

of pneumatic chemistry, he is led to the conclusion, that the arrangement of each of the gases in the united column will be precisely the same as if the other had no existence; that is, that each will form a separate and independent atmospheric column, containing at its base a pressure of fifteen inches, and decreasing in density according to its own peculiar law; so that after a certain height the limit of the carbonic acid atmosphere being passed, hydrogen alone would exist in the column, and after the limit of the hydrogen atmosphere were attained a vacuum.

The author takes occasion, in the course of this reasoning, to suggest, that the absolute height of an atmosphere of carbonic acid or other gas might be found by perfectly exhausting a tall receiver, then letting in a small given portion of the gas, and testing the upper and lower portions, to ascertain its presence below and absence above.

He terminates the paper, 1st, by a view of the constitution of the earth's atmosphere on this idea; according to which it appears, that the atmosphere of oxygen being supposed to reach to the height of 38 miles, that of azote will reach to the height of 54 or 44, according to the different assumptions which may be adopted respecting the weight of its atom;—that of carbonic acid to 10 miles, and that of aqueous vapour to 50 miles: and 2ndly, by a comparison of this view with what should be its constitution on the usual theory:—the whole of this view of course supposes the air to be perfectly at rest, but the actual constitution of the atmosphere is probably materially modified by the motions perpetually going on in it.

*On the Coagulation by Heat of the fluid Blood in an aneurismal Tumour.* By Sir Everard Home, Bart. V.P.R.S. Communicated January 23, 1826. Read March 2, 1826. [*Phil. Trans.* 1826, Part III. p. 189.]

In a case of aneurism of the external iliac artery, the author tied the femoral artery below the sac; but as this neither diminished the pulsation nor arrested the increase of the tumour, he was led to introduce a needle into its centre, connected with a heated bar of steel: as no severe pain was thus produced it was retained for fifteen minutes, during which the pulsation was diminished. On the twentieth day after the operation, the swelling having increased considerably, heat was applied as before; but by a larger needle, retained for thirty-five minutes, this tended to diminish the pulsation, but it returned on the third day with much pain in the tumour. On the forty-fourth day after the operation, a larger heated needle than the former was introduced for thirty minutes, when the pulsation suddenly stopped, and the patient felt free from pain. The tumour was solid to the touch, and there was no return of pulsation in it. The leg, however, soon afterwards became œdematous, mortification ensued, and the patient died on the ninetieth day after the operation, of the effect of the mere pressure of the tumour. The appearance of the coagulum found in the sac after death is shown in an annexed draw-

ing, and the author describes the general appearances of the diseased parts, among which ossification of the arterial trunks was prevalent. He trusts that he has proved that coagulation of the blood in an aneurismal sac, by the means pointed out in this paper, is not only practicable, but that it may be resorted to without the production of any important local or constitutional symptoms.

Sir Everard next details the results of several experiments made with a view of ascertaining the effects of various temperatures upon the spontaneous coagulation of the blood. The separation of serum he finds considerably impeded by a high temperature, but by a heat of  $120^{\circ}$  the blood is rendered buffy; and if drawn from the arm into a cup immersed in boiling water, and kept for some hours at that temperature, it does not form a complete coagulum. A low temperature also interferes with its perfect coagulation; for when drawn into a cup immersed in ice, and left there, in twenty-four hours the surface had a buffy coat, and the coagulum was extremely loose.

It has been generally believed that the cupped appearance of blood depends upon the coagulable lymph being more contractile when separated from, than when blended with, the other parts of the blood. In a patient who suffered under inflammation of the brain, and who was bled in the course of thirteen days to the amount of sixty-eight ounces, some of the blood, though very buffy, was not at all cupped. Its appearance was very peculiar, and the coagulum was divided into an upper dense portion, having the characters of coagulated albumen; while the lower portion had a gelatinous appearance, and exhibited the albumen in a very attenuated state, mixed with the colouring matter.

*On the mathematical Theory of Suspension Bridges, with Tables for facilitating their Construction.* By Davies Gilbert, Esq. V.P.R.S. &c. Communicated March 9, 1826. Read March 9, 1826. [*Phil. Trans.* 1826, Part III. p. 202.]

In this paper the author states that his attention was first directed to a consideration of suspension bridges, when the plan for the Menai Bridge was submitted to the Commissioners of Roads and Bridges. It then appeared to him that the proposed depth of curvature was insufficient for insuring a due degree of strength; and this opinion was confirmed by some investigations, which are printed in the Quarterly Journal of Science. In consequence of this, the interval between the road-way and the points of support has been augmented to 50 feet, and its strength now appears sufficient.

The object of this paper is the expansion of the formulæ, from which the above-mentioned approximation was derived, into tables adapted to general use; and the derivation of other formulæ and tables for the catenary of equal strength; a curve not merely of speculative curiosity, but of practical use when bridges of very wide span are to be constructed. The author first remarks, that as all catenaries,