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## Guide to the Edward Wesley Hughes Papers, 1924-1979

Archives

California Institute of Technology  
Pasadena, California

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### Descriptive Summary

**Title:** Edward Wesley Hughes Papers,

**Date (inclusive):** 1924-1979

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### Biographical Sketch

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Edward Wesley Hughes was born in Wilkes-Barre, Pennsylvania, on March 22, 1904, the only child of a Pennsylvania mining engineer and his wife. He attended schools in north Pennsylvania and became interested in chemistry when he took it as an "overload" subject in high school.

In 1924, he received a bachelor's degree in chemistry from Cornell and remained there for the next fourteen years. While at Cornell, he gained his Ph.D. in 1935. During this period, he became interested in crystallography after hearing Professor Carlton C. Murdock lecture and went to work with Murdock as a graduate student in the physics department. In 1934, Murdock recommended him as teaching assistant to a visiting professor, Lawrence Bragg -who later became Nobel Laureate Sir Lawrence Bragg. X-ray crystallography was invented by Bragg, and Hughes felt honored to work with him and act as technical editor on his book for the Cornell Press. In 1937, Hughes was again recommended as a teaching assistant, this time to Linus Pauling, who was impressed enough to ask him to act as a technical editor on a book and to offer him a two-year post at Caltech.

In 1938, Hughes arrived at Caltech to do research in the chemistry division. During 1940-42, he was involved in teaching "war courses" for technicians from the armed services in X-ray techniques. He also worked with Melvin Calvin on a war research project that was a subcontract with Berkeley. The contract was not renewed in 1943 because Pauling felt the war would be over before its practical applications were developed.

For the next two and a half years, Hughes worked for the Shell Development Company, the research branch of Shell Oil, at Emeryville. He did not really enjoy his time there and returned to Caltech in April 1946. The remainder of his professional life was spent here, except for one year's leave of absence in 1951, as a Brotherton Research lecturer, at The University, Leeds, England. When he returned, he had married Ruth Joanna Heprer, R. N., who became known as the "fabulous" Mrs. Hughes. The Hugheses were active members of the Caltech community, acting as hosts to visiting scientists. Mrs. Hughes established a chemistry division wives' group and such institutions as the "garage," now run by the Women's Club. She worked in the division office and helped Pauling research his book, *No More War*. In 1974, Edward Hughes retired but remained involved in Caltech life, particularly through his work for the chemistry division's Safety Committee.

Edward Hughes was a respected chemist and continued the pioneering work in crystallography, begun at Caltech by Burdick and Ellis in 1916, when he introduced the "Least Squares Method" in 1940. This is the universally accepted method for handling the large amount of data involved in the refinement of crystal structure. He was a member of several organizations, including the International Union of Crystallography, for which he was the United States' National Academy delegate at five international meetings, between 1956 and 1963. He served on other committees within the IUC, including the USA National Committee for Crystallography. Hughes served as a national committeeman for the American Crystallographic Association, was president of Association in 1954, and also acted as their unofficial photographer. Between 1957 and 1963, he was the U.S. coeditor of the research journal *Acta Crystallographica*. He wrote and published many papers and contributed to several books on chemistry and crystallography.

Despite suffering from bad attacks of hay fever and some back trouble, Hughes was a member of the Wildflowers and the Trailblazers Societies. He also enjoyed photography. Hughes was respected professionally and had a worldwide network of friends and colleagues. Dr. Hughes's warmth and lively sense of humor are evident in his correspondence, as is the esteem in which he was held. Edward Hughes, Senior Research Associate in Chemistry, Emeritus, died in Pasadena on December 24, 1987, at the age of 83.

#### **Personal Correspondence**

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**General Correspondence**

**National Science Foundation**  
 Box Box 3,        **Grant proposal P51123R 1965**  
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**American Crystallographic Association (ACA)**

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Box Box 5        **Reprints**

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**Commission on *Acta Crystallographica***

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 Folder 7.9        **Amendola F1497**  
                      **Correspondence re: manuscript and referee reports**

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Folder 8.4	Patterson MS: "Homometric Structures"
Folder 8.5	Franklin MS: "Ambiguities in the X Ray Analysis of Crystal Structures"
Folder 8.6	Cruickshank MS: "Refinements of Structures containing Bonds between Si, P, S, or Cl and O or N. Part III. Na 5Po 3O 10, Phase II"
Folder 8.7	<b>American Chemical Society correspondence</b>
	<b>Referee reports</b>
Folder 8.8	<i>Journal of Physical Chemistry</i>
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Folder 8.10	Correspondence
Folder 8.11	Rundle obituary, <i>Physics Today</i>
Folder 8.12	International Tables correspondence (Lonsdale, Pauling, Murdock)
Folder 8.13	Correspondence with H. C. Freeman re: MS, "Neutron Diffraction Study of Biuret Hydrate"
Folder 8.14	Correspondence re: Hodgkin's MS, "Vitamin B 12"
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	"Atomic Structure of Minerals," by W. L. Bragg
	Correspondence and notes
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Folder 9.3	McLachlan book correspondence
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Folder 9.6	MS: "Experimental Molecular Structure and Crystallography," <i>Annual Review of Physical Chemistry</i> , Vol. VI, 1954 [includes correspondence and notes]
Folder 9.7	Correspondence re: a-glycylglycine paper
Folder 9.8	Crystal structure of b-glycylglycine
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Folder 9.11	Biuret MS and correspondence

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Folder 9.12	<b>"A New Dimer of Triphenyl," MS and correspondence 1965</b>
Folder 9.13	<b>Fritchie Dimer MS and correspondence 1962</b>
Folder 9.14	<b>MS: "X-ray Study of KL with EWH"</b>
Folder 9.15	<b>MS: "X-ray Diffraction Behaviour of Potassuim Laurate Solutions" [unpublished]</b>
Box Box 10	<b>Notebooks and lecture notes</b>
	<b>OEMsr reports</b>
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	<b>6 th Congress, Rome 1963</b>
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Box Box 21,            **Leeds correspondence**  
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Folder 21.3            **Yuen Chu Leung obituary**

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Folder 21.9            **Reviews of X-ray subjects: biological interest**

Folder 21.10           **Personal**

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- Box Box 22, **"Sulphoxidolysis," senior research report by Hughes and C. Bardin, Cornell University 1924**  
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- Folder 22.3 **Report on Investigations and Research (Hecksher Research Grant) 1928 Oct-1929 Apr**
- Folder 22.4 **Bound red day book: notes, graphed diagrams, etc**
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- Folder 22.9 **Summary of calculations 1943 July**
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- Folder 22.12 **UCA: A and O calculations?**
- Folder 22.13 **Miscellaneous notes [includes reports, research notes, seminar and symposia reports, etc.]**
- Folder 22.14 **Miscellaneous notes [correspondence and calculations]**
- Folder 22.15 **Record book with loose notes**
- Folder 22.16 **Data book no. 2: "X-ray Crystal Analysis of Uranium," A. H. Cash, Physics Dept., Cornell [includes an explanatory letter written by Carleton C. Murdoch to E. Hughes, April 27, 1960]**