

*An Account of a curious Phenomenon observed on the Glaciers of Chamouny; together with some occasional Observations concerning the Propagation of Heat in Fluids.* By Benjamin Count of Rumford, V.P.R.S. Foreign Associate of the National Institute of France, &c. &c. Read December 15, 1803. [*Phil. Trans.* 1804, p. 23.]

The fact here stated is as follows :—At the surface of a solid mass of ice, of vast thickness and extent, viz. the Glaciers of Montanverd, certain pits are frequently met with, about seven inches in diameter, and more than four feet deep, perfectly cylindrical, and always quite full of water: their sides are smooth, or rather polished, and their bottoms hemispherical and well defined. They are always found on the level parts of the ice, and only in the summer season, increasing gradually in depth as long as the hot weather continues, and disappearing at the return of winter, when they are completely frozen up.

After calling upon those who maintain that water is a conductor of heat, to solve this phenomenon according to their principles, and pointing out to them, that as the water in these pits, being surrounded by ice, must continually be at the freezing point of temperature, it is not the general heat of the fluid that can melt the ice at the bottom of the pits, our author proceeds to give the following explanation of this singular effect.

The warm winds, he says, which in summer blow over the surface of this column of ice-cold water, must evidently communicate some small degree of heat to those particles of the fluid with which this warm air comes into immediate contact; and the particles of the water at the surface so heated, being rendered specifically heavier than they were before by this small increase of temperature, sink slowly to the bottom of the pit; and here they come in contact with the ice, and communicate to it the heat by which the depth of the pit is continually increased.

Count Rumford mentions next the singular but well-authenticated fact, of the equal temperature, at all seasons, of the water at the bottom of lakes; and shows how difficult, if not impossible, it must be to explain this phenomenon on a supposition of water being a conductor of heat. With a view to illustrate this subject, he gives us hopes that he will soon favour us with some observations, showing why all changes of temperature in transparent liquids must necessarily take place at their surfaces. Some further strictures are next given, and certain difficulties are pointed out, on the cause of the descent of heat in liquids. And, lastly, notice is taken of the observations of Mr. Thompson of Edinburgh, on the experiments our author had contrived to render visible the currents into which liquids are thrown on a sudden application of heat or cold. The whole of this discussion rests on the accuracy of his observations, which Mr. Thompson had called in question, but in which he confidently asserts there was no fallacy whatever.