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## **Presentation of the Emil Wiechert-Medal to Leon Knopoff, Los Angeles, on March 7, 1978 at Münster**



“The Earth Has Music for Those Who Listen”

To the physicist, seismologist and musicologist Leon Knopoff the earth has music indeed which however can be appreciated only if its rules are understood.

The Executive Committee of the Deutsche Geophysikalische Gesellschaft has, during its meeting on October 13, 1977, decided to bestow its highest award, the Emil Wiechert-Medal, on Professor Leon Knopoff. The medal bears the name of the first president of the Deutsche Geophysikalische Gesellschaft following its foundation in 1924. Since first awarded in 1955 to Julius Bartels the Emil Wiechert-Medal has been conferred on Beno Gutenberg, Albert Defant, Inge Lehmann, Sydney Chapman and Ludwig Biermann. Today it will be awarded for the seventh time. In this, the 50th year after the death of its first president, the Deutsche Geophysikalische Gesellschaft awards the Emil Wiechert-Medal to a scientist who in his research has penetrated the solid earth in width and depth.

The experiment in the field or in the laboratory was always stimulating and challenging for you as a theoretical physicist. In particular your investigations with long period surface waves produced important new knowledge on the structure of the earth's upper mantle and its regional differences.

During your systematic study of lateral heterogeneities you came to Germany for the first time in 1960 to explore differences in the upper mantle of southern Germany and the Alps—using a network of long period seismometers. Similar expeditions followed to the Mediterranean, South America and Antarctica. Today you are preparing to extend the range of penetration into the lower mantle.

The improved quality of the observations required a corresponding improvement of classical interpretation techniques. The theory of propagation of seismic waves in layered and in laterally inhomogeneous media, as well as their scattering and anelastic attenuation, has been advanced significantly by you. In particular it became necessary to develop inversion methods which permitted the establishment of the multitude of possible models compatible with the observations. The hedgehog-method devised by you and Keilis-Borok is a most powerful search procedure.

The analysis and synthesis of processes at the earthquake focus plays a key role in your research. You established the body force equivalence of the seismic dislocation model. An analogue and numerical model was developed to understand the sequences of earthquakes observed in nature. Finally you advanced a new method of earthquake prediction by pattern recognition.

An appreciable part of your research has been, and is, devoted towards using seismological knowledge to improve models of the state and composition of the earth's interior. Extensive theoretical investigations covered the state of compounds under high pressures, the state and composition of the core and mantle.

Of the many friends cooperating in your work time permits me to mention but a few: Keilis-Borok, Gilbert, Press, Slichter, Burridge and others. More than 180 research papers are witness of an extremely fruitful scientific career.

As a Member of the National Academy of Sciences and as a Fellow of the American Academy of Arts and Sciences your merits have been previously recognized.

We honour also your distinguished role as secretary of the international Upper Mantle Project. This Project remains the most successful international enterprise in the geosciences—it culminated in a scientific revolution which has changed our thinking. It needed men of your wide and profound knowledge and your ability to stimulate.

It is now my duty and pleasure to award the medal. It bears the inscription: *„Die Deutsche Geophysikalische Gesellschaft verleiht die Emil Wiechert-Medaille an Leon Knopoff, Los Angeles, in Anerkennung seines umfassenden Beitrages zur seismologisch-physikalischen Erforschung des Erdinnern“.*

**Karl Fuchs**

Vorsitzender der  
Deutschen Geophysikalischen Gesellschaft