

B. C. v. 4/1799

Harrington on Heat.



ART. IV. *Some new Experiments, with Observations upon Heat, clearly shewing the erroneous Principles of the French Theory. Also, A Letter to Henry Cavendish, Esq. containing some pointed Animadversions; with Structures upon some late Chemical Papers in the Philosophical Transactions, and other Remarks. By Robert Harrington, M. D. 8vo. 126 pp. Cadell and Davies. 1798.*

THE contents of this work are: *Some new Experiments, with Observations upon Heat*, which form a sort of preface, of 30 pages, to *A Letter to H. Cavendish, Esq.* in which are introduced, *Observations on Dr. Pearson's Experiments, with some other Remarks. Observations on Dr. William Henry's Paper. Observations on Dr. Wells's Paper, with other Remarks.* and, *Observations upon Count Rumford's Paper.*

The author of this strange publication finds fault with almost all the modern philosophers and chemists. Few are mentioned with that respect which is due to their merit; and fewer still, if any, are the objects of his praise. But his praises and his animadversions are of equal value; since they are generally founded on uncertain, mistaken, and often misrepresented facts.

The equivocal sense in which he uses the terms of science; the strange result of some of his experiments, which surpass the bounds of credibility; the vulgarity of his expressions; his presumption, and his conceit, are obvious in almost every page, and must be very unpleasant to every reader.

We should readily have entered into a particular examination of the principal articles of the book, if such an examination could have been attended with instruction or entertainment to our readers; but it would be improper to employ our labour where much rubbish must be removed, in order to discover what, after all, is hardly worth observing. In justification, however, of our own conduct, we have thought it necessary to select, and to subjoin, the following passages, amongst a great number of others, upon which we have founded the foregoing general remarks.

“ The repulsion of fire is one of the most interesting subjects that chemistry can investigate; and it is a principle which has never been introduced in explaining the phenomena. Fire and matter have a very strong attraction for each other, and this attraction, when it takes place, that is, when fire and matter are united together, can only be decomposed in two ways. First, by other bodies having a greater attraction for either of the compound bodies than they have for each other. As in lime; thus the calcareous earth has a strong attraction



attraction for fire, producing lime; but, if an alkali is added to the lime there is a decomposition; the alkali having a stronger attraction for the fire, attracts it from the calcareous earth; and the fixed air of the alkali is attracted by the calcareous earth.

“Also, the lime may be decomposed by the joint operation of fixed air and water, but neither can do it separately.

“But, secondly, the most common way by which fire is set loose from its chemical combination, is by combustion; which operates principally by repulsion. Thus, when a body is set on fire, the pure air’s fire is set loose, and also the combustible body’s fire, which produces so strong a heat, that the fixed fire, which both the air and the burning body possesses, is repelled from its chemical combination, so as to become free, or actual fire. A spark being applied to the combustible body, sets free the fire of the air contiguous to it, then both fires act by repulsion, upon the combustible body’s fire, and so on; as one part of the air and burning body’s fire is set free, it acts upon its neighbouring part till the whole body is consumed.” P. iii.

“To see whether fire would have any influence upon the acid, I took a tube of glass whose diameter was very small; into this tube I introduced a golden wire which nearly filled it; having placed it near half way into the tube, just at its point I melted the glass around it, so that it was impervious to air and water; then, at the other end of it, I dropt into the tube a few drops of the nitrous acid, and introduced another golden wire; and when the acid was all concentrated, in the middle, between the two gold wires, I melted the glass round the last introduced wire, in the same manner as the first. Now here I had the acid placed between the two wires, and the glass closely melted near the point of the wires, so that there was no passage for the acid. Upon passing, for a long time together, the electric fire through the acid, I found, upon examination, it was principally dissipated. That the passages were thoroughly closed upon the wires, and that the acid could not pass through any opening, I was certain, by examining each end of the tube, there being not the least acid. Therefore, it must have united with the fire, and passed with it through the body of the glass; the best examination of the acid is to see what proportion of alkali it will saturate before and after the operation.” P. xviii.

We are inclined to doubt whether this experiment could have been actually performed. The author does not tell us in what manner the electric fluid was conveyed through the acid. If in the form of a gentle stream, it is highly improbable that it could have produced any sensible effect on the acid; and if it was passed in a condensed state, such as the repeated discharge of an electric jar, the glass tube would, most likely, have been burst by the very first discharge. Dr. H. does not mention in what manner he ascertained the escape of the nitrous acid through the pores of the glass, as he does not appear to have either weighed or measured it; which any person of the least caution would have undoubtedly done, in confirmation of
a fact

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a fact so very remarkable in natural philosophy, as the result of this alledged experiment.

“ There is great difference between light and sound ; the former is from the pure fire, or rays of light striking the optic nerve ; the latter from fire united to matter, striking the auditory nerve : and that by means of an agent, the drum, or tympanum of the ear.” P. xxviii.

The Letter to Mr. Cavendish commences with the following paragraphs :

“ In the year 1788, I wrote a letter to you and others upon the extreme errors and fallacy of the French system, and also upon your two experiments, the firing inflammable and pure airs, and passing the electric spark through pure and atmospheric airs ; proving, to the satisfaction of candour and common sense, your very erroneous conclusions from these experiments : which letter you have never been able to refute.—I now address to you another upon the same subjects, but I do not expect more candour from you towards this letter than the former ; I am sensible there is a most powerful and illiberal combination formed against me and my *system*. But, Sir, whatsoever be the arts, influence, and conspiracy, time will unravel the whole.

“ Though this combination is supported by so numerous a body ; a phalanx who flatter themselves their names can command every thing, yet truth will and must prevail. If your opinions, experiments, and conclusions are just, then I am willing to stand condemned as censuring you unjustly ; and in that censure, as being too confident of my own opinion. But I am not like you and your confederates, who skulk from investigation. I do here seriously call upon the public to arraign us both at their tribunal, and to pass their sentence according to their justice. But, in fixing their judgment, I hope, they will carefully weigh the facts *pro* and *con*.

“ No doubt, Sir, you will call this letter presumptuous ; and if I do not prove the French theory to be *egregiously* false, and also, if called upon, shew that every mean, illiberal, and shameful artifice has been made use of to repress fair investigation, I will agree with you that it is presumptuous. When a man believes he has truth and justice on his side, when his opponents dare not openly refuse, but take every method that cunning and art can invent to suppress fair investigation, after they have been publicly called upon ; then under those circumstances, Mr. Cavendish, I think, that I neither do justice to science, truth, nor myself, if I do not state my grievance to the world. I acknowledge that my language is harsh and pointed ; but, Sir, I appeal to your behaviour for its justification : I am aware of the great influence of this overbearing combination, I know that it is great and mighty, and, like many tyrants, has its janisaries (the herd of reviewers) to strangle its adversaries.” P. 1.

How severe an insinuation against us all, who have nothing, it seems, in common but our enmity to Dr. Harrington ! This author's great theory is comprised in the following paragraph :

“ Our aerial philosophers seem to have got into the greatest errors concerning the doctrine of combustion, supposing it is conducted by attraction ;





attraction: but combustion is clearly the separating or breaking the formation of bodies, and not attracting or building up new ones. Thus fire enters into the integral substance of all combustible bodies, which bodies are those which possess the greatest quantity of fire; therefore when those bodies are destroyed by fire, or have their fixed fire set loose as actual, the composition of them is entirely broken down; from two causes. First, As the fire made an integral part of the bodies, and secondly, as the free fire's great principle is repulsion: therefore, as the fire is let loose, all the component parts of the burning body are repelled or forced from their chemical combinations by the repulsatory principle of fire; and unless chemists will introduce this great repulsatory principle of free fire into combustion, they never can account for the phenomena; for this great repulsion of fire is as certain an agent as chemical attraction.—Therefore our late chemical theories teaching that the air acts in combustion by attracting the supposed elements, carbone, inflammable air, or phlogiston, from bodies when burning, is erroneous, as the air acts in combustion as the agent: it being a combustible body formed of fire, fixed air, and water, and its fire being slightly attracted to the fixed air and water, is therefore easily set loose in the combustion, and then acts upon burning bodies as nature's great agent in setting loose the combustible bodies' fire; and in respiration, putrefaction, and other processes, this fixed fire is easily attracted from its union with the fixed air and water of the pure air uniting to the blood in its fixed state." P. 4.

“ But to prove, beyond all controversy, my theory. If the *pure volatile alkali* is thrown into a red hot crucible, previously filled with the pure dephlogisticated or atmospherical air, the volatile alkali will burn; but, instead of turning the dephlogisticated air into water, it turns it into *fixed air*. This experiment is best performed with a crucible in the form of a bottle, with a bladder fixed to its mouth containing the volatile alkali; and when the crucible gets red hot at the bottom, the alkali is then to be put into the crucible; or it may be performed without the bladder.

“ Now, Mr. Cavendish, I appeal to common sense, that the solution of these phenomena can only be from my theory; and bodies burning in dephlogisticated air, change it either into a condensed acid and water, or the aerial acid and water, according to the degree of its combustion. If very intense, it takes from the pure air totally its aerial form, and when not so intense, leaves it in its aerial form as fixed air: in proof of which I have all along brought the most conclusive experiments and arguments, in my publications.—I shall here name only one, as I am tired with going over so repeatedly the same ground. If the red precipitate, which yields only the purest oxygen-gas, be heated with the filings of iron, which yields the purest inflammable air; the purest fixed air is produced, and in the greatest quantity. The cause of which is this: these airs are generated very slowly, therefore the combustion of the airs takes place in a gentle manner, and in consequence, the heat is not sufficient to make that active combustion so as to condense the dephlogisticated air's acid, but leaves it in its aerial form. O! when will men's candour open their eyes?” P. 39.

“ Now

Substance of Lord Auckland's Speech.

“ Now, I call upon all the philosophers, teachers of the no longer to patronize this absurd French theory, so opposite to common sense. But if they are still deaf to reason, candour, and justice, I hope the impartial world will pass a just, public, and fair censure upon them. I have called upon them to relinquish or defend their absurdities. I have challenged, coaxed, and irritated them to it; but all to no purpose. They well knowing that to defend them, would bring them to public notice; and their absurdities would be condemned, laughed at, and ridiculed.—Therefore, they presume, upon their supposed *great* names, their pompous apparatus, and their artful combination.

“ But I positively declare, that all their boasted experiments in their laboratory, are only to be rationally explained upon my theory; calling upon them to produce *even* one against it; for, when closely examined by their own, there are the same absurdities, inconsistencies, and errors, as I have just shewn that there is in its explaining the phenomena of respiration.” P. 77.

“ I have now taken a review of all the chemical papers in the *Trans.* except Mr. Tennant's, upon the combustion of the diamond. And here, Mr. Cavendish, you must excuse my not entering into any discussion of it. For, to endeavour to treat with serious argument, that absurdity of absurdities, viz. that the diamond is pure charcoal, would be an equal absurdity, though it has had the sanction of the *Phil. Trans.* I have related a similar absurdity which this theory of your's has given birth to. See page 75.

“ *The best of all manufactories would be burning charcoal into diamonds, which is only chrystallizing it; for, Mr. Cavendish, your chemical powers certainly can do it.*” P. 124.

Such is the work of an author, who labours hard to be ranked at the head of modern chemists; but labours unfortunately in the wrong way: not by judicious efforts to surpass them, but by censoring others, and commending himself.

