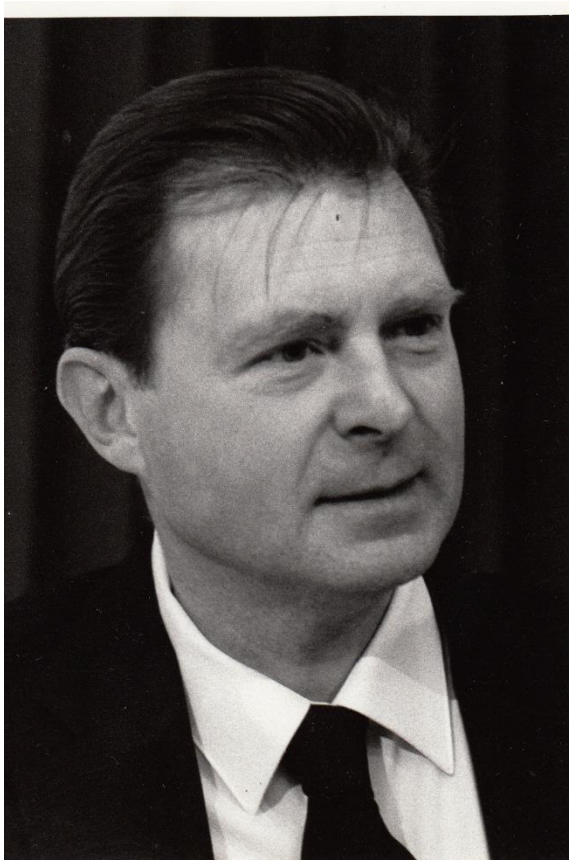
Richard Heck



Brilliant Scientist
Dedicated Teacher
Loving Husband

In memoriam:
August 15, 1931 – October 9, 2015

Early Life

- Dr. Richard Heck was born in Springfield, Massachussetts, on August 15, 1931
- Richard was an only child.
- He described his childhood as “normal”, much like that of other children his age.

Early Life

- Richard's parents were Freoff and Lucille Heck, who were professional dancers.
- The Heck family moved to Los Angeles, California when Richard was 7 years old.
- Their new home was on a barren lot that he described as a "desert."

Early Interest in Chemistry

- Young Richard started working with his dad to landscape the property. It was in the garden of their new house that his interest in chemistry. Charged with taking care of the plants, he started to think about how to make the plants grow better.
- Richard wanted to learn what kinds of fertilizers are the best for the plants. That interest led to want to learn the chemistry of the plants and fertilizers.

High School

- Richard attended Dorsey High School where his interest in Chemistry grew.

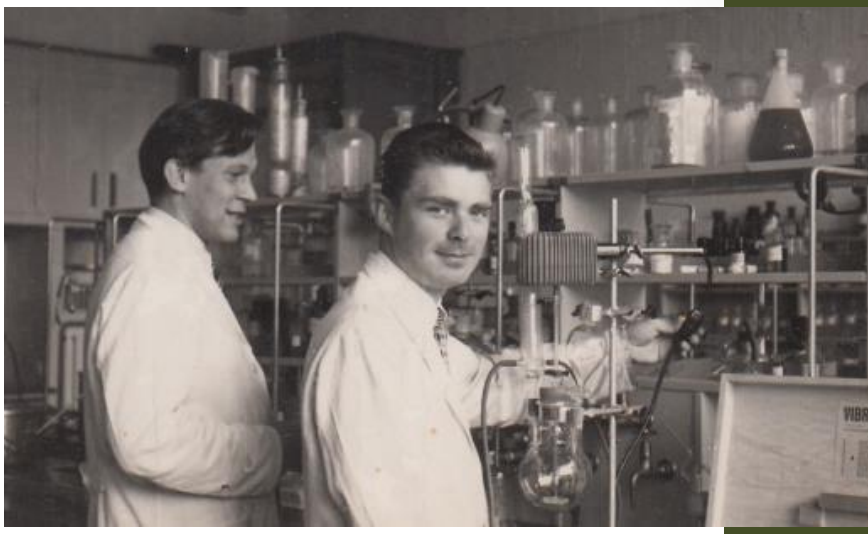
Dorsey High School - Los Angeles CA

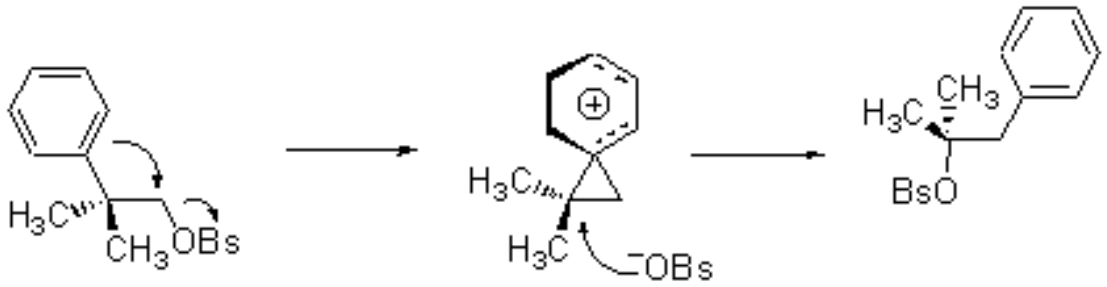
B.S. Chemistry

- Richard obtained his B.S. Chemistry degree in 1952 from the University of California, Los Angeles (UCLA).

Ph.D. Chemistry

- Richard obtained his Ph.D. in Chemistry in 1954 also at UCLA with Dr. Saul Winstein. He studied neighboring group participation in the solvolysis of arylsulfonates.





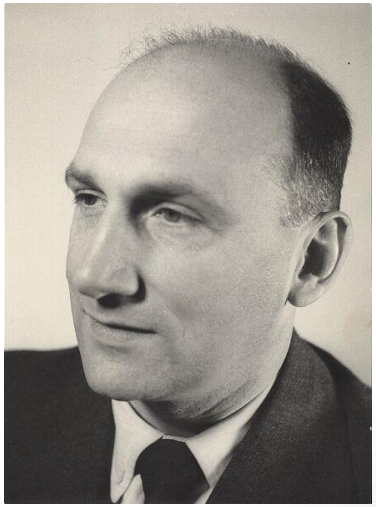
(Preferred attack at the most stable carbocation)

Heck, R.; Winstein, S. Neighboring Carbon and Hydrogen.XXIX. Analysis of Acetolysis of Substituted Neophyl Arylsulfonates. *J. Am. Chem. Soc*. 1957, 79, 3432-3438.

Post-Doctoral Research

- Dr. Heck conducted his post-doctoral studies at the Swiss Federal Institute of Technology Zurich (ETH Zurich) under Prof. Vladimir Prelog

- Prof. Prelog himself was awarded the Nobel Prize in Chemistry in 1975.



Work in Industry

- After ETH Zurich, Dr. Heck worked at the Hercules Corporation in Wilmington, Delaware starting in 1957 where he worked for 14 years.
- While at Hercules, he initiated his research on the chemistry of transition metals, a field that would develop into what we now know as “Organometallic Chemistry.”

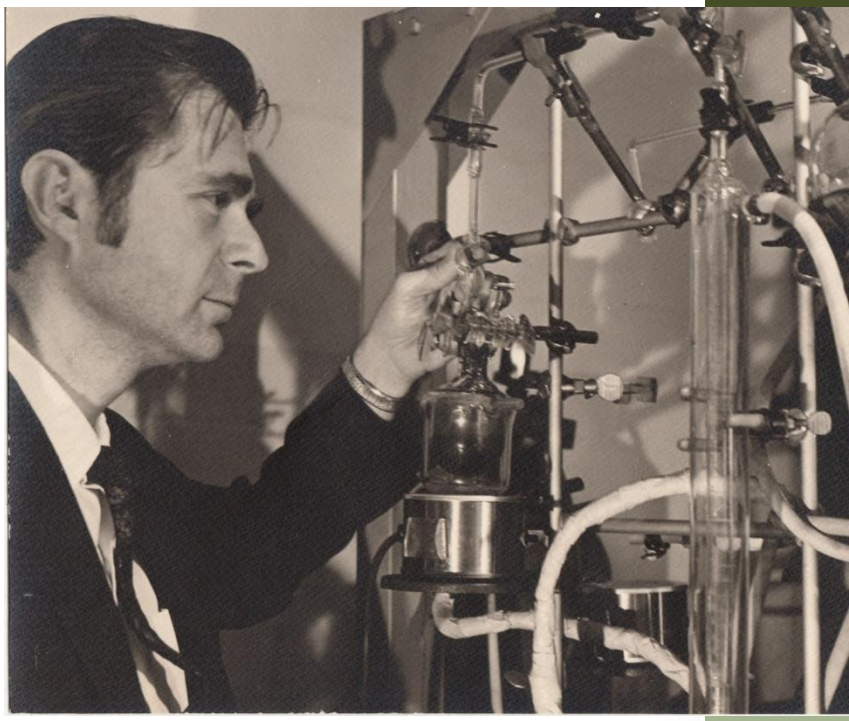
(www.nobelprize.org)

Key Scientific Work

- In the 1970's, transition metal chemistry was still in its infancy and was considered as a "black box" reaction.

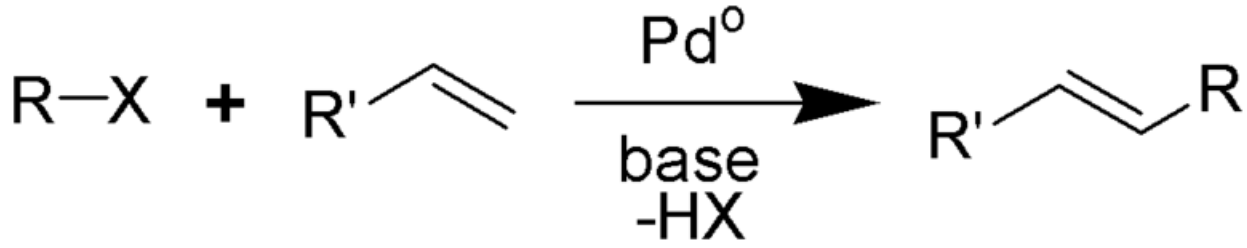
- Dr. Heck took up the challenge of trying to understand this reaction and to make it useful as a catalytic process.

- In 1971, Dr. Heck moved to the University of Delaware where he rose to the rank of Professor of Chemistry.



The Heck Reaction

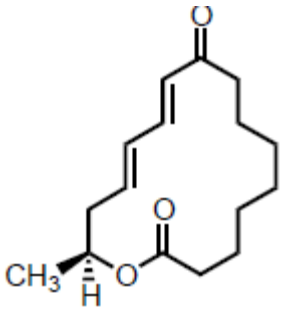
- The culmination of Prof. Heck's systematic work was the development of the **Heck Reaction**.



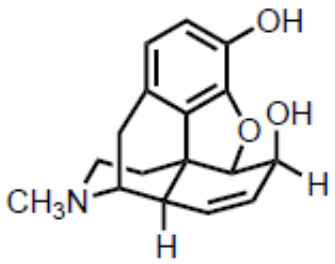
- The Heck reaction laid the foundation for virtually all the metal-catalyzed coupling reactions that are an essential component of modern organic synthesis.

The Heck Reaction

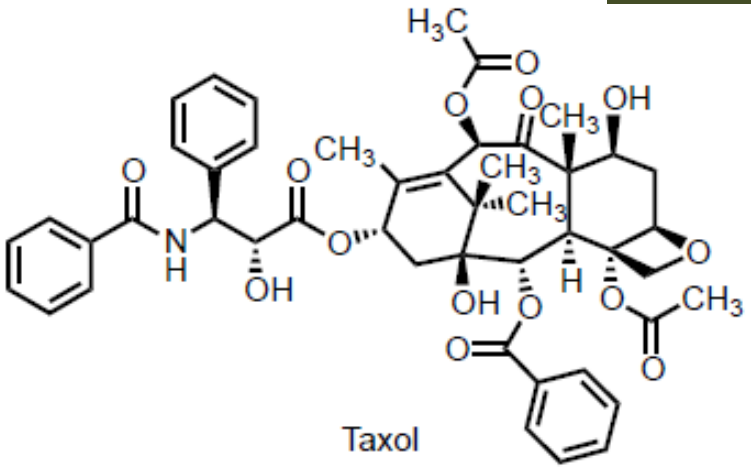
- Prof. Heck's work was documented in a remarkable series of seven consecutive articles in the highly regarded *Journal of the American Chemical Society*.
- The Heck reaction has been used for the synthesis of many important compounds and their synthetic intermediates:



Macrolide antibiotics



Morphine



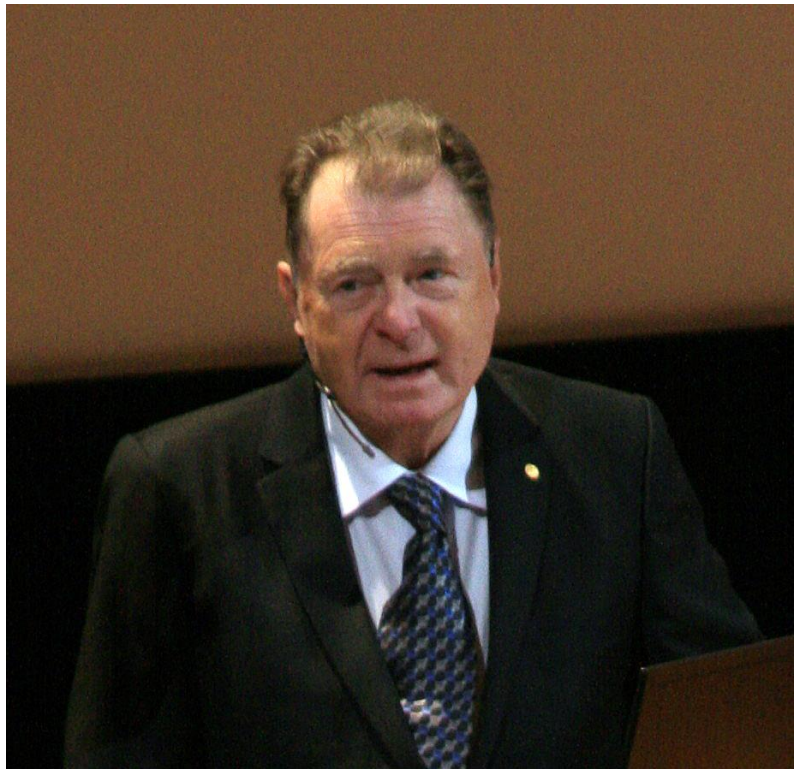
Taxol

Nobel Prize 2010

On October 6, 2010, Prof. Richard Heck was awarded the Nobel Prize in Chemistry along with Dr. Ei-ichi Negishi and Dr. Akira Suzuki.

The Nobel Medal

With the inscription from Virgil's Aenid: "*Inventas vitam juvat excoluisse per artes*" (inventions enhance life which is beautified through art)



Nobel Prize 2010

Prof. Heck was presented with the Nobel Prize on December 10, 2010, at the Stockholm Concert Hall, by His Majesty King Carl XVI Gustaf of Sweden.

Nobel Prize 2010

Prof. Heck was awarded an honorary doctorate from Uppsala University in 2010. Prof. Heck in first row together with devoted palladium chemists from Uppsala.

(www.nobelprize.org)

Insights from Richard Heck

- Scientists should have a true passion for science and be interested in solving problems and understand nature as best as they can.

Insights from Richard Heck

- Challenges and difficulties are part of the nature of research and problem solving. Some things work and some things don’t.

Insights from Richard Heck

» I never looked at difficulties as things you could do or couldn't do; rather these are things that you might be able to do if you know how.

Message for Students!

- ***Students can inspire teachers!*** Dr. Heck says that in high school, he may have been the one who inspired his teachers.

Prof. Heck meeting high school students at the
26th Philippine Chemistry Congress, Cebu City, April 13, 2011

Message for Students!

- Dr. Heck expects students to listen to the lesson and to learn the lesson.

Prof. Heck meeting high school students at the
26th Philippine Chemistry Congress, Cebu City, April 13, 2011

Message for Students!

- Your goals and aspirations must be your own desire. Courses and degrees must be taken because you want to, not because someone else wants to.

Dr. Richard and Mrs. Socorro Heck, after interview with MS Chemistry graduate students of the Chemistry Department, Ateneo de Manila University

Message for Students!

- It is important that science must be done because you love it, not just because you make a lot of money.

Message for Students!

- For those aspiring for a career in science, be passionate about it and be truly interested in science.

God speed and Thank you!!!

- From the Philippine Chemistry Community

Richard Heck

Aug 15, 1931 – Oct 9, 2015