

perature. In my forthcoming Report, these facts (including many which have not been hitherto published) are discussed, in connection with the Temperatures of Inland Seas; and if Mr. Laughton will frame a better hypothesis for the explanation of them than that of the Thermal Circulation first advanced by Pouillet, and latterly accepted by Herschel and Sir William Thomson, I will gladly accept it.

Mr. Laughton will also find that I am not ignorant of the geographical facts he mentions respecting the *horizontal* or *superficial* movements of the Ocean. But he must be well aware that a current may be flowing in one direction on the surface, and a tidal or other movement in a contrary direction at a small depth beneath it. A very careful observer told me a few days since that at a time when the *surface-current* in the Dardanelles, urged on by a south-westerly wind, was blowing *inwards*, he had distinctly seen the movement of the water at a short distance beneath the surface to be *outwards*—this being indicated by the direction of the water-weeds. Below this, again, as the researches of the *Shearwater* have shown, there is a deep under-current *inwards*.

In confirmation of this last statement, my friend Mr. Redhouse, who resided many years at Constantinople as Translator to the Embassy, has informed me that the existence of the deep under-current in the Bosphorus has long been perfectly well known to the native fishermen of Constantinople, as well as to European residents who amuse themselves with the sport.

WILLIAM B. CARPENTER

University of London, Oct. 29

London University Examinations

PROF. W. G. ADAMS, in order to controvert my statement that mechanical and natural philosophy have little to do with medicine, enters into theories with regard to the production of animal heat which I must leave him to settle with his colleague, the Professor of Physiology in King's College. As he insinuates a doubt as to my own acquaintance with the thermometer and its uses, on my own behalf I may venture to say that not only did Professors Graham and Brande require a knowledge of this and kindred matters of candidates for the Matriculation and First M. B. Examinations of the University of London, but that years before Mr. Adams was connected with King's College, I was rather a "swell" at natural philosophy and chemistry under the late Dr. Miller's tuition.

Mr. Adam's temperature must, I fear, have been abnormally high, or his barometer of propriety correspondingly low, when he penned the paragraph relating to the report of the sub-committee, and endeavoured to gain support for his views by suppressing the latter half of the quotation. The sentence really stands as follows: "The preliminary scientific examination has tended to give prominence to theoretical and scientific knowledge at the expense of a sound practical acquaintance with medicine, surgery, midwifery," &c. &c.; but by the omission of the words in italics Mr. Adams makes the report (contrary to its whole tenor) support his view that "it is in consequence of such knowledge that medical science has advanced with such rapid strides." The illustration of the application of a cupping-glass is not a very happy one, for cupping has for years been notoriously a purely mechanical art entrusted to medically-unqualified men, who could in no sense claim a knowledge of natural philosophy.

In conclusion, may I say that the Senate of the University of London at its session of the 23rd inst., took action in the matter to which I have called attention, and appointed a committee to consider it; and may I express a hope that, should Mr. Adams be really ill, he may not be unfortunate enough to fall into the hands of one of his own medical philosophers?

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CHRISTOPHER HEATH

Can the Stature be in any way affected by the Will?

It is written that "no man by taking thought can add one cubit unto his stature;" but if there be any truth in the following extract from Babbage's "Passages in the Life of a Philosopher," it appears that man can, at all events, voluntarily deduct nearly an equivalent amount from his height.

At the opening of chapter xviii. of the work just cited, Mr. Babbage makes the following statement respecting the celebrated thiet-taker Vidocq, with whom he had an interview:—"He had a very remarkable power, which he was so good as to exhibit to me. It consisted in altering his height to about an inch

and a half less than his ordinary height. He threw over his shoulders a cloak, in which he walked round the room. It did not touch the floor in any part, and was, I should say, about an inch and a half above it. He then altered his height, and took the same walk. The cloak then touched the floor, and lay upon it in some part or other during the whole walk. He then stood still, and altered his height alternately several times to about the same amount.

"I inquired whether the altered height, if sustained for several hours, produced fatigue. He replied that it did not, and that he had often used it during a whole day without any additional fatigue. He remarked that he had found this gift very useful as a disguise. I asked whether any medical man had examined the question, but it did not appear that any satisfactory explanation had been arrived at."

Now if this had been the statement of an unscientific person, or one whose powers of observation were presumably untrained, it might be put aside unheeded; but coming, as it does, from one very unlikely to jump to conclusions, it seems to merit some degree of attention.

This, then, being granted, the question arises, how can we account anatomically for this shortening in height? Of this the solution does not appear to be very clear. The only way in which an individual could alter his height would be either by adopting a stoop of his neck and shoulders, or by bending his knees, and flexing his thighs upon his pelvis, or, lastly, by actually shortening his vertebral column.

The two first methods may be disregarded, as they would be pretty evident, even if a cloak were worn, and, if employed by Vidocq, would scarcely have aroused the curiosity and wonder of Mr. Babbage. The last only, namely, a voluntary shortening of the vertebral column, remains then to be considered.

Now, there seems to be a general impression, both among doctors and the laity so-called—though it is difficult to discover any definite and concrete expression of it in the text-books—that, by virtue of the compressibility of the intervertebral fibro-cartilaginous discs, the stature of a man when he goes to bed is shorter than when he gets out of it, the amount of shortening varying, I suppose, according as the individual dangles a cane in the "Row," or is employed somewhat more actively as a "fellowship porter" at the docks.

Granting, then, that there may be some passive, involuntary shortening of the vertebral column to the extent of an inch or an inch and a half* after the application of a weight to its summit for the duration of some hours, how does a voluntary shortening come to be brought about? Since fibrous and cartilaginous structures are not directly acted upon by the will through peripheral nerves, such action must be produced through the medium of muscles; and here we come to the crux, what are the muscles which could be employed in shortening the vertebral column? Hæmally, the only likely muscle in the cervico-dorsal region is the vertical portion of the *longus colli*, which passes from the bodies of cervical vertebræ Nos. 2, 3, 4, to the bodies of the three lower cervical and three upper dorsal vertebræ; and in the dorso-lumbar region there is the *psaos magnus*, which takes origin from all the lumbar and the last dorsal vertebræ, but which, unless the femur (where it is inserted) were fixed, could hardly affect the vertebral column, while neurally there are the numerous dorsal muscles of complex arrangement, such as the *quadratus lumborum*, *sacro-lumbalis*, *longissimus dorsi*, &c.

There seems to be, however, nothing in the arrangement of such muscles as would satisfactorily account for a voluntary shortening and elongation, or rather, restoration to the normal length; of the vertebral column, though it is possible that in some individual cases there may be some special endowment of innervation and co-ordination of muscle which permits of such action,

* Philippus Pieper, in an inaugural thesis, "De Viribus Corporis Humanæ Mechanicis," Berolini, 1821, states, with regard to the elasticity of the vertebral column (p. 5), that in a man of middle height who had been carrying weights the difference at the end of the day was only 11". In the last edition of Druitt's "Surgeon's Vade-Mecum" it is stated (p. 341) that "the intervertebral substance is compressible to such an extent that an adult man of middle stature loses about an inch of his height after having been in the erect position during the day. Since the united thickness of the intervertebral substances in an adult man is about 3.875 inches we see that they lose nearly one-fourth by compression, which they do not recover till after some hours of rest." Among works which I have consulted in vain upon this point are, Borelli, "De Motu Animalium," and "De Vi Percussionis" (Lugdun. Batav. 1686), Giraud-Teulon's "Principes de Mécanique Animale" (Paris, 1858); Henle's "Bänderlehe;" and the "Traité de la Mécanique des Organes de la Locomotion" by G. and E. Weber, in tom. ii. of the "Encyclopédie Anatomique," W. and E. Weber's "Mechanik der Menschlichen Gewerkezeuge" (Göttingen, 1836), is unfortunately in none of the large libraries to which I have access.