they consist solely in the application of known propositions. It was sufficient in this work to give the principle and the result, as we have done in Article 15 of the Memoir cited. From the same condition also the general equation in question is derived by determining the whole quantity of heat which each molecule situated at the surface receives and communicates. These very complex calculations make no change in the nature of the proof.

In the investigation of the differential equation of the movement of heat, the mass may be supposed to be not homogeneous, and it is very easy to derive the equation from the analytical expression of the flow; it is sufficient to leave the coefficient which measures the conducibility under the sign of differentiation.

3rd. Newton was the first to consider the law of cooling of bodies in air; that which he has adopted for the case in which the air is carried away with constant velocity accords more closely with observation as the difference of temperatures becomes less; it would exactly hold if that difference were infinitely small.

Amontons has made a remarkable experiment on the establishment of heat in a prism whose extremity is submitted to a definite temperature. The logarithmic law of the decrease of the temperatures in the prism was given for the first time by Lambert, of the Academy of Berlin. Biot and Rumford have confirmed this law by experiment[1].

[1] Newton, at the end of his *Scala graduum caloris et frigoris, Philosophical Transactions*, April 1701, or *Opuscula* ed. Castillioneus, Vol. II. implies that when a plate of iron cools in a current of air flowing uniformly at constant temperature, equal quantities of air come in contact with the metal in equal times and carry off quantities of heat proportional to the excess of the temperature of the iron over that of the air; whence it may be inferred that the excess temperatures of the iron form a geometrical progression at times which are in arithmetic progression, as he has stated. By placing various substances on the heated iron, he obtained their melting points as the metal cooled.

Amontons, *Mémoires de l'Académie* [1703], Paris, 1705, pp. 205—6, in his *Rémarques sur la Table de degrés de Chaleur extraite des Transactions Philosophiques* 1701, states that he obtained the melting points of the substances experimented on by Newton by placing them at appropriate points along an iron bar, heated to whiteness at one end; but he has made an erroneous assumption as to the law of decrease of temperature along the bar.

Lambert, *Pyrometrie*, Berlin, 1779, pp. 185—6, combining Newton's calculated temperatures with Amontons' measured distances, detected the exponential law