

VII. *Experiments made to determine the positive and relative Quantities of Moisture absorbed from the Atmosphere by various Substances, under similar Circumstances.* By Sir Benjamin Thompson, Knt. F. R. S. Vide *Philosophical Transactions of the Royal Society of London.* VOL. LXXVII. For the Year 1787. PART II. 4to. London, 1787.

AS these experiments relate particularly to such substances as are commonly made use of for cloathing, an account of them cannot fail of being interesting to the medical reader.

The author having procured a quantity of the undermentioned substances, in a state of the most perfect cleanness and purity, exposed them, spread out upon clean china-plates, twenty-four hours in the dry air of a very warm room (which had been heated every day for several months by a German stove), the heat, during the last six hours, having been kept up to 85° of Fahrenheit's thermometer; after which he weighed equal quantities of these various substances in the room, with a very accurate balance, as expressed in the following table.

The same substances were then removed  
into

into a large uninhabited room on the second floor, and there exposed, in the same manner as before, during the space of forty-eight hours, on a table placed in the middle of the room, the air of the room being at the temperature of  $45^{\circ}$ ; after which they were again carefully weighed in the room, and found to weigh as under mentioned.

They were next removed into a very damp cellar, and placed upon a table, in the middle of a vault, where the air, which appeared by the hygrometer to be completely saturated with moisture, was at the temperature of  $45^{\circ}$ ; and in this situation they were suffered to remain three days and three nights, the vault being hung round, during all this time, with wet linen cloths, to render the air as damp as possible, and the door of the vault being shut.

At the end of the three days, each substance was weighed by the Author upon the spot, and found to weigh as is expressed in the third column of the following table.

The various substances	Wgt. after beingdried 24 hours in a hot room.	Wgt. after being ex- posed 48 hours in a cold, un- inhabited room.	Wgt. after being ex- posed 72 hours in a damp cel- lar.	
	Pts.	Pts.	Pts.	
Sheep's wool — —	1000	1084	1169	
Beaver's fur — —	1000	1072	1125	
The fur of a Russian hare —	1000	1065	1115	
Eider down — —	1000	1067	1112	
Silk {	Raw, single thread	1000	1057	1107
	Ravelings of white taffety	1000	1054	1103
Linen {	Fine lint —	1000	1046	1102
	Ravelings of fine linen	1000	1044	1082
Cotton wool — —	1000	1043	1089	
Silver wire, very fine, gilt, and flatted, being the ravelings of gold lace — —	1000	1000	1000	

The weight made use of in these experiments was that of Cologne, the parts or least divisions being  $= \frac{1}{833\frac{1}{3}}$  part of a mark, consequently 1000 of these parts make about  $52\frac{1}{4}$  grains Troy.

The Author observes that he did not add the silver wire to the other substances from any idea that it could possibly imbibe moisture from the atmosphere; but merely to see whether a metal, placed in air saturated with water, is not capable of receiving a small ad-

dition of weight from the moisture attracted by it, and attached to its surface. From the result of the experiment, however, he remarks, it would seem that no such attraction subsists between the metal he employed, and the watery vapour dissolved in air.

From the above table it should seem that those bodies which are the most easily wet, or which receive water in its unelastic form, with the greatest ease, are not those which in all cases attract the watery vapour dissolved in the air with the greatest force.

Perhaps, remarks the Author, the apparent dampness of linen, to the touch, arises more from the ease with which that substance parts with the water it contains, than from the quantity of water it actually holds : in the same manner as a body appears hot to the touch, in consequence of its parting freely with its heat, while another body, which is actually at the same temperature, but which withholds its heat with greater obstinacy, affects the sense of feeling much less violently.

It is well known, he observes, that woollen clothes, such as flannels, &c. worn next the skin, greatly promote insensible perspiration ; and may not, he asks, this arise principally from

from the strong attraction which subsists between wool and the watery vapour that is continually issuing from the human body?

That it does not depend entirely upon the warmth of that covering, is, he thinks, clear; for the same degree of warmth, produced by wearing more cloathing of a different kind, does not produce the same effect.

He observes that the perspiration of the human body being absorbed by a covering of flannel, it is immediately distributed through the whole thickness of that substance, and by that means exposed by a very large surface to be carried off by the atmosphere; and that the loss of this watery vapour, which the flannel sustains on the one side, by evaporation, being immediately restored from the other, in consequence of the strong attraction between the flannel and this vapour, the pores of the skin are disencumbered, and they are continually surrounded by a dry, warm, and salubrious atmosphere.

He is astonished, that the custom of wearing flannel next the skin should not have prevailed more universally. He is confident it would prevent a multitude of diseases; and he knows of no greater luxury than the comfortable sensa-

tion which arises from wearing it, especially after one is a little accustomed to it.

He considers it as a mistaken notion, that flannel is too warm a cloathing for summer. He has worn it in the hottest climates, and in all seasons of the year, and never found the least inconvenience from it. He observes, that it is the warm bath of a perspiration confined by a linen shirt, wet with sweat, that renders the summer heats of southern climates so insupportable; but flannel, he adds, promotes perspiration, and favours its evaporation; and evaporation as it is well known, produces positive cold.

## CATALOGUE OF BOOKS.

1 **A** DISSERTATION on the Properties of Pus; which gained the Prize Medal, given by the Lyceum Medicum Londinense, for the Year 1788, and was ordered to be printed for the Use of the Society. By *Everard Home*, F. R. S. and one of the Presidents of the Lyceum Medicum. 4to. *Richardson*, London, 1788.

2. Observations