

TABLE VII.

TABLE, showing the Variations in the Mortality under the age of Ten Years, consequent on every Change of a Quarter of a Year in the Length of the Period over which the Constant of Infancy presides, the Minimum Mortality between the Ages of Ten and Fifteen Years being assumed to be fixed at one-half per cent. per annum.

Age in years when limit of infancy is attained.....	7½	7¾	8	8¼	8½	8¾	9	9¼	9½	9¾	10
Mortality per cent. { 0—5	4.16	4.60	5.10	5.65	6.26	6.94	7.70	8.55	9.49	10.54	11.73
per annum be- { 5—10	.66	.70	.75	.81	.88	.96	1.05	1.15	1.26	1.38	1.53
tween ages ..... { 10—15	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50

## ON HYDROGEN GAS.

By W. F. STEVENSON, Esq., F.R.S., Sidmouth.

As, since the writings of Liebig, the knowledge of animal chemistry has been considered a necessary part of medical education, and forms the subject of public lectures, it is very important that it should be placed upon a solid basis; or, in other words, that it should be correctly ascertained what are, and what are not, elementary matters, as an error on this point will necessarily endanger the whole superstructure. Since Lavoisier's time, hydrogen has been held to be an element, as he made it one of the constituents of water.

Now, I think it will not be difficult to satisfy your readers that hydrogen is a compound, and that water has never been decomposed.

Lavoisier in 1783, when he communicated his theory to the French Academy of Science, stated, in his "Memoir," that when oxygen and hydrogen gases were inclosed in certain proportions in a glass vessel and ignited by a spark, an explosion followed, when an inflammable matter, accompanied by heat and light, *escaped* from the vessel, and that upon opening the latter the gases were found to have disappeared, and to have left water in their place; and that upon weighing the water it was found to correspond with the weight of the previous gases. He therefore concluded by affirming, that water was constituted of the two gases, *minus* the inflammable matter which had escaped. As in this statement of his theory, he thought, no doubt, that the admitted escape of any matter might create some doubt in the minds of the Academy, he proceeded to give another experiment, whereby he professed to decompose this water, and thereby reconstruct the constituent gases; and this he did, by inclosing the water in a glass vessel, and passing through it repeated charges of the *electric fluid*, when the water was ultimately found to have disappeared, and to have left in its place the gases in question. This the Academy considered as conclusive, and accordingly adopted the theory, which has been ever since the doctrine of scientific men of all countries.

Now, this last process, and which is essential to the maintenance of the theory, is evidently and necessarily a deception. We have seen that in the first process, when the water is formed, an inflammable matter escapes from the vessel, and which makes Lavoisier say that the water is composed of the gases *minus* this matter. Now, it is manifest and indisputable that this escaped matter belonged to one or both of the gases, as the vessel in which they were inclosed contained no other matter. How, then, is it possible that the water can reproduce these gases without the addition of this inflammable substance? By what conceivable process can the *major* be elicited from the *minor*? It may seem most strange that this *physical impossibility* never occurred to these scientific men; but so it is. "Humanum est errare." But the "philosophers" will say, "Don't talk about the impossibility, but examine these gases thus produced; ignite them by a spark, and you will find the same explosion, the same escape of a combustible matter, accompanied by heat and light, and that the same deposit of water follows as before."

Why, then, is it not self-evident that there is a fallacy lurking in the experiment? Of this there can be no doubt. Then what is it? This: that hydrogen is not an element, but a compound of electric matter and water, and which you formed when you passed the charges of electric matter through the water, and which latter, at the same time, liberated the oxygen which it had absorbed in the first experiment.

This combination of the electric matter and water, and thus forming the hydrogen, is a necessary conclusion; for how,

otherwise, could hydrogen be produced from water deprived of the phlogistic matter which had escaped?

What, then, is, in fact, the first experiment of Lavoisier, when he produces an explosion by firing the gases, but this?—that instead of the oxygen and hydrogen uniting, as he states, the hydrogen gas is decomposed, when the electric matter flies off, and leaves the water behind; and as the latter immediately absorbs the oxygen, (which chemists know it will do with avidity,) the water is found to equal in weight the previous gases, the electric matter not being a ponderable substance.

When the experiment is made upon a small scale, the electric matter can be communicated to the water by a heated piece of metallic wire, when bubbles of hydrogen will be generated. This last experiment so misled the Royal Society, not many months ago, that it was pronounced, *ex cathedra*, that water would produce hydrogen by heat alone.

It may be safely taken, I think, as a general rule, that when any theory involves vast improbability it will be found to be a delusion. Now what could be more improbable than that a fluid occupying such a large portion of our globe, and of such universal necessity, should be a compound of gaseous substances, requiring for its formation such enormous quantities of them, that 500,000 grain measures of hydrogen are required (as Mr. Cavendish informs us) to make 135 grains of water; and again, that a fluid, so largely constituted of the most inflammable of matters should be the most powerful agent in extinguishing combustion.

I will only beg to trespass further on your patience by observing that Dr. Priestley demonstrated the absorption of the oxygen by the water formed upon Lavoisier's theory, and that from invariably finding it very acid, he refused to become a convert to it: and that, with regard to hydrogen, Mr. Cavendish, (its discoverer,) Dr. Priestley, and the late Mr. James Watt, all declared their opinion that it was composed of a very little water, and much phlogistic or inflammable matter, as will be seen on reference to their papers, among the printed *Transactions* of the Royal Society.

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## ON THE USE OF GUTTA-PERCHA SPLINTS IN CLUB-FOOT.

By GEORGE WILSON, Esq., M.R.C.S.E., Leeds.

SOME time ago, I read in a circular, issued by the Gutta-Percha Company, an account, by Professor Lyon, of Glasgow, of his method of treating *club-foot* by the application of gutta-percha bandages, after the division of the tendons requiring it in the ordinary manner. His plan, if I remember it correctly, is to envelope the foot and leg in soft linen, and over that to apply a spiral bandage of softened gutta percha, which, being allowed to cool and become hard, effectually retains the parts in the desired position. I have not tried it, but should fear that the removal of the gutta percha, by cutting it away, as the professor directs, would be found inconvenient and difficult. As I have for some time been in the habit of using gutta percha as a support after the division of the tendons, in cases of this deformity, and my method is free from the disadvantage alluded to, I venture to describe it, for the benefit of those who, like myself, prefer a light and simple dressing to the heavy fetters which have hitherto been in general use. I may premise that I think it best to perform the operation at an early period of infancy, as it is then easily done, and the parts are more readily moulded to the natural position than afterwards. From two to three, or four months after birth, is the time I select, and I do not apply the