

densation, the vessel in which the steam acted upon the piston ought always to be as hot as the steam itself; that to obtain a proper degree of exhaustion, the steam must be condensed in a separate vessel, which might be cooled to as low a degree as was necessary, without affecting the cylinder; and that as the air and condensed water could not be blown out by the steam as in NEWCOMEN'S, they must be extracted by a pump, or some other contrivance; that, in order to prevent the necessity of using water to keep the piston air-tight, and also to prevent the air from cooling the cylinder during the descent of the piston, it was necessary to employ steam to act upon the piston in place of the atmosphere. Lastly, to prevent the cylinder from being cooled by the external air, it was proper to inclose it in a case containing steam, and again to inclose that in a case of wood, or of some other substance which transmitted heat slowly.

Although Dr Black's theory of latent heat did not *suggest* my improvements on the steam-engine, yet the knowledge upon various subjects which he was pleased to communicate to me, and the correct modes of reasoning, and of making experiments of which he set me the example, certainly conduced very much to facilitate the progress of my inventions; and I still remember with respect and gratitude the notice he was pleased to take of me when I very little merited it, and which continued throughout his life.

To Dr ROBISON I am also bound to acknowledge my obligations for very much information and occasional assistance in my pursuits, and above all, for his friendship, which ended only with his life; a friendship which induced him, when I was beset with an host of foes, to come to London in the depth of winter, and appear as a witness for me in a court of justice, whilst labouring under an excessively painful disorder, which ultimately deprived him of life. To the remembrance of that friendship is principally owing my