The most notable feature of thermal water distribution is their close association with the subsurface and surface geology. Greater part of thermal waters occurs in the porous, nearly horizontal, young Tertiary sedimentary strata. Their occurrence is also widespread, although very uneven in Mesozoic, chiefly Triassic carbonate rocks of fractured character. They are different in temperature and mineral content. Total amount of mineral matter dissolved in thermal waters ranges from practically fresh water up to high concentration (brine), according to the origin of waters and related geological factors. Aquifers consisting of porous, Pliocene-Pleistocene sands and sandstones have connate (fossil) waters of marine and non-marine origin at various depths. Carbonate rocks, however, contain thermal water mainly of meteoric origin but some gradation is known between the two groups.

The average high temperature of thermal waters is due to the abnormally high geothermal conditions prevailing in the Hungarian basin. Wide areas of the country have higher than normal geothermal gradients (about 18 m/°C on average) and heat flow values. Since thermal waters are not genetically associated with volcanic activity, the possible source of heat is considered to be in the mantle which has intricate magmatic history in connection with late tectonic phenomena. In fact, Earth's crust is relatively thin; depth of Moho discontinuity is 24–26 km on the average as indicated by geophysical investigations.

Geothermal Investigations in Hyperthermal Areas

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The characteristic features of a hyperthermal area are mostly determined by geothermal methods. With the help of a model representing a hyperthermal occurrence the applicability of the geothermal methods for the exploration of thermal water and natural steam is discussed. Temperature-measurements within the near-surface layers are used for the discovery and the evaluation of hyperthermal areas. The dependence of the magnitude of the thermal anomaly on temperature and depth of the hot fluidum searched for is derived. Examples of field measurements from southern Italy, Iceland and El Salvador are presented.

The geological and thermodynamic conditions, which lead to the formation of an economically exploitable steam-field, are reviewed.

The Nature of the Thermal Field at Coso Hot Springs, California, U.S.A.

James B. Koenig

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Coso Hot Springs is a mile long zone of active fumaroles and boiling springs aligned along a northwest-trending fault showing clear evidence of recent vertical movement. Trending westward nearly at right angles for three or four miles is a zone of hydrothermal alteration, low grade mercury deposits, very acid springs, fumaroles and patches of warm and steaming ground. Quaternary and Recent perlitic domes, pumice, and minor basalt flows have been extruded through a basement of Mesozoic granitic rocks. The perlitic domes appear to be of two generations, and form linear belts. To the east is an area of wrench- and step-faulted basalt flows.