

er than that of steam in equilibrio with the atmosphere, which when condensed in order to gain the atmospheric effect, is only one-fiftieth part of the power of steam at 510° temperature, although it is barely 2½ times less temperature than atmospheric steam. Here then is evidence of the saving of fuel, or what is the same thing, demonstration of an immense increase of power obtained by the expenditure of a given quantity of fuel; but what it amounts to in practice may readily be inferred from what has previously been advanced relative to the change of specific gravity. If less fuel is expended to generate steam of every successive atmospheres elasticity—(which every accurate experimenter knows to be the fact,) it necessarily follows that every succeeding atmosphere generated, contains a less quantity of water than the preceding atmosphere or volume.

1st. Because equal quantities of caloric are required to convert equal quantities of water into steam, supposing the steam generated to be atmospheric.

2ndly. Because the steam cannot increase in its specific gravity and elastic force, without converting a portion of sensible into latent caloric, and this is the intermediate cause and effect that is lost sight of; and

3dly. Because the latent caloric becoming sensible, necessarily gives an increased elasticity to the steam through which it is diffused, and the increase of elasticity thereby produced is (as before stated) the precise amount of fuel, or caloric, saved in generating high pressure steam as compared with the generation of a like volume of atmospheric steam.

It must be particularly borne in mind, that the fuel saved refers only to the steam's generation (as before stated,) for it is one thing to generate high pressure steam, and another to apply expansively the said steam as a motive power; unless the opponents to the doctrine are prepared to prove that high pressure steam, by dilatation or diminution of specific gravity, does not convert sensible into latent caloric; or that they are further prepared to demonstrate, (upon Mr. Woolf's erroneous principle,) that the second dose of sensible caloric gives an elastic force to the expanded steam, (when maintained at the temperature such steam was generated at,) equal to the atmospheric pressure.

Steam at or above 212° temperature is as much a permanent gas as atmospheric air, unless it be subjected to a pressure exceeding its own elastic force and the temperature due to such elasticity; in which case it would be converted into the liquid state. Again, steam is known to be governed by the same law as permanent gases, (relating to the law of elasticity,) when dosed with caloric, over and above the temperature at which it was evolved. It therefore remains to show, (if not already proved,) that the quantity of sensible caloric lost by working high pressure steam expansively, can never be compensated for by saturating such steam with a second dose of caloric.

Philadelphia and Columbia Railroad.—Collector's office, Philadelphia, Feb. 28th, 1840.—The following shows the Collection at this office:

	Railway.	M. Power.	Total.
Amount as per last report,	14,574 74½	15,085 84½	29,660 59
Do. week ending Feb. 27,	746 82	925 01	1,671 83
Whole amt. since Oct. 31, 1839,	\$15,321 56½	16,010 85½	31,332 42

A. B. CUMMINGS, Collector.

Railroad Receipts.—The income from passengers alone on the Syracuse and Utica railroad, from July 3d to November 30th, five months, was