

Cover of the February 1, 1983, issue of *Journal of Chemical Education* from I. Hargittai, "Degas' Dancers: An Illustration for Rotational Isomers." Reprinted with permission, © 1983, American Chemical Society.

## Degas' Dancers: An Illustration for Rotational Isomerism<sup>a</sup>

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The representation of rotational isomerism by projection drawings is difficult for some students to grasp because of its abstract nature. Two drawings by Degas, "End of the Arabesque"<sup>1</sup> and "Seated Dancer Adjusting Her Shoes,"<sup>2</sup> provide an opportunity to introduce the concepts of staggered and eclipsed conformations of  $A_2B-BC_2$  molecules in a concrete, interesting (and aesthetic) way.

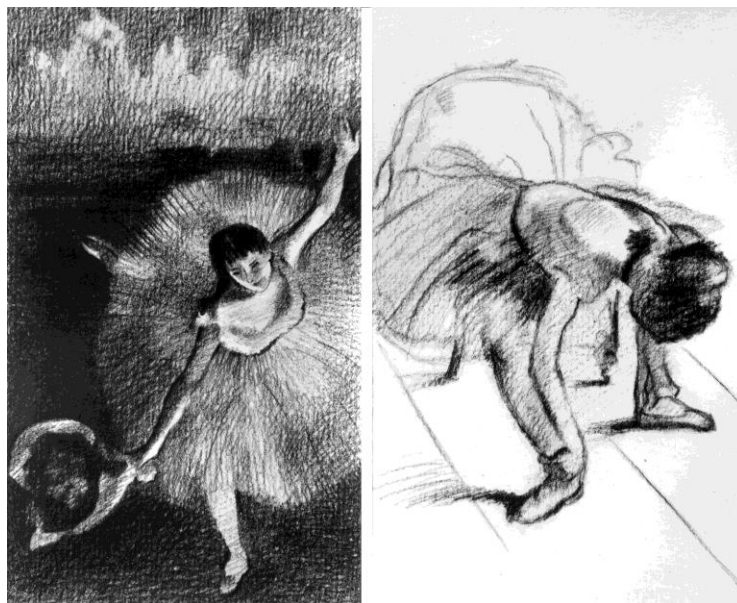
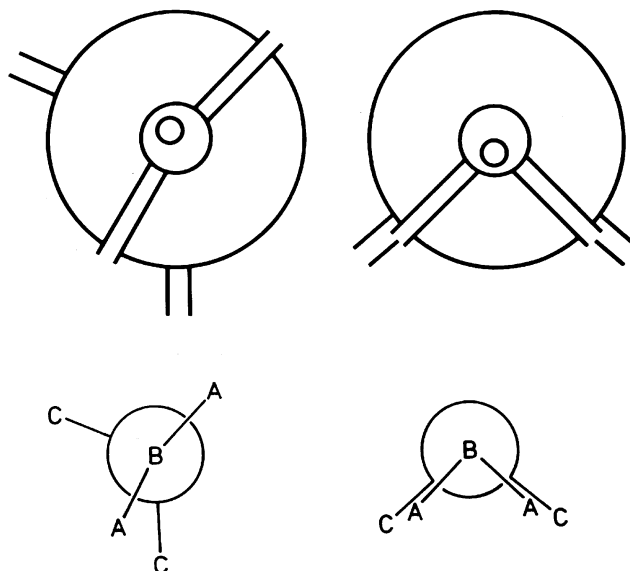


Figure 1. (left) Lantos' drawing after Degas' "End of the Arabesque." (right) Lantos' drawing after Degas' "Seated Dancer Adjusting Her Shoes." Full color reproductions of the originals are available in editions of Degas' work.

The two dancers are shown in Figure 1 as drawn by Lantos<sup>3</sup> after Degas. Stylized contour drawings are presented in Figure 2 in order to facilitate understanding the transition from the dancers to the chemical formulas. A staggered and an eclipsed forms of the  $A_2B-BC_2$  molecule are shown by the usual projection representation in Figure 3.

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Figures 2 and 3. Contour drawings of the dancers shown in Figure 1 illustrating the preparation of the projection representation (top).

Staggered and eclipsed rotational isomers of the  $A_2BBC_2$  molecule by projection representing the view along the  $B-B$  bond (bottom)

The projections represent the view along the  $B-B$  bond. The dancer's body then corresponds to this bond. The plane bisecting the  $B-B$  bond is shown by the circle, and it is represented by the dancer's skirt. The dancer's arms and legs refer to the  $B-A$  and  $B-C$  bonds, respectively. Even the bouquet in the right hand of the dancer showing the staggered conformation may have a useful function: it is viewed as a different substituent, and may help to understand more complicated rotational isomerism. My experience is that showing Degas' drawings not only enlivens a lecture on conformational problems but also facilitates the introduction of the subject.

<sup>1</sup> Louvre, Musée de l'Impressionisme, Paris

<sup>2</sup> The Hermitage, Leningrad

<sup>3</sup> The author appreciates the kindness of the artist Mr. Ferenc Lantos, Pécs, Hungary, who prepared the drawings of Figure 1 after postcards of the pictures by Degas.