

Citation for Chemical Breakthrough Award Program Update (Including 2015 Awards)

Jeffrey I. Seeman
Award Committee Secretary

July 29, 2016

Summary

- Ten years of completed awards (2006 –2015)
- 53 CCB Awards presented to date at 62 sites (due to multiple collaborations and locations)
- Status for the 2016 award year: Ballots and complete nomination forms/supplemental information have been submitted to the awards committee. Votes are due back on or before August 8, 2016. The plan is to announce to HIST's EC the recipients for 2016 prior to the upcoming National Meeting.
- CCB Awards are plaques only, given to institution from which the research was published
- We provide assistance with and sometimes participation in award ceremonies
- Four award ceremonies were held in the last 12 months
 - Bartlett at University of British Columbia (no HIST representative)
 - Fischer at the University of Würzburg with J. I. Seeman and A. G. M. Barrett
 - Michaelis-Menten at the Vivantes Klinikum Am Urban, Berlin (no HIST representative)
 - Curie at Ecole supérieure de physique et de chimie industrielles de la Ville de Paris with J. Gal
- Four additional award ceremonies for 2016 are scheduled (Oxford, Paris, Manchester and Philadelphia ACS National Meeting/Rice University)
- Photographs and associated text dealing with the award ceremonies are found on the CCB Award's web pages
- The CCB Award program now has many links on Wikipedia
- The CCB Award program now has a link and a large description of the program on the ACS National Historic Chemical Landmarks Program

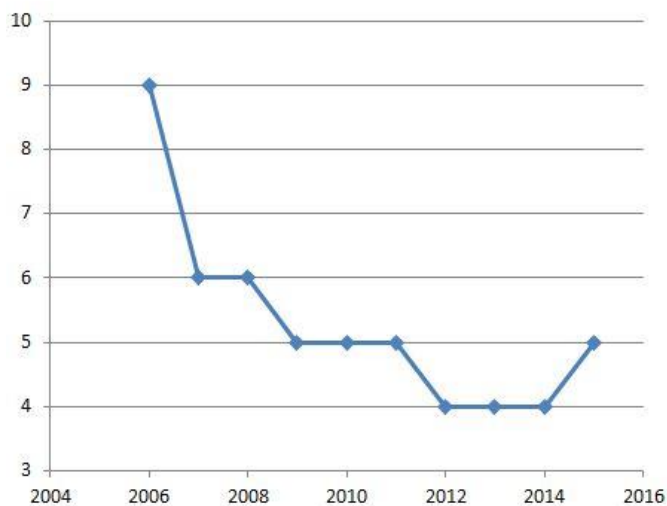
Analyses of the CCB Award Program

Christopher J. Welch (Merck) spontaneously provided two analyses on the CCB award data.

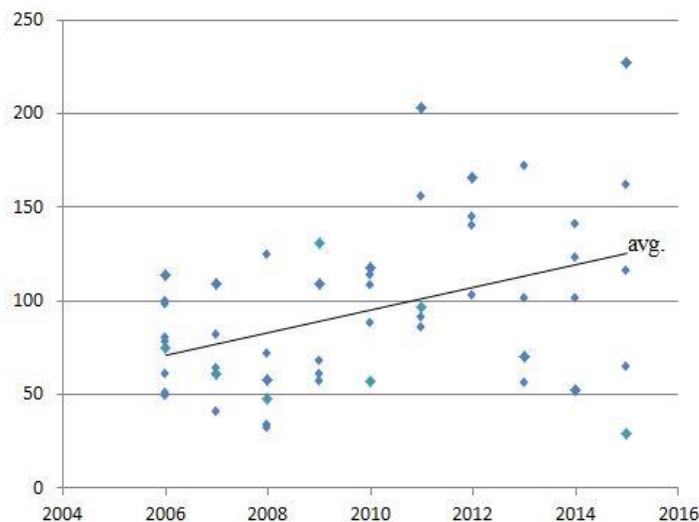
1. The number of awards given per year. This analysis shows that, in the recent seven years, the number of awards/year equals four or five. This decrease from previous years was intentional. The amount of work is excessive beyond five/year and the budget would not allow more awards as well.

2. The paper age versus award year. The award program requires that any award must be for a publication at least 25 years old. This analysis indicates that few awards have been presented for achievements made in the 25-50 old age range. The concern has been raised by others that some mechanism should be devised to be certain that “younger achievements” are recognized by the program award committee. The Secretary is addressing this issue.

Awards vs. Award Year



Paper Age vs. Award Year



The 2015 awards are listed in the graph below, taken from the CCB Award web site that is housed on the HIST website that is designed and maintained by Vera Mainz.

From the HIST website:

Citations for Chemical Breakthrough Awards

2015 Awardees

NOTE: Text in **COLOR** indicates a "live" link.

Scientists/Inventors	Breakthrough Publication (If text is in color, this is a live link to the plaque.)	Location of Award (If text is in color, this is a live link to photographs and other materials related to the presentation.)
Louis Bernard Guyton de Morveau, Antoine Laurent Lavoisier, Claude-Louis Berthollet, and Antoine-François de Fourcroy	"Méthode de Nomenclature Chimique," chez Cuchet (sous le Privilège de l'Académie des Nomenclature Chimique), Paris, France, 1787 .	Académie des Sciences (Paris)
E. Frankland	"On a New Series of Organic Bodies containing Metals," <i>Philosophical Transactions of the Royal Society</i> 1852 , 142, 417-444.	The University of Manchester
P. Curie, M. Curie, and G. Bémont	"Sur une nouvelle substance fortement radioactive, contenue dans l'apochblendé," <i>Comptes rendus de l'Académie des Sciences</i> , Paris, 1898 (26 December), vol. 127, pp. 1215-1217.	ESPCI ParisTech (officially the école supérieure de physique et de chimie industrielles de la ville de Paris; <i>The City of Paris Industrial Physics and Chemistry Higher Educational Institution</i>)
D. Crowfoot, C. W. Bunn, B. W. Rogers-Low, A. Turner Jones	"The X-ray Crystallographic Investigation of the Structure of Penicillin," in H.T. Clarke, J.R. Johnson, R. Robinson (editors), <i>Chemistry of Penicillin</i> , Princeton University Press, Chapter XI, pp. 310-366, 1949 .	Oxford University
H. W. Kroto, J. R. Heath, S. C. O'Brien, R. F. Curl, and R. E. Smalley	"C ₆₀ : Buckminsterfullerene," <i>Nature</i> 1985 , 318, 162-163.	Rice University

The 2015 award plaques are shown in the following five pages. All plaques are also found on the HIST website under HIST Awards, Citation for Chemical Breakthrough Award.



Division of the History of Chemistry
American Chemical Society



Citation for Chemical Breakthrough

The discovery of radium and polonium.

Comptes rendus de l'Académie des Sciences,
Paris, 1898 (26 December), vol. 127, pp. 1215-1217.

PHYSIQUE. — *Sur une nouvelle substance fortement radio-active, contenue dans la pechblende* (†). Note de M. P. CURIE, de M^{me} P. CURIE et de M. G. BÉLON, présentée par M. Becquerel.

« Deux d'entre nous ont montré que, par des procédés purement chimiques, on pouvait extraire de la pechblende une substance fortement radio-active. Cette substance est voisine du bismuth par ses propriétés analytiques. Nous avons émis l'opinion que la pechblende contenait peut-être un élément nouveau, pour lequel nous avons proposé le nom de *polonium* (‡).

M. Demarcay a trouvé dans le spectre une raie qui ne semble due à aucun élément connu. Cette raie, à peine visible avec le chlorure 60 fois plus actif que l'uranium, est devenue notable avec le chlorure enrichi par fractionnement jusqu'à l'activité de 900 fois l'uranium. L'intensité de cette raie augmente donc en même temps que la radio-activité, et c'est là, pensons-nous, une raison très sérieuse pour l'attribuer à la partie radio-active de notre substance.

» Les diverses raisons que nous venons d'énumérer nous portent à croire que la nouvelle substance radio-active renferme un élément nouveau, auquel nous proposons de donner le nom de *radium*.

(†) Ce Travail a été fait à l'École municipale de Physique et Chimie industrielles.

Presented to

ESPCI Paris (Ecole supérieure de physique et de chimie industrielles de la Ville de Paris), 2015.



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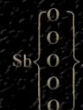
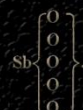
Citation for Chemical Breakthrough

Discovery of the Theory of Valence

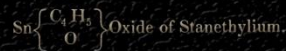
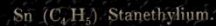
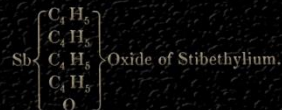
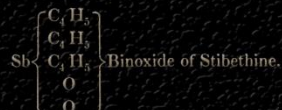
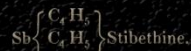
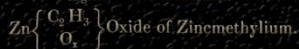
E. Frankland, *Philosophical Transactions of the Royal Society*
1852, 142, 417-444.

XIX. *On a New Series of Organic Bodies containing Metals.*
By Dr. E. FRANKLAND, F.C.S., Professor of Chemistry, Owen's College, Manchester.
Communicated by B. C. BRODIE, Esq., F.R.S.

Inorganic Types.



Organo-metallic Derivatives.



Presented to The University of Manchester, 2015.



Division of the History of Chemistry
American Chemical Society

Citation for Chemical Breakthrough



First widely used system for naming compounds
in a way that describes chemical composition.

MÉTHODE DE NOMENCLATURE CHIMIQUE,

*Proposée par MM. DE MORVEAU,
LAVOISIER, BERTHOLET,
& DE FOURCROY.*

ON Y A JOINT

Un nouveau Système de Caractères Chi-
miques, adaptés à cette Nomenclature,
par MM. HASSENFRAZ & ADET,



A PARIS,

Chez CUCHET, Libraire, rue & hôtel Serpente.

M. DCC. LXXXVII.

Sous le Privilège de l'Académie des Sciences.

Presented to the Académie des Sciences, Paris, 2015.



Division of the History of Chemistry
American Chemical Society

Citation for Chemical Breakthrough



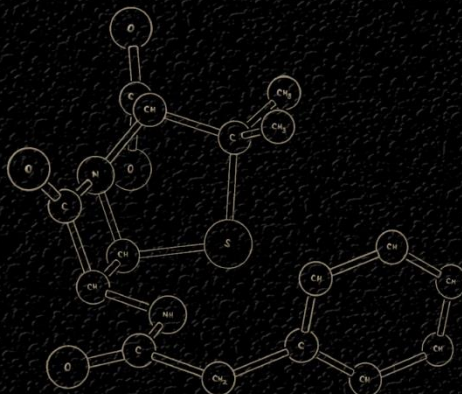
The Use of X-ray Crystallography for Structure Determination.

The Chemistry of Penicillin,
(Eds.: H. T. Clarke, J. R. Johnson, R. Robinson),
Princeton University Press, Chapter XI, pp. 310-366, 1949.

THE X-RAY CRYSTALLOGRAPHIC INVESTIGATION OF THE STRUCTURE OF PENICILLIN

D. CROWFOOT,¹ C. W. BUNN,² B. W. ROGERS-LOW,³ AND A. TURNER-JONES⁴

The Details of the Molecular Structure and Crystal Structure of Sodium, Potassium, and Rubidium Benzylpenicillin. The atomic arrangement shown in the latest three-dimensional electron density distributions calculated for sodium and potassium benzylpenicillin fully establishes the essential structure of penicillin.



Presented to the University of Oxford, 2015.



Division of the History of Chemistry
American Chemical Society



Citation for Chemical Breakthrough

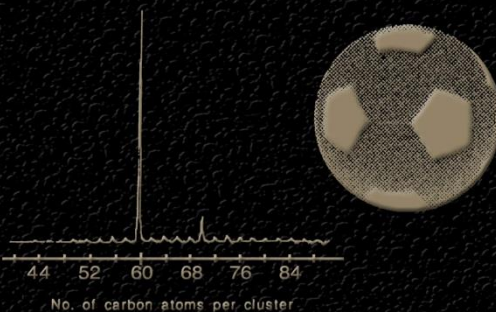
Discovery of C_{60} : The Fullerenes

Nature 1985, 318, 162-163.

C_{60} : Buckminsterfullerene

H. W. Kroto*, J. R. Heath, S. C. O'Brien, R. F. Curl
& R. E. Smalley

Rice Quantum Institute and Departments of Chemistry and Electrical
Engineering, Rice University, Houston, Texas 77251, USA



During experiments aimed at understanding the mechanisms by which long-chain carbon molecules are formed in interstellar space and circumstellar shells¹, graphite has been vaporized by laser irradiation, producing a remarkably stable cluster consisting of 60 carbon atoms. Concerning the question of what kind of 60-carbon atom structure might give rise to a superstable species, we suggest a truncated icosahedron, a polygon with 60 vertices and 32 faces, 12 of which are pentagonal and 20 hexagonal. This object is commonly encountered as the football shown in Fig. 1. The C_{60} molecule which results when a carbon atom is placed at each vertex of this structure has all valences satisfied by two single bonds and one double bond, has many resonance structures, and appears to be aromatic.

Presented to Rice University, 2015.

The members of the 2015 Award Committee are listed below and also on the HIST website (with the Award Committee members from the first award year).

Award Committee Members

2015

Anthony G. M. Barrett, F.R.S. (Imperial College of Science, Technology and Medicine)

Michael Bowers (University of California, Santa Barbara)

Carmen Giunta (Le Moyne College)

Harry Gray (Caltech)

Dudley Herschbach (Harvard)

Peter Morris (Science Museum London)

Amos Smith (Penn)

Joanne Stubbe (MIT)

Jeffrey I. Seeman, Committee Secretary (Non-voting)(University of Richmond)

- The program has received excellent responses in the USA and Europe. To date, no awards have been presented to Asia or South America.
- Announcements of the call for nominations and of the awardees appear regularly in C&EN.
- The plaque-design process is much more difficult than anticipated. It is often hard to obtain the required high quality scans of original publications from the 19th Century. There have been design issues with the recipient organizations.
- We have received extraordinary cooperation from the plaque manufacturer, Stellar Kent (<http://www.stellarkent.com/index.php>). In fact, in 2014, HIST Certificate of Appreciation Awards were given to Carol Hall, Linda Mason, and the Stellar Kent Corporation for their work on the CCB award program.
- As of 2014, the Linda Hall Library of Science, Engineering and Technology (Kansas City, MO) has donated several high quality images of journal articles, if available, at no charge for the award program

Finances and Donations

- The plaques cost ca. \$350 each including shipping to the USA. Shipping to Europe is another \$75 - \$100 and sometimes considerably more than \$100 depending on location.
- Initial funding
 - \$10K from ACS DAC Innovative Grant
 - \$10K from ACS Corporate Associates
 - \$6K from ACS DAC Innovative Grant for Local Section travel
 - Funds from individual donors (which continues to this day)
- HIST currently provides 50% matching to one annual donation (individual donor, \$1200/year; HIST, \$600/year).
- Annual costs ca. \$1700 - \$2200/year.
- Annual income ca. \$1800/year.
- Available as of 8/1/16 for the plaque program (excluding travel, see below): \$2453.56.
- Available as of 8/1/16 for travel support for local section and related representation (ACS Innovative Grant Program): \$4428.16

Website

The HIST website contains high quality images of all the plaques and much supplementary information, including photographs of many awards ceremonies, ceremony agenda, and related materials.

The CCB award program's website is exceptional and expanding, thanks to the continuing excellent work of Vera Mainz. The website is organized by award year. Originally, there was only a table of all award winners for each year (from 2006 when the first awards were presented). From that page, one could and can see the award plaques for each winner as well as the supplementary material associated with that award. In 2014, several new pages were added that provide the visitor with rapid access to the awardees, organized by name OR location OR date of the awardee's publication.

We are fortunate that most of the recipients have provided photographs and other information about their presentation ceremonies, etc. for use on our website.

CCB Award on Wikipedia

In early August 2016, Ron Brashier introduced us to Mary Mark Ockerbloom, Wikipedian in Residence at the Chemical Heritage Foundation. She has volunteered, as part of her outreach role at CHF, to place information about the CCB awards on Wikipedia. She has now placed text

on Wikipedia to the CCB award and links on Wikipedia to HIST's website for all the five awards presented in 2015. For many of these awards, text and links are found in multiple locations due to multiple authors who already have Wikipedia sites. We plan on completing links and text for all CCB awards in the coming months.

CCB Award on the ACS Historic National Historic Chemical Landmarks Program Website

On the "About the ACS Historic National Historic Chemical Landmarks Program" web page, <https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/about.html> the following text and link appears:

as Joseph Priestley, George Washington Carver and Rachel Carson. A complete list of designated achievements is available on the [Directory of National Historic Chemical Landmarks](#).

Citation for Chemical Breakthrough Awards

Since 2006, the Citation for Chemical Breakthrough Award program, administered by the ACS Division of the History of Chemistry, has honored scientific publications, books and patents that have been revolutionary in concept, broad in scope, and which forever changed the face of chemistry.

In 2015, five awards were made:

- Lavoisier, Berthollet, et al. for the first widely used system for naming compounds (Académie des Sciences, Paris) (1787)
- Frankland for the discovery of the theory of valence (University of Manchester) (1852)
- Curie, Curie and Bémont for the discovery of radium and polonium (ESPCI, Paris) (1898)
- Crowfoot, et al. for X-ray crystallography (Oxford University) (1949)
- Kroto, Curl, Smalley, et al. for Buckminsterfullerene (Rice University) (1985)

More information is available on the [HIST Citation Awards](#) webpage.

NHCL Program Information and Resources

Take action: [Nominate a Landmark](#)

**Kelly Pneumatic
Iron Process**
2015 National Historic Chemical Landmark

