History and Construction of the Thermometer.

The invention of the Thermometer, like almost every other discovery of great utility, has been claimed for different philosophers, and national vanity has occasionally been enlisted in support of rival claimants. There seems but two, however, whose titles are worthy of notice.

The Italian writers generally give the honor to their countryman, Santorio Santorio, long a physician at Venice, and afterwards a professor at Padua, and who had obtained just celebrity by his discovery of the insensible perspiration of the animal frame. The Dutch philosophers, on the other hand, unhesitatingly ascribe it to Cornelius Drebbel, a physician of Alkmaar, who appears to have enjoyed a high reputation as a chemist, a mathematician, and an inventive mechanical genius.

Dr. Santorio expressly claims the invention as his own, and he is supported by Borelli and Malpighi. The title of Drebbel is considered as undoubted by Boerhave and Musschenbroek. It would now, perhaps, be difficult to decide the controvery; but it is worthy of remark, that Santorio, who was born in 1561, and died in 1636, did not publish his claim to the invention until 1626; and although thermometers are alluded to by Robert Flud within the first quarter of that century, yet, as he travelled both in Germany and Italy for six years, we can draw no inference from that circumstance. Certain it is, that thermometers were constructed about the same time, both in Italy and in Holland, on the same principle; and though the instruments of Drebbel were well known in Holland and England before the fame of Santoria appears to have reached the northwest of Europe, the most recent writers have generally considered the latter as the real inventor of the thermometer.

It is, however, by no means improbable that each may be justly entitled to the merit of a discoverer.

Be this as it may, the instrument, from its imperfect construction, was of very little use in the hands of either, and required the successive labors of different philosophers to render it a tolerably accurate indicator of the variations of temperature.

The thermometer ascribed to Santorio and Drebbel is precisely the same in form and principle; it consists of a glass tube, with a ball on one of its extremities, and having the other end open. A portion of the air in the ball is expelled by heat, and then the open end of the tube is immersed in any liquid contained in the cup. As the ball cools the included air diminishes in volume, and the liquid is forced into the stem by the pressure of the atmosphere, until it replaces the volume of air which was expelled by the heat. When a heated body is applied to the ball, the air will again be expanded and depress the liquid in the stem; and if this stem be a cylinder, a scale of equal parts applied to it will enable the observer to form some idea of the difference between the relative temperature of bodies applied to the ball.

On the removal of the heat, the volume of the included air again diminishes, and the liquid again rises in the stem by atmospheric pressure—until the elasticity of the air within the instrument is in *equilibrio* with that of the surrounding atmosphere.

Instruments constructed on this principle are called *Air Thermometers*—because their action depends on the elasticity of air; and from their having been originally employed to mark the changes of atmospheric temperature, they are described by the older writers under the name of weather glasses; a denomination also given to barometers.

Drebbel appears to have devised a variety of the instrument more delicate in its indications. The globular form of the common bulb and its small size, rendered it less susceptible of slight changes than a flattened bulb of larger diameter. In the obscure and often almost unintelligible writings of Dr. Robert Flud, published at the beginning of the seventeenth century, frequent mention is made of the thermometer, or, as he calls it *speculum calendarium;* and the common air is repeatedly figured in his singular work, "De Philosophia Moysiaca," published in 1638, with its stem divided equally into an ascending and and descending series, each of seven degrees, respectively appropriated to summer and winter. It is obvious that the size of an air thermometer, on such principles, is only limited by convenience and the length of the column of liquid which the pressure of the atmosphere can sustain in the tube. As originally made, they were unwieldy, they could not be applied to high temperatures, and were, besides, liable to two very important objections, as indicators of the atmospheric changes of temperature,—they were liable to be affected not only by heat and cold, but by the varying pressure of the atmosphere, and the scales adapted to them were arbitrary and without fixed points for the comparison of observations made with different instruments.

The first objection was foreseen and obviated by the scientific members of the Florentine Academy, assembled under the patronage of the Grand Duke of Tuscany. In the first article, in the published transactions of that body, we find a full description and delineation of a thermometer from which the influence of atmospheric pressure is excluded. The expansion of spirit of wine is employed to ascertain the temperature, instead of the dilation of air; and the instrument is sealed *hermetically*, as it is termed, or has its orifice closed by melting the glass, after the introduction of as much spirit as fills the bulb and a portion of the stem. The method employed by the Florentine academicians is nearly that still used by the makers of the instruments; namely, by heating the bulb in the flame of a lamp, to expel the air, and then immersing the open end of the tube in the liquid destined to fill the thermometer. As the ball cools, the atmospheric pressure forces the liquid into the stem and ball, to supply the *vacuum;* and the orifice is closed by melting with the blowpipe the end of the tube, from which any excess of the liquid may be previously expelled by again heating the ball.

The Florentine Academicians appear also to have been aware of the necessity of adopting some fixed scale to the tube; but their attempts were not very successful. They described the thermometer as consisting of a ball and tube of such relative size "that on filling it to a certain mark of its neck with spirit, the cold of snow, and ice will not cause it to fall below 20°, measured on the stem; nor, on the other hand, the greatest heat of summer expand it more than 80°."

This method is evidently erroneous, inasmuch as the last point could be of no determined temperature; and their system of graduation is in itself rather rude. The tube is directed to be divided by compasses into ten equal parts, these divisions are to be marked "by a little button of *white* enamel," subdivided by degrees of *black*.

This instrument was variously modified by them to suit different purposes. The ball was occasionally enlarged and the tube reduced in thickness to render the instrument more sensible; and in the work already quoted, we find a figure thermometer of this sort, with the stem spirally twisted to render it more portable, and less liable to accident.

Another invention of the Florentine academicians to indicate changes of temperature may here be noticed. It consisted of hermetically sealed spherules of glass, of different specific gravities, introduced into a wide tube filled with pure spirit. The degree of the Florentine thermometer at which each sank, was noted, and by hanging this instrument in an apartment, it showed somewhat the variations of the temperature of the surrounding air, though slowly. Imperfect as these attempts were, they paved the way to very important improvements in themselves.

The indefatigable Boyle appears early to have turned his attention to the improvement of the thermometer, and his first attempts were on the air thermometer, or the weather glass as it was then styled. He rendered the instrument more convenient, by making one reservoir for the liquid and for the air at the bottom of the tube; and thus the thermometer might be conveniently dipped in fluid, or applied to any body for ascertaining its temperature. "The thermometer," he says, "being made by the insertion of a cylindrical pipe of glass (open at both ends) into a phial or bottle, and by exactly stopping with sealing wax, or very close cement, the mouth of the phial—that the included air may have no communication with the external but by the newly mentioned pipe." If a portion of any liquid be added sufficient to cover the lower extremity of the pipe to be contained in the bottle, it is obvious, that the expansion of the enclosed air will elevate the included liquid in the cylindrical pipe; and this liquid will again descend on the construction of the enclosed.

Boyle likewise showed that no dependence could be placed on the indications of open air thermometers, under different degrees of atmospheric pressure, and he states that on plunging the bulbs of different thermometers in liquids of very different specific gravities as mercury and water, the liquor in the stem stood at unequal heights, though both had been long exposed to the same temperature.

(To be Continued.)

The Siamese Twins.

Dr. Warren, of Boston, lately communicated the following among other interesting particulars in regard to the Siamese twins:—

The connecting substance is very strong, and has no great sensibility; it can be severely handled without causing pain. No pulsating vessel can be felt in it.—The slightest motion of one is immediately followed by the other in the same direction, so that the same wish seems to influence both; this is quite involuntary, or a habit formed by necessity. They always face in one direction, standing nearly side by side, and cannot without inconvenience face in opposition directions.—One is rather more intellectual, being rather irritable, the other being extremely amiable.

The connection between these twins might afford some very interesting observations in physiology, therapeutics, and pathology. There is doubtless a connection by minute blood vessels, absorbents, and nervous filaments, which might transmit the action of medicines and the causes of disease. As far as known, any indisposition of one extends to the other; they are inclined to sleep and eat at the same time and in the same quantity, and perform in the same manner other similar acts. It is supposed that when they are asleep, touching one awakens both, but when awake, an impulse given to one does not affect the other. The slightest movement of one is soon perceived by the other, that a careless observer might think they acted simultaneously. No part seems to have a perception common to both, except the middle of the connecting substance, and its neighborhood, for when an impression is made at this part, it is felt by both, while beyond this space it is felt only by the one of the side to which it is applied.

From the limited vascular nervous connection that can be discovered, Dr. Warren supposes that the influence of medicine, transmitted from one to the other, would be inconsiderable; and the same would apply to most diseases—for instance, a slight fever would not probably extend from one to the other; while diseases, communicable through the absorbents or capillaries, (as small pox) would be readily transmitted. The beatings of both hearts coincide exactly, as also the pulses under ordinary circumstances: if one exerts himself without the other, his pulse alone will be quickened, while the latter is unchanged. They breathe exactly together.

This harmony in coporeal functions would lead us to ask if there be a similar harmony in the intellectual functions; if they are indentically the same persons. There is no reason to suppose that their intellectual operations are any more the same than they would be in any two persons, confined together, educated under similar circumstances, and with similar habits and tastes.

Then would come the question whether they could be separated with safety. Perhaps such an operation would not be necessarily fatal, but the peritoneum may be continuous from one to the other, and the opening of this great serious cavity might be attended with dangerous symptoms. Should one die before the other, it should be immediately performed, but no surgeon would be justified in attempting such an operation to free them from a mere inconvenience; which inconvenience, if we may believe the reports of their domestic affairs and flourishing condition in worldly goods, is after all of no great consequence.

The Honey Bird.

Mr. Cumming the author of "Five years of a Hunter's life in the Interior of Southern Africa," gives an account of this bird, which invites attention by unceasing chirpings and hummings, and then invariably leads the hunter to a wild bee's nest, on reaching which it hovers above the nest, pointing with its bill, and takes up its position in a neighboring tree, awaiting its share of its honey, which the traveller obtains by stupifying the bees by burning grass at the entrance of their domicile. But sometimes the bird plays tricks, and the pursuit in quest of honey frequently brings the traveller into the presence of a grizzly lion or a crouching panther. Mr. Cumming, when once recreating himself in quail shooting, was lured by a honey bird for a mile through the glades adjoining the Limpudo river, where, instead of finding honey, he was brought face to face with a crocodile of vast size, no part of his body being visible above the water except his head. His glancing eyes were anxiously directed towards eight or ten large bull buffaloes, which, in seeking to quench their thirst in the river, were crackling through the dry reeds as they waded in the deep mud. Fortunately for the buffaloes, the depth of the mud prevented their reaching the stream, and thus the scaly monster was disappointed of his prey.

Old Times.

The Romans of the Empire delighted in the shows of animals. In the days of the Republic Pompey was drawn in triumph by elephants, and Anthony by lions. Aurelian was drawn by deer; Firmus, by ostriches; Heliogabalus was sometimes drawn by four lions, then by four tigers; now by four elephants, then by four mastiffs, not unfrequently by four camels; and once by four naked women! At one time he caused to be collected a thousand rats, at another time a thousand weasels, and at another ten thousand mice, all of which he exhibited to the Roman people. And for the purpose of estimating the magnitude of the city he caused to be collected such a number of spiders as were never collected together before, nor have ever since been seen by human eye. They weighed upwards of ten thousand pounds! He would also give most curious presents to those he called his friends. Ten bears to one; ten crickets to another; to some ten camels; to others ten flies; ten ostriches; and ten pelican's eggs. To some, dead dogs; to others, dead bulls; and to some vessels full of worms, of frogs, of toads, of serpents or of scorpions; and frequently at his feasts he would introduce bears and pards, lions and panthers deprived of their teeth and claws.

A Gigantic Statue.

A Frankfort journal states that the colossal statue of Bavaria, by Schwanthaler, which is to be placed on the hill of Scudding, surpasses in its gigantic proportions all the works of the moderns. It will have to be removed in pieces from the foundry where it is cast, to its place of destination, and each piece will require sixteen horses to draw it. The great toes are each a half a metre in length. In the head two persons could dance a polka very conveniently, while the nose might lodge the musician. The thickness of the robe—which forms a rich drapery descending to the ankles—is about six inches, and its circumference at the bottom is about two hundred metres. The crown of Victoria, which the figure holds in her hands, weighs one hundred quintals. A quintal is a hundred weight.)

A New Way to Puzzle Rogues

In the genuine notes of the State Bank of Ohio, there are as many figures represented, as the bill is worth dollars. If the counterfeiter wishes to alter the small bills to large ones, as a $1, to $100, they would have to put in ninety-nine human figures—a thing not quite so easily accomplished.