1998-2014)  [See Research Materials (Series 2, Box 20, Folder 3)](#series2box20folder3) : Journal article by Alexander Boldyrev and Jack Simons (1998);  [See Expense Reports (Series 4, Box 58, Folder 6)](#series3box48folder6) : Check Request for Dr. Alexander Boldyrev's visit (April 27, 2014) |
| 1 | 5 | 22 | E-mail from Vladimir Mastryukov about his visit (July 2, 1999) |
| 1 | 5 | 23 | Note from Ray Hefferlin to colleagues (September 14, 1999)  [See Research Materials (Series 2, Box 20, Folder 4)](#series2box20folder4) : Notes on definition of dimension=d;  [See Journal Articles (Series 3, Box 44, Folder 13)](#series3box44folder13) : Journal of Physical Chemistry A (1998) "On the Electronic Structure of NLi2 and PLi2, Ground and Low-Lying Excited States" by Demeter Tzeli, Aristotle Papakondylis and Aristides Mavridis |
| 1 | 5 | 24 | E-mail from Victor Gerkasij to the Faculty at Southern Adventist University (September 15, 1999) |
| 1 | 5 | 25 | Note from A. Mavridis to Ray Hefferlin (September 28, 1999) |
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| 2 | 13 | 2 | Research presented at conferences (1978)  [See Research Materials (Series 2, Box OS42, Folder 20)](#series2box42folder20) : Periodic Chart for the Diatomic Molecules |
| 2 | 13 | 3 | AIP Style Manuals (1978-1990) |
| 2 | 13 | 4 | Articles on quark molecules (1978-2013) |
| 2 | 13 | 5 | Indian Journal of Pharmacology 13 "A Quantitative Structure Activity Relationship (QSAR) Analysis of Carbamoyl Piperdines, Barbiturates and Alkanes using information theoretic topological indices" by S.K. Ray, S.C. Basak, C. Roychandhuny, A.B. Roy\* and J.J. Ghosh (1980) |
| 2 | 13 | 6 | Polymer Science U.S.S.R vol. 22 no. 6 " The High-Temperature Equilibrium of the System Octamethyclyclotetrasiloxane-Polydimethyl-Siloxane\*" by V.S. Svistunov, V.S. Papkov and A.A. Zhdanov (1980) |
| 2 | 13 | 7 | Research presented at conferences (1980-1984)  [See Photographs (Series 7, Box 65, Folder 5)](#series7box65folder5) : Photo of "On Ground, at Potential Minima, of Neutral Quasi-Molecules formed from Neutral Atoms of Ions" presentation (1983);  [See Journal Articles (Series 3, Box 43, Folder 11)](#series3box43folder11) : Published articles by Ray Hefferlin and others presented at conferences (1977-1983);  [See Correspondence (Series 1, Box 1, Folder 12)](#series1box1folder12) : Letter from Ray Hefferlin to Kieran Doherty (October 12, 1980);  [See Research Materials (Series 2, Box OS42, Folder 16)](#series2box42folder16) : Fig. 1 and materials for Russian presentation |
| 2 | 13 | 8 | II Chemical Systems Transparencies (1980-1987) |
| 2 | 14 | 1 | Notes, transparencies and articles on Crystallography (1980-2012)  [See Photographs (Series 7, Box 66, Folder 12)](#series7box66folder12) : Photo of Quilt (August 8, 2005) |
| 2 | 14 | 2 | Articles on biochemistry and cell evolution (1981-2009) |
| 2 | 14 | 3 | Arzneimittel-Forschung Drug Research 32 "A Quantitative Structure-Activity Relationship Study of N-Alkylnorketobemidores and Triazinones Using Structural Information Content" by S.K. Ray, S.C. Basak, C. Raychaudhury, A.B. Roy, and J.J. Ghosh (1982) |
| 2 | 14 | 4 | Blank Abstract Submission forms (May 1983) |
| 2 | 14 | 5 | Description of and welcome to Inorganic Crystal Structure Database (1983)  [See Correspondence (Series 1, Box 1, Folder 19)](#series1box1folder19) : Letters between Ray Hefferlin and others about constructing periodic systems for small molecules (1983-1984) |
| 2 | 14 | 6 | Journal of Pharmaceutical Sciences vol. 73 No. 4 "Comparative Study of Lipophilicity versus Topological Molecular Descriptors in Biological Correlations" by S.C. Basak, D.K. Harriss, and V.R. Magnuson\* (April 1984) |
| 2 | 14 | 7 | "Ciel et Terre" Bulletin for the Belgian Royal Society for Astronomy, Meteorology and Physics of the World (in French)  [See Correspondence (Series 1, Box 2, Folder 18)](#series1box2folder18) : Letters and e-mails between Ray Hefferlin and A. Jacques Sauval (1988-2014) |
| 2 | 14 | 8 | Research Logbooks on N-Atomic Molecular Systems (July 1985)  [See Research Materials (Series 2, Box OS42, Folder 1)](#series2box42folder1) : Research Logbooks on Diatomic Molecular Systematics (1979-1984) |
| 2 | 14 | 9 | Physical Review Letters vol. 55 no. 17 "Structural Classification of AB2 Molecules and A3 Clusters from Valence Electron Orbital Radii" by Wanda Andreoni, Giulia Galli, Mario Tosi (October 21, 1985) |
| 2 | 14 | 10 | Notes and articles prepared for publication and presentation (1985-1987)  [See Correspondence (Series 1, Box 2, Folder 2)](#series1box2folder2) : Letters between Ray Hefferlin and others concerning publication and presenting at seminars (1985-1987);  [See Photographs (Series 7, Box 65, Folder 8)](#series7box65folder8) : Photo of Periodic Chart of Molecules presentation (December 1987);  [See Research Materials (Series 2, Box 14, Folder 10)](#series2box14folder10) : Research and information for National Conference at University of North Carolina at Asheville (April 23-26, 1987) |
| 2 | 15 | 1 | Notes and articles on particle physics (1985-2010) |
| 2 | 15 | 2 | Articles on Genetic Codes (1986-2007) |
| 2 | 15 | 3 | Notes and articles on the detection of the C7H molecule and others (1986-2007) |
| 2 | 15 | 4 | Physical Review Letters vol. 58 no. 26 "Structural Classification of Polyatomic Molecules Based on Valence-Electron Orbital Radii: AB3 and A2B2 Compounds" by Wanda Andreoni (June 29, 1987) |
| 2 | 15 | 5 | International Journal of Quantum Chemistry: Quantum Chemistry Symposium 21 "The Freeon Unitary Group Procedure and The Structure of Matter" by F.A. Matsen (1987) |
| 2 | 15 | 6 | Journal of Mathematical Physics 28 "Comment on the paper "Thetaseries and magic numbers for diamond and certain ionic crystal structures"" by George C. Hall (1987) |
| 2 | 15 | 7 | Leonardo vol. 20 no. 1 "Lines and Junctions and the Topology of Space" by Robert Adolphus Wiggs (1987) |
| 2 | 15 | 8 | Guidelines and proposals for endowed chairs (1987-1996) |
| 2 | 15 | 9 | Articles on research used in Ray Hefferlin's book "Molecular Taxonomy" (1987-2011)  [See Correspondence (Series 1, Box 7, Folder 3)](#series1box7folder3) : E-mails between Ray Hefferlin and others about editing and revising his book "Molecular Taxonomy" (2003-2011);  [See Research Materials (Series 2, Box 24, Folder 6)](#series2box24folder6) : Lambert Academic Publishing "Molecular Taxonomy" by Ray Hefferlin (2011)  [See Research Materials (Series 2, Box OS42, Folder 17)](#series2box42folder17) : Holifield Radioactive Jon Beam Facility Pamphlet |
| 2 | 15 | 10 | XI Hyperperiodic system transparencies (1988) |
| 2 | 15 | 11 | Notes, articles and transparencies prepared for publication and presentation (1988-1993)  [See Photographs (Series 7, Box 65, Folder 12)](#series7box65folder12) : Photo of Bosonic Symmetry and Periodic systems of Molecules presentation (1992);  [See Correspondence (Series 1, Box 4, Folder 6)](#series1box4folder6) : Letter from Ray Hefferlin requesting permissions to use a figure by A. Haas (1993) |
| 2 | 15 | 12 | Articles on Barbiturates and Polychlorinated biphenyls (1988-2004) |
| 2 | 16 | 1 | Documents and notes on USSR resident visitation (1989) |
| 2 | 16 | 2 | Interviews by and articles on Arseny Berezin (1989) |
| 2 | 16 | 3 | Research Logbooks on N-Atomic Molecules and notes on research on molecular periodic systems (1989-2008)  [See Research Materials (Series 2, Box 16, Folder 7)](#series2box16folder7) : Transparencies on research on molecular periodic systems at SAU (1990-1998);  [See Research Materials (Series 2, Box OS42, Folder 7)](#series2box42folder7) : Research on Molecular Periodic Systems and additive diatomic data (1992-2000) |
| 2 | 16 | 4 | Preparation for meeting of the Association of Adventist Physicists (January 19, 1990-January 20, 1990) |
| 2 | 16 | 5 | Affidavit of Support by Bernardo and Anita Orquia for Carmencita Orquia (1990) |
| 2 | 16 | 6 | Research notes on periodicity and monolonicity of molecules N>2 at Southern College (September 10, 1990-January 17, 1993) |
| 2 | 16 | 7 | Transparencies on research on molecular periodic systems at SAU (1990-1998)  [See Research Materials (Series 2, Box 16, Folder 3)](#series2box16folder3) : Research Logbooks on N-Atomic Molecules and notes on research on molecular periodic systems (1989-2008) |
| 2 | 16 | 8 | Various notes and articles on Clusters (1990-2004) |
| 2 | 16 | 9 | Registration form for the VIIth ICQC Menton in France (July 1991) |
| 2 | 16 | 10 | OB2 - 2011 Book (1992-1993) |
| 2 | 17 | 1 | SO (2,1) (1992-1993) |
| 2 | 17 | 2 | The Chancellor's Report from Mellen University and Mellen University Press (1992-1993)  [See Correspondence (Series 1, Box 4, Folder 7)](#series1box4folder7) : Letters between Ray Hefferlin and Mellen University and Mellen Press (1993-1994) |
| 2 | 17 | 3 | SO (3) x SU (2) (1992-1994) |
| 2 | 17 | 4 | X Group theory transparencies (1992-1995) |
| 2 | 17 | 5 | "The Path of Scientific Truth Leads to God" by Yu. I. Kulakov and Yu. I. Koropanchinskii (June 1993)  [See Photographs (Series 7, Box 65, Folder 11)](#series7box65folder11) : Photos of Ray Hefferlin in Russia with Yurii Ivanovich Kulakov (December 1990);  [See Correspondence (Series 1, Box 3, Folder 14)](#series1box3folder14) : E-mails, letters and postcards related to "The Path of Scientific Truth Leads to God" by Yu. I. Kulakov and Yu. I. Koropanchinskii (1991-1992) |
| 2 | 17 | 6 | X Spare Transparencies (September 21, 1993) |
| 2 | 17 | 7 | Group theory multiplet fitting (1993) |
| 2 | 17 | 8 | Multiplets for Diatomic Molecule and Vectors (1993) |
| 2 | 17 | 9 | Saint-Leterbuig State University Faculty of Physics (In Russian) "Investigation of the Electronity Properties of Molecules in the Models of a Breakful Unitary Symmetry" (1993) |
| 2 | 17 | 10 | SO (3)" x SU (2)' (1993) |
| 2 | 17 | 11 | SO (4) x SU (2) (1993) |
| 2 | 18 | 1 | SU (7) (1993) |
| 2 | 18 | 2 | Theoretica Chemica Acta 86 "Freeon unitary group formulation of Hartree-Fock theory" by Frederick A. Matsen and Loudon L. Campbell (1993) |
| 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 Sympletic Integration Algorithm for Molecular Dynamics Simulations" by Dusanka Janezic and Franci Merzel (1995)  [See Correspondence (Series 1, Box 5, Folder 10)](#series1box5folder10) : E-mails and letter between Ray Hefferlin and Dusanka Janezic (1997-2001) |
| 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)](#series1box5folder14) : Letter to Ray Hefferlin from Tatiana Allen on his presentation at UTC (February 13, 1998);  [See Research Materials (Series 2, Box 19, Folder 6)](#series2box19folder6) : 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)](#series1box5folder20) : Letters and e-mails between Ray Hefferlin and Subhash C. Basak (01/98-05/13);  [See Research Materials (Series 2, Box 20, Folder 12)](#series2box20folder12) : Journal Article by Subhash C. Basak (2001);  [See Research Materials (Series 2, Box 33, Folder 13)](#series2box33folder13) : "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)](#series4box58folder6) : Check Request fro Dr. Alexander Boldyrev's visit (27 April 2004);  [See Correspondence (Series 1, Box 5, Folder 21)](#series1box5folder21) : 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)](#series3box44folder13) : Journal of Physical Chemistry A (1998) "On the Electronic Structure of NLi2 and PLi2, Ground and Low-Lying Excited States" by Demeter Tzeli, Aristotle Papakondylis and Aristides Mavrides;  [See Correspondence (Series 1, Box 5, Folder 23)](#series1box5folder23) : 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)](#series2box42folder9) : 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)](#series4box52folder7) : Endowment Fund account balances and access for research expenses (1988-2001);  [See Correspondence (Series 1, Box 5, Folder 9)](#series1box5folder9) : 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)](#series1box5folder27) : 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)](#series3box45folder5) : Published articles by Ray Hefferlin and others presented at conferences (2000-2002);  [See Research Materials (Series 2, Box 20, Folder 7)](#series2box20folder7) : 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)](#series1box5folder11) : 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)](#series1box5folder20) : Letters and e-mails between Ray Hefferlin and Subhash C. Basak (01/98 - 08/13);  [See Research Materials (Series 2, Box 20, Folder 2)](#series2box20folder2) : Preliminary Proposal for Joint Research with Subhash C. Basak (January 26, 1998);  [See Research Materials (Series 2, Box 33, Folder 13)](#series2box33folder13) : "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)](#series1box4folder11) : Letters and e-mails between Ray Hefferlin and Alexandru T. Balaban (1993-2014);  [See Journal Articles (Series 3, Box 44, Folder 3)](#series3box44folder3) : 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)](#series1box2folder3) : 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)](#series1box4folder12) : Letters and e-mails between Ray Hefferlin and Milan Randic (1993-2014) |
| 2 | 20 | 17 | Journal Articles written by K. Balasubramanian (2002)  [See Correspondence (Series 1, Box 8, Folder 4)](#series1box8folder4) : E-mails between Ray Hefferlin and K. Balasubramanian (2007-2013) |
| 2 | 20 | 18 | Notes and sketches by Vladimir Mastryukov (2002)  [See Correspondence (Series 1, Box 5, Folder 4)](#series1box5folder4) : 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)](#series1box6folder22) : Note from Ray Hefferlin to Ruth Williams-Morris (September 8, 2003) |
| 2 | 21 | 3 | American Institute of Physics' Physics and Astronomny Classification Scheme (2003)  [See Correspondence (Series 1, Box 6, Folder 19)](#series1box6folder19) : 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 silocone gel-filled implants" by Daniel Flassbeck, Bettina Pfleiderer, 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)](#series7box66folder5) : 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)](#series1box4folder9) : 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)](#series1box5folder29) : 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)](#series1box5folder31) : 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)](#series7box66folder9) : Photo and pictures of Ray Hefferlin presenting at institutions (2004);  [See Journal Articles (Series 3, Box 46, Folder 1)](#series3box46folder1) : Published Articles presented at conferences (2004-2007);  [See Ephemera (Series 5, Box 62, Folder 1)](#serie5box62folder1) : 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)](#series2box27folder1) : Atom period drawings and sketches of isoelectrons;  [See Correspondence (Series 1, Box 10, Folder 3)](#series1box10folder3) : 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)](#serie5box62folder3) : 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)](#series1box5folder19) : 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)](#series1box7folder29) : 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)](#series7box67folder2) : 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)](#series3box47folder4) : Published articles presented at conferences (2008-2012);  [See Ephemera (Series 5, Box 62, Folder 5)](#serie5box62folder5) : CD of Canada AAS poster;  [See Correspondence (Series 1, Box 8, Folder 8)](#series1box8folder8) : 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)](#series1box9folder15) : 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)](#series1box8folder9) : 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)](#series1box6folder6) : 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)](#series1box5folder28) : 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)](#series2box38folder14) : "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)](#series1box6folder7) : 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)](#series1box6folder17) : 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)](#series1box8folder22) : 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)](#series2box42folder10) : 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)](#series1box8folder26) : 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)](#series2box15folder9) : Articles on research used in Ray Hefferlin's book "Molecular Taxonomy" (1987-2011);  [See Correspondence (Series 1, Box 7, Folder 3)](#series1box7folder3) : 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)](#series4box60folder3) : 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)](#series3box48folder1) : 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)](#series2box36folder4) : Notes on molecules echoing atomic periodicity;  [See Correspondence (Series 1, Box 9, Folder 3)](#series1box9folder3) : 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)](#series1box8folder21) : 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)](#series4box60folder5) : Membership and Subscription Renewal to American Chemical Society (2014);  [See Research Materials (Series 2, Box OS42, Folder 11)](#series2box42folder11) : 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)](#series1box7folder27) : Letters and e-mails between Ray Hefferlin and Rainer Bruggeman (2006-2014) |
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| 3 | 43 | 19 | Journal of Quantitative Spectroscopy and Radiative Transfer Vol. 32, No. 4 "Periodic Systems of N-Atom Molecules" – copy (1984) |
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| 3 | 46 | 4 | Croatica Chemica Acta 79 "A Periodicity-Sensitive Vector Index for Small Molecules" – copy (2006) |
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**Series 4: Expense Reports, 1867-2014**

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