

# ORGANOMETALLICS

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## Editor's Page

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Bis(benzene)chromium, the molecule on our cover, is a famous one. It caused quite a stir, as I remember well, when Ernst Otto Fischer described its synthesis by Walter Hafner and its surprising properties in his talk on this molecule and other bis(arene)–metal complexes during the Gordon Research Conference on Inorganic Chemistry in New Hampton, NH, in Aug 1956. A sandwich complex built up of two *neutral* benzene molecules and a *zerovalent* chromium atom that was thermally stable to 300 °C in the absence of air!! In the meantime, the field of arene–metal complexes has been developed broadly by Professor Fischer and his students and by many others throughout the world. New bis(arene) complexes of many metals, not only of transition metals but also of some lanthanides and some main-group metals, now are known, and there also is the important class of mono(arene) metal complexes, (arene)ML<sub>m</sub>, among which are the (arene)Cr(CO)<sub>3</sub> complexes (including  $\eta^6$ -C<sub>6</sub>H<sub>6</sub>Cr(CO)<sub>3</sub>, also a Fischer first), for which an extensive and useful organic chemistry has been developed.

However, there is a significant prehistory to bis(benzene)chromium. The derived cation, (C<sub>6</sub>H<sub>6</sub>)<sub>2</sub>Cr<sup>+</sup>, probably was prepared by Franz Hein in 1918, although he did not know it at the time. Hein's 20 year, unsuccessful struggle to understand the 3C<sub>6</sub>H<sub>5</sub>MgBr + CrCl<sub>3</sub> system is a classic story of organometallic chemistry. The solution to this problem was provided in 1954 by some very limited experiments of Zeiss and Tsutsui and an inspired idea of Lars Onsager, but these workers had a difficult time getting their suggestion of a  $\pi$ -bonded bis(arene)chromium cation that had a sandwich structure accepted by their peers (and by the *Journal of the American Chemical Society*).

The bis(arene)chromium story, with its pre- and extensive "post"-history, is a long one; therefore, we are publishing it in two parts. Although bis(benzene)chromium is on the cover, it will not show up until Part 2. In the present part the prehistory, Hein's extensive studies and those of Harold Zeiss and his graduate student, Minoru Tsutsui, are described in some detail. Part 2 will bring an account of the discovery of bis(benzene)chromium and of further work related to the bis(arene)chromium complexes and bis(arene) complexes of other metals by the research groups of Fischer, Zeiss, Hein, and others.

The cover illustration was kindly provided by Professor Arnold L. Rheingold.

**Dietmar Seyferth**  
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