Summary — The geothermal gradient in the Carpathian Basin lies between 40-70 °C/km. According to careful measurements in shafts the value of terrestrial heat flow in the southern part of Hungary is \((2.055-3.066) \times 10^{-6} \text{ cal/cm}^2 \text{ sec}\). These measurements are believed the first ever attempted in continental Europe. Systematic heat flow measurements are being extended to other part of this country.

Introduction — Numerous measurements have been undertaken in the Carpathian Basin in the last seven decades. It has been found that the value of the geothermal gradient is between 40-70 °C/km. The causes of this high value have not yet been ascertained since the thermal conductivity of the rocks has not yet been established.

Measurement of Virgin Rock Temperature — The drifts and shafts of deep mines offer — under certain conditions — the chance of exactly determining the virgin-rock temperature when the measurement of temperature is taken immediately after having got out the rock, as has been shown by my previous investigations \(^1,2\). In the liassic coal basin of Transdanubia the sinking of two big shafts offered a favourable opportunity to determine terrestrial heat flow. The shafts at Zobák are just being sunk, presumably, to a depth of 1000 metres, and thus a good opportunity has been offered, to perform exact and strictly controlled virgin-rock temperature measurements, a fact that has already lead to a knowledge of the geothermal conditions prevailing in this mining district. The shafts are being sunk at a distance of 90 metres from one another. Except one sandstone layer of 20-30 m thickness, both shafts are being sunk in the middle liassic grey marl for a considerable length from the surface onwards. The shafts at present have reached to a depth of 550, respectively 600 metres.

Measurement of virgin-rock temperature, thermal conductivity and thermal diffusivity has been described in one of my previous papers \(^3\). The measurement of thermal conductivity was made by the divided bar method, very similar to that of Benfield \(^3\) and Bullard \(^6\). The thermal conductivity of the brass bars used in my work, were established by a comparison of three artificial quartz discs. These measurements were controlled by quartz discs lent by the National Physical Laboratory, Teddington, Middlesex, and I am much obliged to Prof. E. C. Bullard,
who kindly lent me the discs for the control. In the following computations I have 
based rock conductivity on the discs mentioned above, and my data on rock con-
ductivity and heat flow may be compared to those of Benfield and Bullard \(^{(4,5,6,7)}\).

The effect of the moisture of the rocks on conductivity, was a feature that 
was given a detailed consideration in the course of my investigations. The moisture 
in the liassic shales was found to be slight and hardly showed any changes during 
measurements. A small loss in weight amounting to not more than 0.7-1.6 per cent 
was recorded after heating samples at 120°C for three hours; after heating the 
samples were immersed in water but they absorbed less moisture than the loss 
following upon heating. The influence of moisture on thermal conductivity was 
negligible. No correction on this account, was therefore necessary.

The influence of temperature on thermal conductivity was closely investigated 
by Birch & Clark \(^{(8)}\). The thermal conductivity of rocks generally decreases as tem-
perature rises. The virgin-rock temperature was 15-37°C while during the measure-
ments the mean temperature was at 18-22°C. Due to the slight temperature differen-
tes, the changes in thermal conductivity were under the values of the errors in the 
measurement, and therefore it was not thought necessary to apply any corrections.

The density of rock samples \((\rho)\) was determined by means of pyknometers. 
As the volume of the cylindrical rock sample 
could be determined with great precision by 
measuring diameter and thickness, the mea-
sured weight allowed to compute reliable va-
lues for density as well.

To determine specific heat \((c)\) the rock 
samples were cut down to grains of 0.5-2 
mm and heated up to a certain temperatu-
re; the grains were then dropped into a ca-
lorimeter and the quantity of heat given up 
was then measured. Thermal diffusivity was 
computed by means of the formula

\[
a = \frac{\lambda}{c \cdot \rho}
\]

*Determination of Terrestrial Heat Flow*—
The probable error of a single temperature 
observeration is assumed to have been not more 
than \(\pm 0.1 \, {^\circ}\text{C} \).

Fig. 1 records the temperature values found in the downcast shaft at Zobak. 
The shaft is in the middle liassic grey marl which is a fairly good heat conductor.
Between 517 and 550 metres there is a sandstone layer of low conductivity.

It must be mentioned that in the carboniferous layers the thermal gradient will 
presumably give higher values on account of the smaller thermal conductivity 
of the coal.

Measurement for thermal conductivity were performed in three samples of 
varying thickness. The thermal conductivity of the medium-size sample, can be 
computed from the values found for the other two samples assuming the same film 
correction \(^{(3)}\). Judging by the difference found between the observed and the com-
puted values from a great number of observed data, the standard deviation, is