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## REVIEW

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# An early chapter in behavioral physiology and sociobiology: the science of Martin Lindauer

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**Abstract** The fields of behavioral physiology and sociobiology enjoyed spectacular success in post World War II Germany. One of the major contributors to this blossoming in behavioral science was Martin Lindauer, who furthered the research approach of his mentor (Karl von Frisch), made numerous seminal discoveries, and nurtured a strong next generation in the area of neurobiology and behavior. We review the scientific development of Martin Lindauer within the German academic system in the years surrounding World War II, examine his research approach and achievements, and discuss his unusually successful methods of scientific pedagogy.

## Introduction

For over 50 years, the name Martin Lindauer has appeared atop scientific papers on the behavior of honey bees. Through his studies of these small creatures, mankind has gained a deeper understanding of how animals communicate and learn, sense the world, find their way, and live in societies. Besides being a creator of science through his own investigations, Lindauer has guided and inspired numerous outstanding doctoral and post-doctoral students. Without people such as Hölldobler, Linsenmaier, Markl, Maschwitz, Menzel,

and Wehner, the distinguished history of behavioral physiology and sociobiology in post World War II Germany is unthinkable.

Professor Lindauer's accomplishments in his research and teaching, and his relations with his own famous mentor, Karl von Frisch, are among the themes we develop in this paper. It is not a full-fledged biography. Rather, it is a compact report which traces the history of Lindauer's scientific work, and emphasizes the varied contributions he made to the study of behavioral physiology and sociobiology.<sup>1</sup>

## Family and early memories

Martin Lindauer was born on 19 December 1918 in the tiny village of Wäldle, located in the foothills of the Bavarian Alps, near Oberammergau, some 90 km south of Munich. He was the next to youngest child of Matthias Lindauer and Katharina née Erhard. The Lindauers had 15 children – 8 daughters and 7 sons – which was not unusual for that place and time. The Lindauers were farmers who gained their livelihood through hand labor. The hard work in the stony meadows in summer, and the even harder work in the snowy forests in winter, demanded many hands. Martin Lindauer's parents had little education, but they were