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Editor's Page

There is now an ETHYL gasoline pump beside the tetraethyllead molecule on our cover. During the years covered in part 2 of the tetraethyllead cover molecule essay—from 1920 to the present—tetraethyllead rose from obscurity to become a chemical that was produced on a very large scale. At its peak in 1970, 279 000 metric tons of lead were consumed in the USA in the production of lead alkyls: mostly tetraethyllead, but also some tetramethyllead. Another 326 000 metric tons of lead were used for the same purpose outside of the USA in 1970. The secret of tetraethyllead's success was that it is an extremely effective antiknock agent when added in small amount to the gasoline used as fuel in the automobile engine. In its heyday, over 98% of the gasoline sold worldwide contained 3−4 cm^3 of tetraethyllead per gallon—big business indeed! The discovery of this important application of tetraethyllead was made by an inventive young mechanical engineer, Thomas Midgley, Jr., and his colleagues in December 1921. Midgley, as his career developed, became more and more immersed in chemistry and went on to win the Priestley Medal, the highest award of the American Chemical Society, and to become the President of the American Chemical Society in 1944.

The dramatic rise of tetraethyllead as a large-scale commercial chemical was followed in the mid-1970s by an equally dramatic fall. This was in part the result of the serious concerns of environmental and public health advocates about the dispersal of inorganic lead compounds in the environment when tetraethyllead was used as a gasoline additive. Another equally important factor responsible for the decrease in tetraethyllead production was the introduction of the catalytic converter in automobiles in the mid-1970s, whose noble-metal catalysts were rendered ineffective by the inorganic lead products formed when tetraethyllead was present in the gasoline.

During its commercial lifetime of some 60 years, tetraethyllead for the most part was flying high. Its antiknock action made possible the development of the high-compression automobile engine, which was the key factor in the rapid growth of the Automobile Age. It played a very important role in World War II as an essential ingredient in the fuel used in all military vehicles and aircraft of the USA and other countries. However, while some aspects of its chemistry made it useful as a gasoline additive, other aspects of its chemistry led to its downfall. It is this story that we tell in this essay.

My thanks to the Ethyl Corporation for permission to use the old Ethyl logo on the gasoline pump in the cover illustration.

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Editor

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