16.11 - Seebeck Effect

The Seebeck effect (thermoelectricity) involves the direct conversion of temperature differences into electricity. It was first reported in 1821 by the German-Estonian physicist Thomas Johann Seebeck (1770-1831), who observed that a temperature difference between two ends of a metal bar created an electrical current in between, with the voltage being directly proportional to the temperature difference (the Seebeck coefficient). Thomas Johann Seebeck was born in Revel (now Tallinn), the capital of Estonia which at that time was part of East Prussia. Seebeck was a member of a prominent merchant family with ancestral roots in Sweden. He studied medicine in Germany and qualified as a doctor in 1802. Seebeck spent most of his life involved in scientific research. In 1821 he discovered that a compass needle deflected when placed in the vicinity of a closed loop formed from two dissimilar metal conductors if the junctions were maintained at different temperatures. He also observed that the magnitude of the deflection was proportional to the temperature difference and depended on the type of conducting material, and does not depend on the temperature distribution along the conductors. Seebeck tested a wide range of materials, including the naturally found semiconductors ZnSb and PbS. It is interesting to note that if these materials had been used at that time to construct a thermoelectric generator, it could have had an efficiency of around 3% - similar to that of contemporary steam engines.

<< 16.10 - - **Part 16** - **Table of Contents** - - **16.12 >>**