Practical observations on the use of oxygen, or vital air, in the cure of diseases : to which are added, a few experiments on the vegetation of plants / by Daniel Hill.

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TO THE

RIGHT HONOURABLE

LORD VISCOUNT ANSON.

My Lord,

I avail myself of the honour of your obliging indulgence, to dedicate this Edition of my Practical Observations on the use of Oxygen Air to your kind Patronage. I flatter myself the important facts herein contained, the clear evidence of a new agent discovered, in the œconomy of the human lungs and heart, to remove various diseases, under which humanity suffers, will not be found unworthy your serious regard. The subject

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PRACTICAL OBSERVATIONS, &c.

CALLED upon by the highest motives of humanity, I am desirous, that no longer time should be lost, in making publickly known many important facts, which have come within my knowledge, as a professional man, during the course of several years practice. With the greatest deference to the public, I submit to their inspection my observations and experiments in a new and wide field of science, the application or use of vital air in the cure of diseases; and I trust they will prove, that it's effects upon the human frame are so powerful, when combined with medical aid, as to produce not temporary relief merely, but complete cures of many diseases, which medicine alone could not accomplish. At an early period I made this branch of science my particular study, and with unremitted attention pursued every varied means, likely to bring oxygen and other factitious airs to the greatest degree of purity. I

was likewise cautious in administering them, until, by long experience, I had attained a regular system, and a certain and rational mode of practice.

In a philosophical point of view, it was almost impossible not to conceive, that the singularly fortunate discovery of the chemical properties of the air of our atmosphere, as composed of twenty-six parts of vital and seventy-four of azotic air in a hundred parts, must lead to great and salutary effects in the cure of many diseases peculiar to the human frame, and more especially those of our moist cold climate. Asthma seemed a disease best calculated, according to Dr. Beddoes's Theory, for a trial of vital air, and in many cases of this complaint I had considerable success.

Reflecting farther on the subject, I judged, that in all cases of debility likewise, and where the action of the heart and arteries was weak, it might prove extremely beneficial. As this was my own particular case, I was fully warranted to try it upon myself, and enabled thereby to make accurate observations. After having inhaled vital air by measure for several weeks, occasionally taking such mild remedies, as seemed necessary at the moment, I had the satisfaction to find myself in a state of health and strength, which I had not experienced for the last seven years; owing to a gouty constitution, accompanied with nervous irritation, for which the use of medicine, under

the direction of the late learned Dr. Warren, and others of the faculty, had not afforded me the least relief.

This speedy renovation of constitutional vigor was marked by an unusual redness of the skin, more especially of the face, and both extremities, which occasioned my having no doubt in my own mind, that this very active remedy might be successfully applied in many bad surgical cases, as ulcers, gangrenes, &c.; since one great object in surgical practice is, to excite a due action in the languid vessels of old and indolent ulcers, so as to promote a granulating and healing process. The first trial I made, in order to confirm this opinion, was in the case of a Mrs. Munt, an elderly woman, of Fore-street, Cripplegate; who, after having suffered eighteen years, from an extremely irritable and obstinate ulcer in her leg, was perfectly cured in three weeks, by following the same alterative plan of inhaling vital air, with the occasional use of other remedies. The second was a more desperate case, that of the Rev. J. C. Atwood, in whose left leg a large gangrenous ulcer had existed for above a year and a half: and although he had been under the care of two eminent surgeons, so little success attended their endeavours, that amputation seemed inevitable, and was nearly decided upon, when he came to me. This case also was cured in six weeks; and a further account of both will be given in their proper place.

These cases were published in Dr. Beddoes's Treatise on factitious Airs.

Having so far been successful, I was led to conclude, that, as vital air had produced such good effects in the soft and fleshy parts of the body, it would likewise on the more solid and bony parts. For the living principle being thus imbibed by the blood from the lungs in breathing, thence conveyed to the heart, and, from the known laws of the circulation, transmitted by the heart through the arteries, by an infinite number of branches and ramifications, it must not only penetrate the soft parts, of which I had sufficient proof in these facts, but all the different organs, and the various bones of the body. Hence I farther hoped, it might give such energy, when judiciously excited, as would cure white swellings, and diseases of the bones; and more especially assist in the process of growing, and cases of deformity. This conjecture is happily confirmed by numerous experiments. A reference to the beautiful anatomical preparations, to be seen in the possession of almost every surgeon, and in the elegant museum of —— Heaviside, esq. demonstrate how much arterial action precedes the conversion of cartilage into bone. These preparations also show how vascular all young bones are, during their natural evolutions in growing. Every feeling mother likewise can testify, from anxious maternal attentions, the peculiarly vascular, red, heated, and inflamed

state of children's gums, during the necessary but painful process of *teething*. How natural then to conclude, that what is thus discovered by anatomical facts, and farther extensively confirmed by repeated experience, as a great law of nature with regard to the human economy, must ultimately prove of great importance in surgical and medical practice.

What most surprises me is, that it is the fancy of particular individuals, and those who ought to know better, to depreciate this new application of vital air in the cure of diseases, as a sort of quackery, or novelty in the practice of medicine and surgery; and that they have no *belief* in it's power or efficacy.

Παλαια δε η πλανη καινον δε αληθεια.

'Error is old, therefore truth seemeth new:' says a Greek author.

But let it be considered, that the novelty of a discovery is not of itself a sufficient foundation for a disbelief of it; it being no uncommon thing, for errors to be admitted for truths, only because they are popular or established errors, which the many deviations from old received systems, speculative or philosophical, abundantly evince. *Novelty* therefore is as likely to have truth on it's side, as *antiquity*.

'The imputation of novelty is a terrible charge,' says Mr Locke, 'amongst those who judge of

men's heads, as they do of their perukes, by the fashion; and can allow none to be right, but the received doctrines. Truth scarce ever yet carried it by vote any where at it's first appearance: new opinions are always suspected, and usually opposed, without any other reason, but because they are not already common. But truth, like gold, is not the less so for being newly brought out of the mine. It is trial and examination must give it price, and not any antique fashion: and though it be not yet current by the public stamp; yet it may, for all that be *as old as nature*, and is certainly not the less genuine *.'

That truth, and the sublime laws of nature, have been perverted or overlooked, will be proved to those, who read for information, and the highest gratification of the human mind. Such will do well, to peruse a book entitled, 'Morsels of Criticism, tending to elucidate some few passages in Scripture upon Philosophical Principles,' written by C. King, esq †. Whoever will candidly

* Locke's Epistle dedicatory to his Essay concerning Human Understanding.

† '*And God said, let there be formed* A STRENGTHENING [OR CONSOLIDATING] SUBSTANCE [or atmospherical air] *in the midst of the water, And let it be a means of separating through the midst, (or of dividing,) between water, and water. And it was so.*

'Philosophical discoveries have of late years convinced us, that *air* is the great *band*, and support, both of animal and vegetable life; and that it is even itself reduced to a

examine the mosaic account of the creation, as thus philosophically explained, and compare it's great outline with modern discoveries in chemistry relative to light, heat, and air, as agents co-operating to the support of the animal and vegetable world, will assuredly admire the united sub

most *solid* and *fixed state*; so as to form a most solid part, and even the greatest part of the substance of almost every thing existing on earth. And, moreover, that it is even the *very means of consolidating* and binding the other component parts together.

'Dr. Stephen Hales was one of the first who began to examine and to consider rightly the nature and properties of air. And he soon discovered, by means of a very simple plain experiment *, that, in consequence of *breathing*, a great quantity of air, in its passage to and from the lungs, is much altered in its nature, and reduced from an elastic, to a fixed state. He discovered also, further, that plants imbibe vast quantities of air; not only from the earth beneath, through their roots; but also from the atmosphere itself, through the surface of their trunks, and leaves †; and more especially at night. And that it freely enters the vessels of trees, in very great abundance, and is even (as he expresses it ‡) *wrought into their substance*.

'And at last also, he even found reason to conclude, in the most satisfactory manner, that air *alone* makes a very considerable part of the *solid substance* both of vegetables, and of plants of all kinds; and of animals §. And that there is even much more of it in their solid and most fixed parts, than in their fluid parts ‖.

* Statical Essays, Vol. II. p. 323. † Ibid. Vol. I. p. 159, 326. ‡ Ibid. Vol. II. p. 267. § Vegetable Statics, Vol. I. p. 216. ‖ Ibid. Vol. I. p. 301. 311, and Vol. II. p. 278.'

limity and simplicity of the ancient writer. But as my object is to call the public attention to the practical benefit of oxygen, or vital air, in the cure of disease, I shall proceed to show, how much this subject occupied the thoughts of the immortal Harvey, immediately after the discovery of the circulation of the blood.

'After all these discoveries; that most curious and accurate philosopher, Mr. Cavendish, investigated the matter still further: and, having had reason to conclude, that *all* animal and vegetable substances contain *fixed air*; he at last found, that *vegetables* consist almost *entirely* of *fixed* and *phlogisticated air*, and some water *. And he had even reason to be persuaded, that *the very water itself* consisted solely of inflammable air united to dephlogisticated air †.

'Hence we may perceive, that *vegetation* is merely the *process*, of *converting air into a fixed and solid substance*; or rather the *process* whereby *air becomes the means of* CONSOLIDATING *all the most beautiful adornment of the face of the earth.*

'And we have manifest instances of the process of its becoming fixed in other kinds of bodies; even in such a manner as to increase their weight greatly. For it has been observed, and clearly shewn by M. Lavoisier ‡, that all *combustible* bodies whatever, do actually increase in weight while they are burning, and calcining; by means of the air which is, from the atmosphere, CONSOLIDATED, and fixed in them.'

'* Phil. Trans. Vol. LXXIV. p. 150, 152. † This last conclusion has since been strengthened very much by some subsequent experiments of Dr. Priestley's, Vol. LXXV. p. 299. ‡ Memoires de l'Academie Royale for 1783, p. 508, 512, 522.'

• Cœpi egomet mecum cogitare, an motionem quandam quasi in circulo haberet, quam postea veram esse reperi, & sanguinem è corde per arterias in habitum corporis, & omnes partes protrudi, & impelli, à sinistri cordis ventriculi pulsu, quemadmodum in pulmones per venam arteriosam à dextris ; & rursus per venas in venam cavam, & usque ad auriculam dextram remeari, quemadmodum ex pulmonibus per arteriam dictam venosam, ad sinistrum ventriculum ut ante dictum est.

‘ Quem motum circularem eo pacto nominare liceat, quo Aristoteles aërem & pluviam circularem superorium motum æmulatus est. Terra enim madida à sole calefacta evaporat, sursum elati condensant, condensati in pluvias rursum descendunt, terram madefaciunt, & hoc pacto fiunt hic generationes & similiter tempestatum & meteororum ortus, à solis circulari motu, accessu, & recessu.

‘ Sic verisimiliter contingit in corpore, motu sanguinis, partes omnes sanguine calidiori perfecto, vaporoso, spirituoso, (& ut ita dicum) alimentativo, nutriri, foveri, vegetari : Contra in partibus sanguinem refrigerari, coagulari, & quasi effœtum reddi, unde ad principium, videlicet Cor, tanquam ad fontem sive ad lares corporis, perfectionis recuperandæ causa, revertitur : ibi calore naturali, potenti, fervido, tanquam vitæ thesauro, denuo colliquatur, spiritibus, & (ut ita dicam)

balsamo prægnans, inde rursus dispensatur, & hæc omnia à motu & pulsu cordis dependere.

' Ita cor principium vitæ & sol Microcosmi (ut proportionabiliter sol Cor mundi appellari meretur) cujus virtute, & pulsus sanguis movetur, perficitur, vegetatur, & à corruptione & grumefactione vindicatur: suumque officium nutriendo, fovendo, vegetando, toti corpori præstat Lar iste familiaris, fundamentum vitæ, author omnium *.'

Exercitatio Anatomica de Motu Cordis, cap. 8.

* ' I began to reflect within myself whether the blood had a certain motion as it were in a circle, which I afterwards found to be true, and that it is pushed out, and impelled from the heart through the arteries, into the habit of the body, and all it's parts, by the pulse of the left ventricle of the heart, as it is into the lungs through the arterious vein, on the right, and again flows back through the veins into the *vena cava*, and to the right auricle, in like manner as from the lungs through the artery called *venosa*, to the left ventricle aforesaid.

' Which motion we may be allowed to call circular, in the manner that Aristotle has compared the circular motion of the things above, by the air and rain. For the wet earth heated by the sun sends forth vapours, these vapours wafted upwards condensate, when condensated they again descend in rain, moisten the earth, and by this means generations are here performed, and in like manner is brought on the rise of storms and of meteors from the sun's circular motion, his approach and retreat.

' Thus probably does it happen in the human body, by the motion of the blood, that all the parts are nourished, cherished with warmth, and made to vegetate or grow, by the warmer perfect vaporous, spirituous, and (as I may say) alimentative or living blood: that on the contrary, the blood

Whoever admired Harvey formerly, will in future venerate his memory beyond any other man in the profession. If I had not been supported in my pursuits and experiments by a number of his opinions corresponding with mine, I should be held up to the world as a man guided by a fanciful imagination: but having ever disregarded all the various artifices used by particular individuals, I shall state a variety of facts, with that confidence, which integrity and good intentions

in its passage through the different parts of the body, is chilled, coagulated, and as it were enfeebled, or made vapid, whence it returns to it's principle, namely the heart, as to the source, and inmost focus of the body, in order to recover it's perfection. Thereby the natural potent fervid heat, as in the treasure of life, it again becomes liquid, fraught with spirits, and as I may say, with balsam, is again distributed from thence, and all these things depend on the motion and beating of the heart.

'Thus the heart, the principle of life and sun of the microscosm, man (as proportionably the sun deserves to be called the heart of the world) by the power of which the blood is impelled, moved, perfected, vegetated, and rescued from corruption, and becoming clotted; and that familiar inmate or good genius the foundation of life, and author of all things, performs it's office throughout the whole body by nourishing, cherishing with warmth, and vegetating it, or making it grow *.'

* This discovery of the circulation, and consequent opinions of Dr. Harvey, so enraged the medical men of that period, that he was under the necessity of leaving London, and living on his estate in the country.

have a right to claim from a liberal public: knowing, that this new discovery, when judiciously applied in combination with medical aid, must be extremely useful to mankind, by lessening human miseries, and restoring health and vigour to many valuable individuals, where the usual mode of practice had heretofore failed. Thus, having fulfilled my duty as a professional man, I shall rest satisfied, let the event be as it may in respect to myself.

I. *The Case of Mrs. Forder's Daughter, late Rocking Woman to Her Royal Highness the Princess Charlotte of Wales, at Carlton House.*

This child, from it's birth, was delicate and weak. She was early placed out at nurse, under the care of a Mrs. Johnson at Pimlico; and had good health, until she was two months old, when a complaint in her bowels, to which children are liable, came on. A medical gentleman in the neighbourhood was called in, and the usual remedies given; but the complaint continued for near a fortnight, with little or no amendment. On some sudden increase of illness, another gentleman was consulted; who, seeing the disease rapidly advance, after a week's attendance, thought there was no hope of the child's recovery.

The anxious mother had the child brought to Carlton-house; and, under the influence of *some*

high authority, a medical gentleman of the household saw it: but the violence of the disease both of the stomach and bowels, together with a constant vomiting, for near a week, had not only reduced it's strength and pulse, but so directly precluded all useful nourishment or remedies, that it was supposed she must die in a few hours, or at least in the course of the night. Contrary to all expectation, however, some slight remains of life were visible the next morning.

The circumstances of the child's danger, and the entire relinquishment of all medical aid, being communicated to Mrs. *Hayman*, then residing at Carlton-house, she, to quiet the feelings of the distressed mother, happily suggested to her a hope in the trial of vital air. This thought was brought to Mrs. *Hayman's* mind, from her having lately seen some curious cases and experiments at my house in Great Russel-street: whence she was induced, to press the mother, to try it's effects on the child. The nurse resisted this proposal, deeming it altogether impossible that any thing could save the child's life. The mother and nurse, however, accompanied by Mrs. *Hayman*, brought the child to Great Russel-street, and thus had ocular evidence, how far vital air possesses the power of restoring, as well as supporting life. The state of the child certainly was not mended by the motion of the carriage; for never did a child more resemble a corpse, from the deadly paleness of it's

countenance, it's white lips, it's sunk and closed eyes, and cold extremities, while the pulse was too feeble to be distinguished. I conceived this was the ultimate stage of some mortal disease in the viscera, that had thus gradually destroyed the living principle; but no harm could arise from an experiment, as I had invented an apparatus of great accuracy, that could mechanically force into the lungs of children as much air, as might serve useful purposes. Immediately I prepared a portion containing two parts in twenty of the purest vital air. A proper quantity of this was forced into the lungs; and by the time the whole was expended, to the great surprise I must confess of the whole party, we saw the red colour restored to the child's lips, and to the extremities of the fingers and toes; suddenly too the eyes opened, affording pleasure which can be more readily felt than expressed. The pulse soon became active; warmth was diffused over the whole surface of the body: and in a few minutes the general action of the muscles began to show strength. After a second, but milder quantity was completely finished, the child was so much alive, as to smile at it's mother's impassioned attention.

This singularly happy recovery demanded secondary consideration. The long continued vomiting, and the weak state of the bowels connected with it, required immediate attention. Accordingly I ordered the child small doses of rhubarb

and magnesia, twice a day, in peppermint water; and twenty drops of a weak solution of vegetable alkali, each time it was fed by the spoon. The next morning, July the 20th, 1798, I found that the vomiting had never returned; and that the child had slept well in the night, accompanied with a moderately soft skin. By a repetition of the above plan, as agreeing with the stomach, to promote *digestion*, with milder doses of *vital air* to support the *living principle*, administered by the *lungs*, I had the satisfaction, to see the child daily advance in strength; and after thirteen or fourteen farther applications of this new remedy, all local irritation of the stomach and bowels ceased; so that in three weeks time my attention was no longer necessary.

Observations on the preceding Case.

To every man of real science, liberality, and feeling, in the profession, this case will afford singular satisfaction. It opens a new scene to observation and reflection; which, if pursued in all it's extent, with moderate, candid, and judicious experiments, will bring us to a point, where medicine has long been deficient. In all stages of low nervous fever this remedy cannot fail of being infinitely useful. Having always endeavoured, in my professional experience, to extend my views from one given practical point to another

next in analogy, I cannot forego mentioning here, that, from the very decisive and immediate recovery of this child, I was led to recollect, what my former very extensive practice in midwifery had taught me, that many children, from various obvious causes, are still-born: and hence I naturally considered, how applicable and compendious this operation with vital air would be in such cases, and far more philosophical and rational than any other means heretofore attempted. Although many children, from mechanical injuries, cannot be supposed capable of being brought to life; yet, if five out of twenty can, by these means, be recovered, the discovery of vital air thus applied, must prove gratifying to the feelings of mothers. I flatter myself, however, that a much greater number, when it is used by enlightened practitioners, will be restored. I will farther add, it's use may be above all other means applicable in cases of people suffocated by deleterious vapours, in mines, in wells, or in the holds of ships, and in the recovery of drowned people. A description and plate of the apparatus will be given in the second number.

In a practical point of view this case, among many others, has been a guide to me in a great variety of instances. In the first place it proves, that very many children, and even grown people, as will be hereafter shown (see Case Mrs. Holehouse, No. XI.), are reduced to a dying

state by diseased irritation only; and the number of both, that thus die, is incalculable. It is true, when the constitution is impaired by any considerable disease, or greatly altered structure, or organic defect in any of the principal viscera, perhaps it may be hereafter found, that the use of vital air is as ineffectual to produce a cure, as any other remedy. At all events, whoever is led, to try the use of vital air in such diseases, should be well aware, how far he ought to go, and never to give it but with a very cautious hand. Indeed it should be used only as a mild alterative, combined with proper remedies to support the constitution, and palliate urgent symptoms. In such cases I have very often omitted it's use altogether, as it's tendency to excite arterial action is very frequently considerable *; for every scientific practitioner will be convinced, how ineffectual all human means must be, in extensive diseases of the lungs, the liver, and other viscera †, especially when combined with loss of substance from suppuration, or any material alteration of the natural structure. But when the constitution is

* I was consulted in such a case by the late honourable Mr. P. Curzon, and the honourable Mr. Justice Buller, also a lady in consultation with Mr. Heaviside, and several ladies of rank at the west end of the town, where I avoided giving vital air for the above reasons.

† See Morgagni's Dissections, and Dr. Baillie's Morbid Anatomy.

sinking under simple irritation, debility, or in the last stage of low nervous fever; or when only common diseases of the extremities, as disorders of the joints, or scrofulous affections, are bringing on hectic diarrhœa, and night sweats, in the greatest degree, I must here observe, with great confidence, no human contrivance, or discovery, ever equalled the power of vital air, to arrest the progress of the complaint, and, with a proper assistance from medicine, ultimately to restore the balance of life and health. Harvey says, page 57, by this treasure of life (meaning vital air imbibed into the lungs, to carry on the circulation) the parts are nourished, cherished with warmth, and made to grow, by the warmer perfect vaporous, spirituous, and (as he calls it) alimentative or living blood. That on the contrary, the blood in it's passage through the body, (as in the state of this child) was chilled, coagulated, and as it were enfeebled, or made vapid, but when again enlivened by the natural potent and fervid heat as the treasure of life, it again became liquid, and fraught with spirits, &c. It is singular, that the above case should correspond, in so many essential points, with this truly great man's theory.

Since chemistry has unravelled this intricate subject, we know, that, by the union of the vital air with the blood in the lungs, a chemical decomposition takes place, and the latent heat of this air is transmitted in free and active caloric

into the circulation, to support the due temperature of the body. But with this internal energy we may also calculate a great degree of recruit given to a weak habit, from the consequent vascular distention, and great support to the constitution, under the heavy load or barometrical pressure of our foggy, damp, cold, heavy atmosphere. This will be particularly proved, by showing the use of vital air in the cure of weakly, ricketty, distorted, and scrofulous children.

II. *Case of Hydrocephalus, in the Child of William Bennet, late of Berner's Mews, now No. 26, Devonshire-place Mews.*

This was a strong, healthy child, till six months old, when he was seized with the small-pox in the natural way. The epilectic fit, common to young children previous to the eruptive fever, lasted three quarters of an hour, accompanied with strong convulsive struggles, and much seeming pain and uneasiness in the head. The morning after this fit, the small-pox appeared. With common nursing, during the several stages of the disease, the mother, to a certain degree, recovered the child; but as it often happens, that, without proper medical aid, the constitution is much impaired, so it was in this child; for, when the eruption was gone, the habit was very much exhausted, a great heaviness affected it, and there was a considerable

inflammation in the white part of the eye, where a pustule had been.

The child was taken in this state to the Small-pox Hospital. Mr. Wachsel, the attendant apothecary, very judiciously ordered leeches to be applied to the temples, and several doses of physick, which soon recovered the eye. Shortly afterwards, however, the child began to appear more dull and heavy; his head gradually enlarged; the sutures, which had been united except the two fontanels, were beginning to lose their bony union; and his lower extremities were so unable to support his body, that every attempt to move him gave him great pain.

He was now taken a second time to the hospital. Mr. W. immediately discovered, that the enlargement of the head proceeded from water lodged within it, and apprised the child's mother of it's fatal consequences. He notwithstanding advised more doses of physick, and some tonic remedy. The opening medicines gave him relief for a few days; but, after that, symptoms of oppression returned with great violence, when the same remedies were repeated, but with no good effect. The head being now wonderfully increased in size in consequence of the weight and pressure of the water on the brain, the paralysis of all the extremities was complete.

The child was brought to me in May, 1796, then seventeen months old. On examining it's

head, I found the sagittal suture, commencing from the nasal process, or bones of the nose, and extending through the os frontis, or frontal bone, open to the full extent of half an inch. The other sutures, connecting the several bones of the head, were in the same proportion open, and expanded from their natural bony union into a wide membranous one, under which water was felt to fluctuate very readily. On any kind of pressure a convulsive motion of the body followed. His pulse was weak, and beat near a hundred in a minute; and all his lower extremities were perfectly flabby, and motionless.

This deplorable case, on being presented to my view, appeared to me one of the most incurable diseases, to which the human frame could be subject; and from it's extent far more threatening, than any I had ever met with during my practice. The child's total incapacity to inhale, even if vital air could act as a remedy, was the first difficulty I had to encounter. I therefore contrived to apply a tube to the body of my apparatus, closed the child's nostrils with my finger and thumb, made it cry, and, as often as it took a deep inspiration, forced the vital air from the apparatus into the lungs. This method succeeded completely; for warmth in the extremities was immediately felt, with a firmer pulse, and soft skin. The succeeding night he slept with much more composure, than he had done for many months; and his

mother observed, that he made an unusual quantity of water.

From continuing the same dose of two parts of pure vital air to twenty of common air daily, in the course of a week he was evidently stronger, more lively, and his bowels, which from the general paralytic torpor had been disposed to great costiveness, were become quite regular. As the action of the air by this time had produced a white tongue, I ordered a dose of rhubarb and sal polychrest, to clear the bowels gradually, by repeating it at short intervals. This soon cleared the tongue; the child ate a great deal heartier, and improved very much in appearance; the membranes soon became flaccid; and, as the water gradually lessened, new *ossific* matter gradually closed the suture in the frontal bone. In a month the whole of the sutures, except the two fontanels, were again united by a firm bony union. The head being reduced nearly to it's natural size, on the cause of it's enlargement being gradually removed, the palsy of the lower extremities recovered. Tonic remedies were now ordered, so that by the middle of October he could stand, and walk alone; and to so great a degree did the vital air renovate this poor little being, that he cut eight new teeth. This farther effort of nature appeared to be the only reason, why he did not recover the entire use of the lower extremities sooner. Since his recovery, this child has had his

thigh fractured: but his constitution has surmounted this accident, though he is rendered somewhat lame, by the injured limb being shorter than the other *.

Observations on the preceding Case.

VITAL air thus mechanically applied with the happiest effects, in the last stage of this fatal disease, a disease too becoming more prevalent among children, with the phenomena of it's thus imparting life to the blood, and exciting strong action in the heart and arteries, cannot fail to claim much attention, and give confidence in future practice. In the next place it promoted an increase of the secretions, by the skin, kidneys, and bowels. To these effects succeeded the restoration of natural sleep; the subsequent absorption of the water covering the brain, the renovation of the ossific process in uniting the various sutures of the skull, and lastly the removal of all the paralytic affections of the arms, legs, and bowels. These facts must give greater insight into the laws of the human economy, than could have been imagined.

Many of these curious circumstances may perhaps admit of some farther explanation on chemical principles. In the first place, that matter

* See Mr. Wachsel's certificate at the end.

of nourishment, denominated hydrogen by modern chemists, which, after solution, or digestion in the stomach, is absorbed by the lacteals from the bowels, and conveyed by the thoracic duct to the left subclavian vein, and thus into the circulation, by the vena cava superior into the right auricle of the heart, exists in a weakly combined state in the blood, ready to unite with the vital air, which the lungs are constantly receiving in respiration. This nourishing hydrogenous principle seemed in this child's habit to be in great excess*. The chemical union of the oxygen, or vital air, with this hydrogenous principle, and perhaps with other substances in the blood, as carbone, &c. immediately let loose their latent caloric, and imparted a higher degree of temperature to the cold, weak, exhausted body, alike subdued in strength by the defect of mental or nervous energy, and by the weakened action of the heart and arteries. While the oxygen, or the base of vital air, by it's union with the hydrogen; imparted this benefical warmth to the body, at the same time it formed water†. *This*, passing off by the secretions of the kidneys, and skin, removed a cause of irritation, that existed in the constitution, and produced quiet sleep. Thus by a mild repetition of this air, keeping up the action of strength, and supplying the conso-

* This will be farther considered in cases of erysipelas, ulcers, mortifications, &c.

† Eighty five parts oxygen, and fifteen hydrogen gas, divested of caloric, form water.

lidating principle to the habit, the absorbent vessels gradually took up the superabundant fluid on the brain. The arteries, too, were enabled to convey all the necessary materials for the secretion and deposition of bony matter *, until the head was reduced nearly to its natural state, and freedom of motion was restored to all the paralytic limbs.

Considering this case in a practical view, it instructs us to imitate the laws of nature, by a mild, regular, and due supply of this principle of strength; aiming, at the same time, to support an equable degree of temperature in the body, and to keep up, by proper medicines, the important functions of the stomach and bowels; so that all the combined powers of mind, air, food, and medicine, may be made to act upon the various organs of the body, for the support of life, and promotion of health, according to the general laws ordained by the Creator.

This curious subject cannot fail of interesting mankind, in proportion as the administration of vital air serves not only to restore and support life, but recover children from the two deplorable diseases already mentioned, as well as from many

* This well known natural process of the combined action of the absorbents connected with deposition of bony matter is well illustrated by the late ingenious Mr. John Hunter, and will be exemplified largely in many other cases where vital air has been used as a remedy.

others, which will be laid before the public in the following cases.

III. *The Case of Charles Wayte Dare, Son of Mr. Dare, Dowgate Hill.*

This young man had always appeared strong and healthy, until eleven years of age. At that period, being very abruptly informed, that his father's house was on fire, the shock affected him so much, as to throw him into an epileptic fit. From this time the paroxysms failed not to return every three or four weeks; and though, during the course of some years, the number of his fits did not much increase, his bodily strength and mental faculties were considerably impaired. Several medical men were consulted on the first attack, but the remedies prescribed by them gave little or no relief. On his becoming deaf in one ear, and his eye-sight failing him, whatever he learned at the Blue-coat-school was forgotten on the return of another fit. His parents, therefore, thought it adviseable, to take him home. At length having received some benefit from medical aid, his father placed him on trial at Mr. Davison's, in Sise-lane; but a fright soon bringing back all his former disorders, he was obliged to return again to his family. His fits were now exceedingly violent, and their frequency increased to eighteen or twenty in

twenty-four hours. In consequence of this he became more deaf than ever, his vision weaker, and his intellects so materially injured, that it was impossible to leave him alone, for fear he should either fall into the fire, or meet with some other calamitous accident. In this truly deplorable state he was put under my care, early in March 1796. The morning previous to my seeing him, his fits had been so particularly violent, as to exhaust him greatly, and his pulse beat above one hundred in a minute. It was not without infinite difficulty, that I could either persuade him, or make him comprehend in what manner, to inhale vital air from my apparatus: and the general torpor of his mind, extreme debility of body, and deafness, gave me but faint hopes of his recovery. However, after he had inhaled a moderate dose of vital air, an unusual warmth diffused itself over his whole frame, accompanied with a considerable degree of perspiration. He afterwards passed the whole day, and the following night, without any return of fits; a circumstance which had not happened for several months. The next morning he was tolerably cheerful; his hearing and vision less defective; and his pulse more firm, beating ten strokes less in a minute than the preceding day. On having again recourse to the vital air, it revived him as before, and the second day passed without a fit: but he found a disposition to fullness in his head, and such a tendency to

falling down during that day, that it would have taken place, had not his own exertions prevented it. The third morning, before he came to my house, he was attacked with a very slight fit. Finding in him this tendency to local fullness in the head, I ordered cupping, and an opening medicine. By paying due attention to the fullness in the head, and keeping the bowels properly open, the pulse became regular; while the active effects of the vital air so invigorated his constitution, that he not only lost his fits, but in six weeks gradually regained his vision and hearing, and was able to walk six or seven miles a day, without fatigue, or any inconvenience whatever. Some sultry weather coming on in the month of May, he became nervous; had the head ach, and some slight degree of fever, after a fatiguing walk to Hampstead; and for the second time only experienced a trifling relapse. I now directed him to be bled with leeches on the temples, and to take the usual dose of opening medicine: after which, as soon as the fever had subsided, he was to have recourse to the bark and vital air, at different intervals, until the middle of July. He then became perfectly well in health, strength, and spirits; and in December, 1797, his father engaged him as clerk to Messrs. Hopkins and Lincoln, in Barbican, where he now resides; and not having had any return whatever of his former complaints, he is fully enabled to keep such accounts, as require a mind

perfectly free from every degree of oppression or irritation.

Observations on the preceding Case.

However the general appearance of this young man may have been as to strength, some peculiarity of habit, as irritability of stomach and bowels, most likely had existed, and was a predisposing cause of the complaint. Be this as it may, any sudden surprise or misfortune will almost always produce some determination of blood to the head, more or less violent, in the strongest frame. In this case, as in many others, it laid the foundation of very serious mischief. In length of time it exhausted the nervous energy; and the powers of life, depending on an equable circulation, were reduced to extreme debility. Under these circumstances, no remedy, one short instance excepted, arrested the progress of the disease, still less gave hopes of a recovery. The success in this case was beyond my expectation: for I was apprehensive, that the several organs of sense, as the eyes and ears, were become paralytic from some organic defect in the brain, owing to the long continuance, violence, and frequency of the attacks. Contrary to my conjecture, however, the patient was relieved much in the same manner as the subject of the preceding case; and, as the same consequences followed, nearly the same reasoning applies to both; viz. some accumulation

in the system being removed by the chemical union of vital air in the blood, the secretions by the skin and kidneys, being promoted, and the energy and strength of the nerves being restored, then tonic remedies recovered the chylopoietic viscera to their due functions.

I cannot avoid particularly observing, that this lessening of the determination of blood to the head is a fact of great importance to all nervous people. The following is a letter from his father.

" TO MR. HILL.

" SIR,

" I CAN with pleasure inform you, that my " son, Charles Wayte Dare, has, by the blessing " of God, and your kind attention to him, with " help of your vital air, received a very great " cure from his fits, deafness, and nervous com- " plaints, which had long affected him; and they " increased on him so fast, that, when he applied " to you, he had from sixteen to twenty a day. " He could not be left at any time, even a quarter " of an hour in a day. He has not had a fit, I " think, these eighteen months, or near two years.

" I am, Sir,

" Your obliged humble servant,

" CHARLES DARE.

" Dowgate Hill,
" July 18, 1798."

A second case of this disease I have by me, with the daily memorandums of its progress, and of the benefit received, regularly detailed by the patient, with a subsequent letter confirming his recovery. By the imprudence either of himself, or his friends, however, in doing what I desired should not be done, he has brought on a relapse, and the general conduct of the parties has rendered them beneath my notice.

IV. *The Case of John Rogers's Son, of Weymouth Mews.*

This boy from infancy was strong and healthy, but at seven years old he fell out of a hay loft when at play, very much cut and bruised his head, and by the accident lost a considerable quantity of blood. Before his recovery from the weak state, to which he was reduced, he was attacked by the small-pox in the natural way. It proved to be the confluent sort, and the eruption was very full. Soon after the eruption had come to the height, whether from previous constitutional debility, or want of judicious and proper management, the pustules on a sudden struck in, and a total palsy of the lower extremities ensued, accompanied with great difficulty of evacuating either his water or fæces. After lingering a long time, he recovered from the small-pox, but was

still confined to his bed for three months in a miserable paralytic state.

During the course of five years subsequent to this, he so far recovered the use of his legs, as to be able by degrees to crawl about; but not without infinite difficulty, dragging his feet after him, and on moving onwards he frequently fell down by the exertion. The decrepitude from the spine to the lower extremities, and torpor of the bowels and bladder, with cold feet, corresponded with his weak state: for even at this time he had no evacuation, either of water or fæces, oftener than once in twenty or thirty hours.

In this situation, in January, 1797, he was brought to me. I immediately administered vital air; hoping, that it's power on the human frame would remove the paralytic torpor, by exciting arterial action, giving life to the blood, and infusing warmth into the cold extremities. By inhaling vital air, and taking an opening medicine as occasion required, in ten days the powers of the rectum and bladder were completely restored to their natural functions, and in six weeks the boy was so perfectly recovered, as to be able to walk and run without any difficulty whatever.

V. *Case of Ann Bridges, near the Adam and Eve, Tottenham-Court Road.*

This young woman was of a gross, full habit of body, and not quite regular, either in her

bowels, or in the catamenia. In her seventeenth year, she was suddenly seized with a kind of epileptic fit, succeeded by long continued convulsive struggles; and a violent fever ensued, which, after lasting several weeks, terminated in a complete palsy on the left side.

No medical aid at home relieving her, she was advised to become an in-patient at Bartholomew's hospital, where she continued for six months, taking such remedies, as were supposed likely to effect a cure.

On her leaving the hospital, without having found the least benefit, she applied in succession to different dispensaries. The medicines prescribed there, however, did not prove more serviceable; and after lingering thus for four years, she was deemed incurable.

Accidentally hearing of the case, I desired to see her, and recommended a trial of vital air. In June, 1795, when I first administered it to her in the proportion of one part to twenty of common air, she was not able to move, even with the assistance of crutches, from one part of the house to the other, without infinite difficulty. Yet such were the effects of this powerful remedy, that by degrees she felt an unusual warmth diffuse itself over her whole frame, her animation and spirits considerably increased, she slept much better, gradually grew stronger, and, only taking occasionally an opening medicine to regulate the bow-

els, with the bark to strengthen the stomach and assist digestion. she was able, in a few weeks, to walk to my house without the aid of her mother, or the use either of crutches or a stick. She is now so intirely recovered, and in every respect strong, as to be able to fulfil all the usual occupations in her line of life.

VI. *Case of Sarah Banister, Bedford-street, Covent-garden.*

March, 1800.

Dear Sir.

Whenever cultivation of science promotes the advantage of others, it's laudable utility claims the tribute of public acknowledgement; I feel therefore happy, to send you the following case, which demonstrates the benefit derived from your combined preparations of air.

Sarah Banister, aged twenty-four years, was received into Covent-garden work-house, in July, 1798, in a most deplorable and hopeless situation. According to her own expression, 'being sent in to die:' as the medical gentlemen of the institution, under which she was delivered, said, that she could not live a week. After a very difficult and dangerous child-birth, she was reduced by fever to extreme debility; accompanied with total incapacity to retain her urine, which con-

stantly dribbled away, as it was secreted into the bladder. From contemplation of the case, there was reason to suppose, that the sphincter had entirely lost it's tone from paralytic affection. By much care and attention the fever, with all it's concomitant symptoms, was subdued; the pains in her head, complaints in her stomach, and disordered state of the bowels, were entirely removed; her appetite returned, she gained strength daily, and visibly grew better: but the incontinence of urine was just the same. It is needless to say, how miserable the unfortunate patient must be in such a situation. Every kind of prescription, which seemed likely to revive the tonic powers of the organ, sheath it against irritating acrimony, or lull sensation to the common action of the salts of the urine, was tried in vain: and it appeared, from the very great excoriation of the parts adjacent, that a particular sharpness prevailed in the fluids. Topical applications relieved the skin, and by co-operating with internal assistance, this sharpness was subdued: but cold water, though applied repeatedly to the pubes, &c. never communicated the least retentive faculty to the bladder, or animated the sphincter into action. At last, every other symptom being removed, I thought she was very fortunate, to have preserved life, on which she must congratulate herself, and bear this inconvenience with patient resolution during the remainder of her days.

Relative conversation led me to describe her unhappy state to you. Hope of giving assistance and commiseration joined to desire she would attend you at home. Medicine was suspended. In a fortnight or three weeks after the oxygenated or combined preparation of air had been administered, she grew better: her nights were more comfortable, and she became sensible of a want to evacuate the bladder; as she could retain the urine to a quarter of a pint, and in two or three months double this portion. Those medicines, which before had been of no avail, however calculated to recover tone and excite action, were now resorted to with good effects. She sustained scarcely any inconvenience during the day time, being for the most part sensible when nature wanted relief. Her looks, health, and spirits were wonderfully improved: insomuch, that life passed tolerably on without much inconvenience, and induced her to think of going to service again. Her exertions, however, brought back debility, and her disease returned, affecting likewise the state of her bowels. Your kind administration of the combined oxygenated air was again serviceable; and co-operating prescriptions restored those advantages, which she experienced before she went out, and which rest and quiet have since much improved.

From the occurrences in this case it is certain, that, without the help of the combined oxygenated

air, she would not have derived any benefit from medicine; that to it's manifestly essential aid she was indebted for her amendment in the first instance; and that it communicated such tone to the relaxed organs, as enabled them afterwards to become sensible of medical influence. Your kind and humane desire to assist the unfortunate patient, when I mentioned her case, as well as the confirmation of your hope to render service by administering the oxygenated air, are fully entitled to the most cordial thanks of,

Dear Sir,

Your's most sincerely,

RICHARD GRIFFITH.

MR. HILL,
Great Russel-street, Bloomsbury.

VII. *Case of Mr. Dod, Silversmith, Aldersgate-Street.*

THIS gentleman's constitution was not originally strong, and from much confinement to business and writing, he felt great nervous debility. In April, 1793, these symptoms increased, attended with weakness of the eyes, defective vision, and paralytic affection in both eyelids, but more especially that of the right eye, which became so painful towards evening, as to preclude his at-

tending to any business whatever. Medical assistance being called in, the usual routine of tonic remedies was for a length of time pursued. On their failing, an oculist in the city was consulted. He tried various recipes for some weeks, and advised the use of spectacles, which assisted the sight in a small degree; but the patient's other complaints were not in the least degree lessened. After having had recourse to the advice of two other medical men, who procured him no relief, it was recommended to him, to take a journey to Scarborough. On remaining in the country five weeks, Mr. Dod experienced some benefit, as to his general strength, and found rather less weakness in his eye and eye-lids: but soon after his return to town he relapsed, though in a less degree than before his journey. On taking bark for a considerable time, so much benefit accrued, as to check the complaint's making farther progress, until the spring of 1796; when the former debility of constitution, nervous symptoms, weakness of vision, and paralysis of the right eye-lid, increased in so alarming a manner, that in April the above statement was laid before me. Not seeing any appearance of diseased structure in the eyes, I recommended vital air, as a general renovator of the constitution. By a daily use of it for three weeks, the sight was so far improved, that spectacles were left off, the paralysis of the eye-lids was nearly removed, and the necessary

business of writing in the evening pursued without any inconvenience. By continuing the vital air at intervals for one or two months, and latterly joining bark and steel with it, this gentleman's health was completely re-established; and from the above period to this time, August, 1800, he has not experienced the slightest relapse.

VIII. *Case of a nervous Affection in the Face, Jaw, and Teeth.*

Miss ———, naturally of a good constitution, was attacked, in 1784, with a sudden cold, supposed to have been caught by getting wet in the feet at a particular period. A swelling and unusual degree of pain affecting her face, jaw, and teeth, on the right side, the usual remedies for such complaints were prescribed. These not succeeding, several teeth were extracted; but the violent pain and irritation continuing whole days and nights, with scarcely any cessation, Dr. Warren was called in. He ordered various antispasmodics, opium, and volatile tincture of bark, in such forms and combinations as seemed proper.

After six weeks extreme pain, the disease gradually lessened, and in the summer months was wholly removed: but every autumn, or winter, it regularly returned; and though it's violence was in some degree abated by large doses of

laudanum, cicuta, and bark, yet it continued for six or eight months,

In 1791, the constitution being much reduced in strength from pain, want of natural sleep, and the constant use of opium, the disease returned with double violence. Dr. Warren, not knowing what farther to do in respect to medicine, recommended change of climate. Spa was fixed upon on account of it's chalybeate springs, and the purity of the air; but even there, during a few weeks in July, no benefit was found. On Miss ———'s returning to England as much indisposed as ever, Dr. W. advised Lisbon. That mild climate produced the happy effect of enabling her to pass a whole year with little or no return of her complaint. But in the autumn of 1792, she caught an epidemic fever; and, although it was attended with no great danger, it's debilitating effects produced a return of the pain.

Dr. Withering, of celebrated memory, being then at Lisbon, was consulted, and advised a course of mercury, sufficient to produce an active salivation. During the early use of mercury, the symptoms of pain and irritation were lessened: but on it's farther progress, the constitution, and especially the nervous system, becoming irritable and weak, the disease was more aggravated, than had ever been experienced in that mild climate.

This induced Miss ——— to return home. Dr. Warren prescribed the former remedies of

bark, &c. which procured temporary relief: but in the autumn of 1796, the pain raged to such a height, that two hundred drops of laudanum did not procure an hour's sleep for many weeks. In May, 1797, a consultation was had between Dr. Warren, two other physicians, and a surgeon. These gentlemen were inclined to suppose, that matter in the antrum, or cavity in the upper jaw, was the cause of such acute sufferings; and that a surgical operation was necessary. However all thoughts of undergoing the operation was delayed until the twenty-second of that month, when I was called in for the purpose of performing it. But six hundred drops of laudanum in divided doses not procuring remission of pain, or sleep, during three days and nights previous to my being consulted, I declined doing it at so short a notice: believing too, that the complaint was a nervous irritation, rather than a diseased antrum. Accordingly I proposed a regular course of vital air; and with difficulty I prevailed on it's being tried for a few days. Much to my satisfaction, and infinitely to my patient's relief and comfort, she soon felt ease; and without any opiate enjoyed sound sleep for seven hours the succeeding night. Though the pain returned at different intervals the next day, the paroxysms were less frequent, and the pulse softer, and ten beats less in a minute than before. On again taking the vital air, genial warmth was produced, with relief from

pain, and nearly as much sleep as the preceding night. By pursuing this mild method, agreeably to my general practice, the disease gradually subsided; and in three weeks the constitution regained, by the farther aid of bark, it's natural tone of health; so that, except occasional spasms on taking cold, or fever, of which the constitution in spring and autumn is very susceptible, the complaint has not returned, to be in the same degree confirmed; for, as proper remedies are directed to remove the cold, or the fever, and it's attendant bilious accumulation, the symptoms soon subside, and the constitution regains it's usual balance of health. Two winters have elapsed without any return, to prevent her going to parties and other public places, which has seldom before occurred since the first attack of the complaint.

IX. *Case of Miss* ——

This young lady, of a delicate habit, was seized in October, 1797, to all appearance with a common cold, which continued, without any unusual symptoms or violence, above a week; when, on a sudden, the cough came on with a degree of spasmodic action, that changed the sound of coughing into a kind of barking. At this very time, it is to be observed, a number of young ladies at the same school were attacked with this nervous, barking cough. These fits increased in

violence and duration, till they continued eight or ten minutes at a time, and gradually exhausted her strength. Tonic and antispasmodic remedies were prescribed, and a general plan of the tonic and antispasmodic treatment was continued, till December, when the symptoms had nearly disappeared, although the constitution was still very much reduced in strength.

In January, 1798, some sudden surprise reproduced this same nervous cough, so that by the ninth of the month from sixteen to eighteen fits occurred in the twenty-four hours. On the thirteenth I was consulted. Finding the young lady's pulse very weak and quick, and her general appearance very delicate, I recommended the trial of vital air. At the same time I had the curiosity to measure her height, which was four feet seven inches. In pursuing this tonic remedy in varied doses, according to the strength, I gradually found the cough less violent in degree, and reduced in a few days from sixteen or eighteen fits to four in the twenty-four hours. At this time the bowels seeming to require a little attention, I ordered a dose or two of mild physick, and then the bark, to combine in restoring the general strength of the stomach and bowels. By the twenty-seventh of January, I had the satisfaction, to find her cough nearly gone; and she was grown in height full half an inch. On this day she took her leave; and on the sixteenth of February she

did me the favor to call, and thank me for her recovery, her cough being gone, and her strength confirmed; she having in the mean time continued the use of the bark, at my desire, to prevent a relapse. Judging from her appearance, and as her age was about thirteen, that she must have grown since, as during the time she daily inhaled the vital air, I again measured her; but to my great surprise, no advance whatever had been made in her growth.

This strong fact confirms all my experiments, as to the constant effect of pure air in promoting a general action of strength, in the system of the human body, at all periods during the growth of young people, where there is no local disease in any of the organs necessary to life. This addition of vigour to young people corresponds with a well known law in the animal economy, that at the period of accumulated strength, or puberty, nature, as it is called, cures many diseases of youth, which had previously resisted all medical treatment. The truth is, many diseases at this period disappear of their own accord, though medicine had afforded no benefit. The reason of this, as it now appears to me, is, the general diffusion of vital energy; the oxygenous principle from the lungs being expended in the circulation. While this principle is requisite, not only for the mental and animal functions, but for the evolution of all the various parts and organs of the body, certain

diseases will often prevail: but, when the several parts and organs are fully developed, this proportion of energy being no longer consumed, the surplus reverts on the constitution, sensations of weakness gradually lessen, and by the accumulation of power diseased actions are cured. This being the natural course of things, nature is said, with propriety, to cure the disease.

When this vital, or oxygenous principle, from a narrow capacity of chest, or diseased ulceration of the lungs, or other viscera, is less extensively diffused through the constitution than is necessary, under the circumstances above stated, diseases, instead of being cured, continue, and the patient lingers on a miserable existence, or soon dies. Facts of this kind are innumerable. But we have this consolation, in the present enlightened state of medical science, that vital air, cautiously and judiciously, used, in conjunction with the aid of medicines, will administer relief to the miseries of thousands. In diseases of this nature, it is wise, to adopt the present fashion of trying the sea air; which no doubt has it's good effects, upon these rational grounds. But how can the mass of the various classes of society find means, to go, and drink in by the lungs this purer sea air? And in truth, after all, I have found it infinitely less effectual in curing many diseases, than vital air, mechanically used, and combined with appropriate remedies corresponding to it's action

on the animal economy. From facts we shall derive solid grounds, on which to proceed with *accuracy* in the administration of vital air for the cure of various diseases; and success will stamp a due character of *science* on the practice.

X. *The Case of Mrs. Priest, Strand.*

THIS patient was always of a delicate constitution. In August, 1795, in the twenty-seventh year of her age, being on a visit in the hundreds of Essex, she was seized with an ague and fever. The symptoms at first were so violent, as to endanger her life. The periods of intermission were so short, that no remedy relieved her. From peculiarity of habit the disease resisted bark, mercury, aromatics, change of air, and every thing that was directed by different physicians, for nearly three years, until it became a constant tertian ague; the violence of which so much exhausted her strength, that she was seldom more than a few hours from the bed, at any one interval. Connected with this state of reduced strength, a very great enlargement of the spleen, or ague cake, as it is called in Kent and Essex, occupied the whole of the abdomen on the left side, causing a great pressure on the vessels there situate, so as to produce œdematous swelling of the lower extremities. Early in the disease a jaundice had accompanied the complaint, and the countenance

of Mrs. P., at the time I was consulted, which was in May, 1798, indicated an obstruction of the liver also. This was rendered more probable, from jaundice having continued one whole year during her long illness.

Under such cirsumstances, I scarcely knew what to advise. After some hesitation, however, I recommended a trial of vital air, hoping thereby to give such energy to the constitution, as to enable tonic remedies to cure the disease. After ten days, giving the air diluted in the proportion of one quart to forty of common air, I had the satisfaction to observe, that the paroxysms of ague and fever were much less violent, and of shorter duration; while the usual effects of warmth, perspiration, and sleep followed the inhalation of the air. By gradually increasing the proportion of vital air in each dose, the leading symptoms of the disease were arrested in their progress. I then directed a mild use of steel, and in a fortnight the ague entirely disappeared. By continuing this alterative plan of vital air, occasionally keeping the bowels open, and persevering in the use of steel as a tonic, she was perfectly recovered in the space of a month. At this period her complexion became healthy, her appetite good, and sleep natural: it appeared to me, likewise, that the enlargement of the spleen was considerably lessened. This, however, I did not consider of much consequence; but on calling to see her at

distant periods of time, I now know, that not the least remains of this enlargement is to be discovered, and she has enjoyed better health than she ever experienced since she was married, which is above sixteen years ago.

It is curious to remark, that some specific bad quality of the air in Essex produced this disease, and that it's opposite, pure air, removed it. Marsh miasma may be nothing but some modification of inflammable air, extensively diffused in countries like Kent and Essex, where ague prevails.

XI. *Case of Mrs. Holehouse, Union-street, Southwark.*

In July, 1796, Mrs. Holehouse, naturally of a delicate constitution, was obliged to discontinue suckling her child, then three months old, being seized with nervous irritation, loss of appetite, want of sleep, and a general diminution of strength. Dr. ——, who had attended her during her lying in, was consulted on the occasion. After a few months, her complaints resisting every remedy that was tried, change of air was recommended, and a journey into Staffordshire taken. As no benefit accrued from this journey, some mild remedies were prescribed, to remove urgent symptoms, and restore her strength, which was extremely reduced by periodical discharges. These remedies proving

as unsuccessful as the former, the succeeding summer Dr. —— was again consulted. The diseased irritability on the one hand, and the weak state of the constitution on the other, at length so affected the bowels, as to occasion a continual laxity in them; which common remedies, taken for many weeks, were unable to diminish.

At this period Mrs. Holehouse was reduced to a mere skeleton in appearance; her spirits were exceedingly bad, and in such a state of weakness, that she was scarcely able to walk up and down stairs; her appetite was so nearly gone, that she could not eat even the quantity of half an egg a day; and the catamenia had ceased ever since September, 1798. Night sweats coming on, and her bowels being in such a state, that she had either very violent discharges, or no evacuation at all, the medical gentleman, who attended her, declared to her family, that medicine could be of no avail, but her dissolution must soon take place.

In this deplorable situation, the latter end of March, 1799, she consulted me. After trying a mild use of vital air, adapted to her weak and emaciated state, I had the satisfaction to find, that it produced a general warmth over the whole system, a proper degree of perspiration, and refreshing sleep. By daily inhaling vital air, and taking an opening medicine, her appetite in a few weeks began to return, her digestion evidently improved, and from that period the stamina of her

constitution were so renovated, that by the middle of May she was capable of using moderate exercise, either by walking, or in a carriage; and by the latter end of June she was so well recovered, as to require little or no medical assistance. I then recommended farther change of air, and have recently had the satisfaction of knowing, that Mrs. Holehouse is at present in a very good state of health, her strength of body and powers of mind being completely restored.

On any inquiry being made, relating to the recovery of this lady, a satisfactory statement will be given, either by her aunt, Mrs. Neale, of St. St. Paul's Church-yard, or Mr. Holehouse, No. 6, Union-street, in the Borough.

XII. *A Case of deformed Chest, with scrofulous glandular Swellings, in the Son of George Ford, Book-binder, No. 47, St. Martin's-le-grand.*

From infancy this child was weakly, and his very narrow and ill-formed chest characterized a constitution disposed to debility and disease. At five years old, without any apparent cause, many scrofulous swellings appeared on his shoulders, arms, and left leg, accompanied by an unusual degree of weakness of body, and torpor of mind. Various remedies prescribed by medical men pro-

ducing no benefit whatever, in April, 1796, he was so much reduced in health and strength, as to render it necessary for him to be brought to my house in a person's arms.

At this period the lower part of his chest formed a sharp angle, and immediately under the extremity of the sternum the ensiform cartilage bent inwards so considerably, as, with the sinking in of the muscles of the abdomen, to produce a complete hollowness in that part. Two of the scrofulous tumours in the leg discharged a very ill-conditioned fluid; there was one open on the shoulder, and several others tended to suppurate; his pulse beat nearly one hundred in a minute; his countenance was cadaverous; his lips were very thick; the pupils of his eyes were dilated; his extremities were cold; and every indication of scrofula and debility was present. By daily attention to this boy, and giving him vital air, one part in twenty, which, from the narrow capacity of his chest, was extremely difficult to accomplish in sufficient quantity, a general diffusion of warmth over his frame succeeded on each inhalation, and by degrees the constitution was evidently much invigorated. The glandular swellings, which had been discharging for several months, gradually healed, as well as others that had suppurated; and the child's strength was so much restored, that in six weeks he could walk to my house, and back again, with great ease. His chest became more

enlarged, especially at the angle, and the hollow before mentioned much shallower; his torpor of mind was completely removed; and he grew at the rate of one inch a month. Every unfavourable symptom being subdued within the space of a quarter of a year, I considered his daily attendance as unnecessary, but gave him vital air three times a week, for two months longer. The powers of his constitution were then so entirely restored, that few boys appeared equally strong and healthy, when wholly confined to London air.

Observations on the preceding Case.

As this was the first case, that led me to judge experimentally of the growth of bones, and the lessening of distortion, as well as of the cure of scrofula, I was particularly cautious, not to administer any medicine, before I had tried the effects of the vital air alone. This operated in it's usual way, invigorating the system, imparting colour to the blood, promoting muscular strength, and so far altering the habit, as to give the indolent tumours a healing tendency. When I had seen these effects, I ordered an occasional dose of opening medicine, to remove any white appearance on the tongue, and to keep the bowels open. In six weeks the boy's strength was such, that he could walk near three miles, without the least fatigue;

the narrowness of his chest was expanded mechanically by the exertion of drawing in air out of my apparatus; and the important organ of renovation was rendered capable of supplying the blood and constitution with it's necessary living principle. Thus the whole vital economy was changed from a state of weakness to a state of strength, and the constitution by degrees so renovated, as to promote his growth, and afford such nervous energy, as is usual in healthy children. The summer heat, with the vital air, having produced a tendency to perspiration, I ordered him bark. As this conduced still farther to strengthen the stomach, and promote digestion, I found him in three months free from every diseased tumour, excepting one; which suppurated in the spring of 1797, and was accompanied with some slight return of debility. On having recourse to the former plan, however, for a few weeks, all symptoms of debility were completely subdued, the tumour healed, and from that time he has ever appeared a stout, healthy boy. The application to the sores was bruised sorrel, which was not applied, till a change had taken place in the secretion, that I might have clear evidence of the offensive fœtor of the former state of the sores being removed by the use of the vital air; a fact of great moment in all cases of surgery, where the peculiar state of the habit is the cause of the ulcerated process, as in old ulcers, &c.

XIII. *The Case of Thomas Mazey, of Great Ormond-yard.*

In the early infancy of this boy, the process of teething, as usual with children, was attended with much fever; and from a combination of subsequent causes, he was incapable of walking, or even moving without crutches, when eleven years and a half old. The latter end of July, 1796, his height was found to be no more than three feet, two inches, and five eighths; his weight, forty-eight pounds, fourteen ounces. The long continued weakness had not only thus overcome the natural powers of growth, but at this period he had only two of the adult teeth, and four remaining only of the first, or milk teeth, and these very much decayed. A view of Plate I. will show the extremely irregular formation of every part of his body; but his cadaverous countenance, apparent torpor of mind, and peculiar, rough skin, all combined to produce such a diseased appearance, as no drawing can imitate, or language describe.

In July, 1796, as an experiment, I put him under a daily alterative course of diluted *vital air only*, for six weeks. In the space of ten days, he was evidently stronger; in a fortnight he grew in height, and could move with more ease; and thus he continued gradually improving to the

Pl. I.

J. S. 1796

Pl. II.

middle of September, when, to my very great satisfaction, he had grown one inch and half higher, and was one pound four ounces heavier. In correspondence with these effects he had cut two new teeth, and many more were forming in his gums; his strength too was so much renovated, that he could walk across a room, without either his crutches, or a stick. Immediately upon observing these very curious and interesting facts, I had the drawing taken, Plate I, marking the above particulars, with others seen in the drawing, as data for future experiments and observations. Plate II is the same boy, farther improved by the continued use of *vital air* up to the period of September 1797, taken by the same person; and as a comparison may be easily made, I shall simply state the following particulars.

	Weight.		Height.		External Deformity.	Internal Deformity.
	lb.	oz.	F.	Inch.	Inch.	Inch.
September, 1796, see Plate I.	50	2	3	4½	4¼	5
Ditto. 1797, see Plate II.	61	6	4	0	3	3

Here appears a farther change in one year of seven inches $\frac{7}{8}$ in height, and eleven pounds four ounces in weight. On examination he had also cut eight new teeth.

The external deformity, or deviation from the perpendicular line *f* at *g*, was at this time reduced one inch and a quarter; The internal deviation from the perpendicular *a b*, at *k*, was reduced two

inches; the projecting exostosis in each leg was nearly absorbed; and every other deformity was proportionally lessened, the angular roughness of the bones gradually becoming rounded, the skin soft and smooth, and it's colour more healthy and ruddy. The boy is still improving, and become quite strong and active to every common purpose of life.

XIV. *Case of Mr. Halentz's Son, of Southampton-street, Covent-garden.*

From infancy this child was very delicate and weak, and always appeared incapable of keeping himself up in an erect and firm position, like a strong healthy child. At the age of two years and a half a deformity of the upper part of the spine of the back being discovered, and increasing very rapidly, recourse was had to the best medical and surgical advice, and tonic remedies and cold bathing were prescribed. No diminution of distortion and weakness being found from these remedies, sea air and sea bathing were tried for many months: but the deformity extending it's progress, in the spring, 1798, the boy, who was then seven years of age, was so reduced in strength, as to be incapable of walking, and was carried about in arms like an infant. At this period a constant difficulty of breathing was apparent, from the

narrowness of his chest, accompanied with irritation, restlessness, and hectic fever; his appetite was nearly gone; and his sleep was so much interrupted by shortness of breathing, that it was expected, not only by his parents, but by the medical gentleman who had last attended him, that his dissolution would shortly take place.

Some judgment may be formed of his situation, danger and deformity, from a view of him in the plate. In July, 1798, the superior part of the deformed spine projected upwards, in the shape of a sugar-loaf: the four spinous or posteriour processes of the upper joints of the spine, which in a natural state incline downwards, in this case were inverted, and projected perpendicularly upwards; so that the whole of the cervical vertebræ, or bones forming the neck, were sunk out of sight, and could not even be felt when the head was in an erect posture; as the neck, from it's curvature, was unable to support the head, the hinder part of which, in consequence, rested on the spinous process of the first joint of the back. This resting place behind, and the chest, upon which the chin reposed, were the only supports of the poor sufferer's head. His chest corresponded with the back in deformity; the upper part forming nearly an acute angle, and the lower part being drawn inwards, and contracted by the irregular growth of the spine; so that the chest was narrowed in

an extraordinary degree, scarcely allowing room for a few cubic inches of common air to enter the lungs in breathing. Thus, when we consider the necessity of the circulation of the blood through the lungs, and of the motion of the heart to carry on the circulation to the extremities, it must be obvious that the common functions of the body could not but be very much interrupted; and that there could not be any powers in such a weak frame, to support life long: in fact, he was a little being, rather vegetating than living; his weight at this time being only twenty-seven pounds and a half, and his height but three feet, although he was seven years old. In this case it appeared incontrovertibly, that vital air, acting with common air, has power to enlarge the capacity of the chest; to give more of the living principle to the blood; and, when judiciously supplied to the constitution, to add vigour to the motion of the heart: for in the course of six weeks this boy, by daily inhaling diluted vital air, has had the natural functions of the body restored; his sleep is refreshing; his digestion good; his spirits extremely enlivened; and the deformity in every part to such a degree lessened, that he is capable of walking without assistance; at the same time he weighs one pound more, and is become one inch taller.

This child is gradually getting stronger, his distortion is diminishing, and he continues with

the appearance of much more health, and a general improvement in all the parts of the spine and breast.

Explanation of Plate III.

Fig. 1. *a.* The original situation of the spinous process of the upper dorsal vertebræ, on the superior bone of which the head rested, when thrown backwards.

b. The resting place of the chin, when the head was thrown forward, owing to the cervical vertebræ being sunk below the dorsal, which see, *a.*

Fig. 2. *c.* The neck, which was entirely concealed by the spine in it's former state, but now much nearer the natural position than it was in October, when the drawing Fig. 1, was taken.

Fig. 3. *d, e.* The upper and lower portion of the chest, originally forming an acute angle, now spread out near half an inch in width, and lengthened full half an inch from *d* to *e.*

N. B. The above measures of the chest were taken by the child's mother, whose well known abilities as a fashionable mantuamaker will give some conviction of their accuracy.

XV. *Case of Richard Gorges, Esq.*

This gentleman, naturally of a strong constitution, was attacked in May, 1787, being then in the thirtieth year of his age, with a slight rheumatic fever, which proved of short duration. In the latter end of June following, a severe relapse took place. The late Dr. Warren was called in, and attended him three months, during which time the complaint was general and violent. The joints of both knees were very much inflamed, painful, and swelled; more especially the right knee, which had some months before been bruised by a gate falling on it in hunting. After being reduced very low from pain, fever, and long confinement, Mr. G. went to Buxton, by Dr. Warren's desire. The Buxton waters assisted in removing the stiffness of the joints; yet they remained weak till October, when their strength was nearly restored. The right knee, however, was weaker than the other; and after any fatigue, either of walking or hunting, it constantly became painful, swelled, and required several days confinement before it recovered. Occasional attacks of this kind weakened the joint, and by degrees a fluctuation of fluid within the capsular ligament became perceptible.

In 1789 Mr. John Hunter was consulted. He recommended gentle emetics, and sea bathing;

but no material improvement, or inconvenience, followed.

In the year 1790, another surgeon was consulted; and a strengthening plaster was applied for above a year and a half. This merely supported the stre gth of the joint, and, while the constitution remained sound, the complaint put on no serious appearance.

In the spring of 1794, much pain returned, with increase of the swelling, and Mr. Cruickshank was consulted. He applied the same plaster, which did not remove the pain, although it seemed to support the joint. He also punctured the capsular ligament with a lancet, and a small quantity of a yellow glareous fluid followed; but the opening soon healed, and produced neither good nor harm. The same plaster was renewed, and by September the pain lessened.

No unusual inconvenience occurred till July, 1795; when this knee was again violently affected with pain and swelling, accompanied with a great degree of fever. These symptoms continued for several weeks, during which time the joint was much more enlarged, the pains at night were very excruciating, and the constitution began to be seriously affected. Quieting remedies, with rest, were continued till September; when a surgeon, long eminent for his cures in this particular disease, was called in. The violence of the pain, the thickening of the integuments, the enlargement

and alteration in structure of the patella, and the other bones of the joint, together with their grating feel on pressure, made him entertain very serious apprehensions for the event. After having tried various means with little success till October, two vesicatories were applied, one on each side of the joint, and constant quiet and confinement to the room were strictly enjoined. When the blisters were healed, two caustics were applied, to keep up as large a discharge as was thought convenient: and occasionally, when the pain and unfavourable symptoms were most violent, another blistering plaster was applied on the centre of the joint. This plan, with slight modifications, was pursued till October, 1796, which made the confinement in all fourteen months; and during twelve of these a constant discharge was kept up by caustics and vesicatories.

A particular friend of Mr. G.'s, happening to read Dr. Beddoes's Treatise on Factitious Airs, saw the case of Lieutenant Field, of the East Devon militia, whose diseased knee I had cured by administering to him *vital air;* and recommended to Mr. G., to write to Mr. Bastard, colonel of the East Devon militia, for a confirmation of that fact. Mr. B. answered, that Lieutenant Field, from suffering pain and lameness, was now become active, and equal in every respect to the duty of his situation as an officer in the regiment. Whether the disease were a white

swelling, or not, he could not ascertain; but he referred him to me, whom he had long known, and whose abilities and judgment he could strongly recommend.

This very flattering introduction induced Mr. G., on the eleventh of October, 1796, to consult me. The extremely bad appearance not only of the diseased joint, but of the sores on it; the habit of body, and general debility of the constitution; with a weak, quick pulse, and cadaverous countenance; afforded a very unfavourable prognostic. Previous to Mr. G.'s coming to me, his friend had requested the surgeon, under whose care he was, to inform him with candour, what he thought of the state of Mr. G.'s knee, and what prospect there was of a cure. To this the surgeon replied, that the case was nearly hopeless, short of amputation: however, he should pursue every mild remedy for sometime longer, and if all failed, an amputation of the limb must take place.

Mr. G. having put himself under my care, a mild use of vital air, inhaled according to my usual alterative method, produced such effects within the space of a few weeks, as afforded evident indications, that the disease would be removed. On his first visit, he could scarcely go up stairs, even with the help of crutches; but, in the course of six weeks, he was able, with the assistance of a stick only, to walk a mile out, and

a mile home, without pain, stiffness, or fatigue, except that now and then a temporary pain occurred. This progressive amendment continued, so that in six months Mr. G. found his constitution greatly restored, and the disease of the knee so far removed, that he could walk ten or twelve miles at a time, without the least inconvenience. This gentleman has now continued to enjoy uninterrupted health for more than three years.

Two diseases of the knee joint, equally dangerous in their tendency, have been since cured under my management: in several instances of diseased bone, where hectic, diarrhœa, and night sweats, had reduced the constitution to the utmost degree of weakness and danger, the use of vital air, in a mode properly suited to the state of debility, has removed all the unfavourable symptoms, and enabled medicines to act with effect, by duly supporting the living principle: and, in two cases of scrofula, this remedy, combined with medicine, has produced exfoliation of the diseased bones, and saved not only the limbs, but in all probability the lives of the patients.

"Dear Sir,

"I have looked through the particulars of your statement of my case, and am happy to confirm every circumstance relating to the recovery of my knee, and renovation of my constitution. I can

farther say, that, ever since the recovery of my knee, I have been more robust in my general health, than I have for several years experienced. As a proof of it, I walked the day before yesterday fourteen miles, without the least fatigue or inconvenience. If this will add to your credit in the use of vital air, by removing the public prejudice, which I am sorry to find is prevalent, I beg you will make what use of this letter you please. I remain, with great truth,

Yours sincerely,

RICHARD GORGES."

London,
May 2, 1800.

XVI. *Case of John Jackson, Footman to Mr. Gosling, of Lincoln's inn-fields.*

THIS young man was always of a slender, weak habit of body. In March, 1799, in the thirty-third year of his age, he was attacked by a fever, accompanied with pains in his bones, loss of strength, and great depression of spirits. In this situation, he was attended by a medical gentleman, under whose care the disease was gradually removed; yet his constitution did not regain it's usual strength.

In May following he was again seized with a fever, accompanied with a fixed and violent deep

seated pain in the lower part of the left thigh bone, extending down to the knee joint. By degrees a general thickening of the periosteum of the thigh bone, with outward swelling of all the extensor muscles covering it, and of the tendons connected with the joint, rendered it incapable of motion. Various remedies were employed, to remove these symptoms, for several weeks together; but these having no material effect, Sir ——— was consulted. He ordered a large blistering plaster to be applied to the part affected, and the discharge to be kept up for a month. Some little benefit appearing to be produced by it, the same plan was continued, until sixteen vesicatories had been applied.

In November following I was consulted. At this time the patient was reduced to a state of great debility, with extremely quick and feeble pulse, hectic heats, and night sweats; the joint was very stiff; the thigh bone, periosteum, muscles, and tendons, were greatly thickened, and very hard, rendering any motion extremely difficult. Considering the state of the young man, I had recourse to a mild alterative plan of vital air, to give energy to the weak constitution, and thus diminish the irritation and hectic fever; in which I completely succeeded. As soon as these effects were clearly perceived, I ordered the occasional use of a mild tonic, in addition to the use of the vital air, to assist the powers of digestion, and recruit

the body. By these means the enlargement of the bone, and thickening of the periosteum, were gradually absorbed; the muscles grew soft; perspiration took place through the skin; the limb became flexible, and strong, and capable of such motion, as to allow him to walk to my house in Great Russel-street, without any assistance whatever.

In two months time the disease of the extremity was so far removed, that I had no occasion to consider this complaint as deserving any attention. But there appeared strong reasons to suspect an obstruction in the liver; and as I had succeeded so well in restoring the constitution, and removing the local affection before mentioned, I conceived, that the continuance of the vital air would assist a mild course of mercury, to remove this disease also. By long perseverance it has so far answered the end, that he is now in better health, and enjoys greater strength, than he had known for more than a year and half; indeed he is nearly as strong, as he was previous to his being attacked with the disease.

XVII. *The Case of E. Jarvis, Housemaid to Sir R. Neave.*

In May, 1797, this young woman was attacked with a violent inflammatory eruption in the left arm, extending from the elbow down to the extremities of the fingers. The eruption then proceeded to

the right arm, and afterwards broke out on the face and neck; extreme pain in one hand, and a discharge in the other, soon occasioned loss of sleep and fever; and medical assistance was called in. After a long continuance of cooling remedies, the discharge, irritation, and fever, gradually lessened; and on removing into the country during the summer months the disease seemed to be completely cured But in the latter end of September it returned again, with unusual violence, in both arms; the surface being perfectly raw, and discharging a watery fluid; and on any remission of the inflammation and discharge, the arms became covered with scales resembling those of a fish. As none of the former remedies now lessened this very painful disease, in January, 1798, I was consulted.

On examining the case, I observed the whole of the cellular membrane covering the fascia and muscles of the arm was much thickened, and contractions strongly and partially taking place upon the fascia, so as to render the straightening of the arms extremely difficult. The young woman's pulse was weak and quick, and her strength, from constant irritation and want of sleep, evidently much reduced. I gave her a mild dose of vital air, which produced it's usual effect of recruiting the spirits, diffusing general warmth through the constitution, and occasioning sound sleep the following night. My patient continuing to inhale

vital air, in five or six days her arms not only became cool, but the skin wore a more natural appearance, than had been seen for many months. During this favourable change in the arms, an unusual quantity of water was made, and the diseased accumulation removed. On a sudden, however, in consequence of catching cold, she was seized with a shivering fit, succeeded by fever, which brought back all the former symptoms; but a few doses of opening medicine abated the violence of the attack; and the use of vital air being resumed, this soon diminished the discharge, and by the middle of February the arms were quite healed. Two months afterwards another relapse taking place, the usual remedies to remove urgent symptoms were administered, and she soon grew better. Considering this fever as somewhat of the intermitting kind, as soon as it was practicable I ordered bark and guaiacum, and by a continuation of the vital air my patient was at length perfectly cured, becoming strong in her constitution, so as to be able to return to all her usual occupations.

In May, 1799, the young woman was sent to me by Sir R. and Lady Neave, that I might have the satisfaction of knowing her cure was complete.

XVIII. *The Case of John Jones, late Shopman to Mr. Gibson, Linen-Draper, St. Martin's-lane.*

This young man was always of a very delicate habit, and several of his family have died consumptive in the early part of life. As he was once exercising himself in jumping, he injured the knee joint, and excessive pain, swelling, and fever ensued. The enlargement extended itself most on the outer part of the joint; but by rest, and proper care, the pain and fever gradually disappeared. The hard tumour however continued, with a constant weakness; and after any exertion the pain returned, with stiffness of the joint, and often much swelling. This, in the course of some years, produced a confirmed disease. A projecting enlargement of the head of the fibula, with thickening of the integuments, at length began to threaten serious consequences, as the least pressure gave pain, and the constitution, by the middle of February, 1799, was irritated by fever, violent pain in the night, want of sleep, and occasional night sweats.

At this period I was consulted, and thought it proper, to put him under a mild course of vital air. After pursuing this a few days, the pain lessened, sound sleep ensued, and the night sweats entirely disappeared. By continuing the above plan, with occasional doses of physic, and latterly

some mild tonic, in six weeks the thickening lessened, the bony exostosis was absorbed, and at the time this note was written, January, 1800, he was free from pain, the swelling of the integuments and the bony enlargement were entirely gone, and the general health and strength of his constitution were better than they had been for many years past.

XIX. *The Case of Hannah Howard, Servant to Mrs. Mourgue, of Putney.*

In February, 1799, this young woman, who is of a delicate constitution, and in the twenty-second year of her age, was suddenly seized, in the night, with a violent attack of a very painful spasm, or cramp, in her stomach. Early in the morning the family surgeon was sent for, and ordered proper remedies to lessen the violence of the pain, with a large blister over the region of the stomach. This treatment produced a remission of the pain during the next night, but for the two succeeding days it was unremittingly violent. On a sudden the spasm left the stomach, and attacked, with equal violence, the hip and knee joints. This, as a security from immediate danger, was a fortunate occurrence; but it occasioned her to be confined to her bed, and disabled her from walking for above six weeks. At the expiration of this time, by using proper remedies, she regained the use of the hip joint; but the knee continued in a kind of

spasmodic state of stiffness, so as to be fixed in a straight line, and incapable of the least flexion whatever. All that the skill of the surgeon who attended her could suggest in no instance lessened it, and after seventeen months continuance it was considered as an incurable stiff joint.

On the 29th of July, 1800, she came under my care, as an object of charitable attention. I found the capsular ligament as if bound tight upon the knee joint, both the flexor and extensor tendons in a similar state, and the patella rigidly fixed in it's situation. From these appearances, and the long confinement of the patient, I despaired of removing the complaint; imagining only, that, if vital air as usual could be made to produce perspiration in the part affected, and at the same time give strength to the constitution, some motion might gradually be restored to the joint by mechanical means, which at least was worth a trial. Accordingly I administered a mild dose, which produced warmth in the usual manner, and the knee joint perspired considerably in the course of the next night. The following morning I repeated the same dose, and immediately after examined the knee, when to my surprise I found the sweat trickling down it, in a manner I had never before seen. At the same time I perceived a relaxation of the ligaments and tendons, and with some difficulty I could move the patella. By taking hold of the extremity of the foot, as the utmost

length of the lever from the joint, I found, after some exertion, a small degree of motion was produced. I now saw, that more benefit would be obtained from the use of vital air, than I had before conjectured, which encouraged me to pursue daily the same method. By these means, supporting constantly the proper temperature of the joint, and employing very slight exertions in bending the knee, my patient was perfectly able to return home in nine days; being completely recovered, and having had no return whatever of her complaint; so that she can now walk with as much strength as at any former period of her life.

General Observations.

In the prefatory part of this work, the grounds, on which I imagined the use of vital air would be found beneficial in practice were briefly mentioned: referring to the well known laws of the animal economy, the vascularity of the parts, combined with weak action of the heart and arteries, and nervous debility. The cases adduced have sufficiently proved, by the evidence of unequivocal facts, that vital air, when judiciously used, operates powerfully on the most solid parts of the body, through the lungs, heart, and arteries: and they have also shewn, that the brain, and whole nervous system, overwhelmed by oppression from water, have been equally acted upon,

through the same source, until the mind, or nervous power, that spiritual something superadded to matter, has been enabled, through the medium of the nerves in this and various instances, to resume it's influence of involuntary and voluntary energy over the whole body, wherever in a healthy state it's natural influence extends *.

These facts have been purposely delayed, to give more time for experience; and I am now perfecly satisfied, from combining anatomical facts with many years extensive practice, that in diseases of weakness, scrofula, and nervous debility, from infancy up to puberty, as an aid to medicine, the use of vital air will be found of the greatest possible service. From puberty up to forty-five, or fifty, is the next period of life, in which, by the use of vital air, combined with proper medicines co-operating in the same general intention, many individuals have been more completely renovated, than had ever been accomplished, since medicine had any pretensions to be termed a science. That it's beneficial influence extends to much later periods of life, I could prove by many strong facts: but when I consider, in how great a proportion the arteries are lessened, while at the same time their coats are grown more rigid, and in what greater proportion the venous system is increased, with fulness of blood, combined with

* See Bennet's child's case.

oppression, relaxation, weakness of circulation, and nervous debility, I must seriously caution the practitioner against the imprudent use of vital air, in cases where the patient is of an advanced age. Any sudden or strong action of the heart and arteries, or direct combination of caloric, in such a constitution, late in life, may be productive of effects more active, than any prudent or judicious practitioner would willingly excite. At all events it should ever be preceded by a proper preparation of bleeding, physic, spare diet, and a due degree of exercise: with which precautions it may be used occasionally, and may be followed by the best effects; though never to the same extent as in young people. In these any occasional surplus of the vital principle, or warmth in the blood, is easily expended by growing, increased perspiration, or a secretion by the kidneys: and the white tongue, the indication of too strong action, is often with some difficulty produced; while in old people this whiteness of the tongue very soon appears, and the common resistance of the skin seldom allows the heat to pass off by it: more frequently indeed it seems to do so by the kidneys, but not in such a degree, as to be attended with the same happy, or permanent effects. No practice, that I have ever seen recorded, has been so generally effectual in paralytic affections of young people; but it has been much less successful in

those of the old: and to every medical man of science or experience, who considers this subject, with the facts discovered by dissections on the one hand, and the many melancholy cases existing on the other, which resist every remedy, I cannot but think my observations will appear conclusive.

All these various facts, candidly considered, demonstrate, that the organ of the lungs is not only the support, but the principal medium of renovation of life, health, and strength; and that all the secretions greatly depend on the due supply of vital air, or living principle, from this source. In the cases of Ford's child and Mr. Halentz's son, see Plate III. the very narrow capacity of the chest was accompanied with the weakest powers; and whatever tends to diminish this capacity, as diseases of the different viscera, interrupting the functions of breathing, in every such case the individual will suffer this weakness in nearly the same degree, unless to this small bronchial * sur-

* "The internal surface of the air-vessels of the lungs of man are said to be equal to the surface of the whole body, or about fifteen square feet, on this surface the blood is exposed to the influence of the respired air, through the medium of a thin moist pellicle. By this exposure to the air, it has it's colour changed from deep red to bright scarlet, and acquires something so necessary to the existence of life, that we can scarcely live a minute without this wonderful process." —Darwin's Phytologia, Sect. IV, 1, 2, page 41.

Fig. 1.
Fig. 2.
Fig. 3.
Pl. III.

face of the lungs, as in the cases alluded to, be applied a pure air, whence the blood may receive the living powers. By this the body is rendered more warm; and the blood being thus saturated, the heart acts with vigour, the arteries are enabled to extend themselves in length, and increase in diameter, acquiring greater power to secrete, deposite and build up bony, or whatever matter is necessary for the general structure; the corresponding assistance of the absorbents supplies the habit with nourishment, and takes away superfluous accumulation; at the same time, it seems as if the mind were the active superintendant of the whole, directing the perfection of the frame, and superadding to the whole that inexpressible animation, which, in a sensible human countenance, commands in some degree, the whole animal creation.

This general effect of improved health, renovation, and growth in young people, has been observed in more than a hundred cases; and many others of equal importance, perhaps more decisive in point of experience for the public benefit, are now under my care, and will be presented to the world in the second part of this work.

Explanation of Plates IV and V.

The fourth and fifth plates are to illustrate experiments, proving, that *vital air*, imparted to the

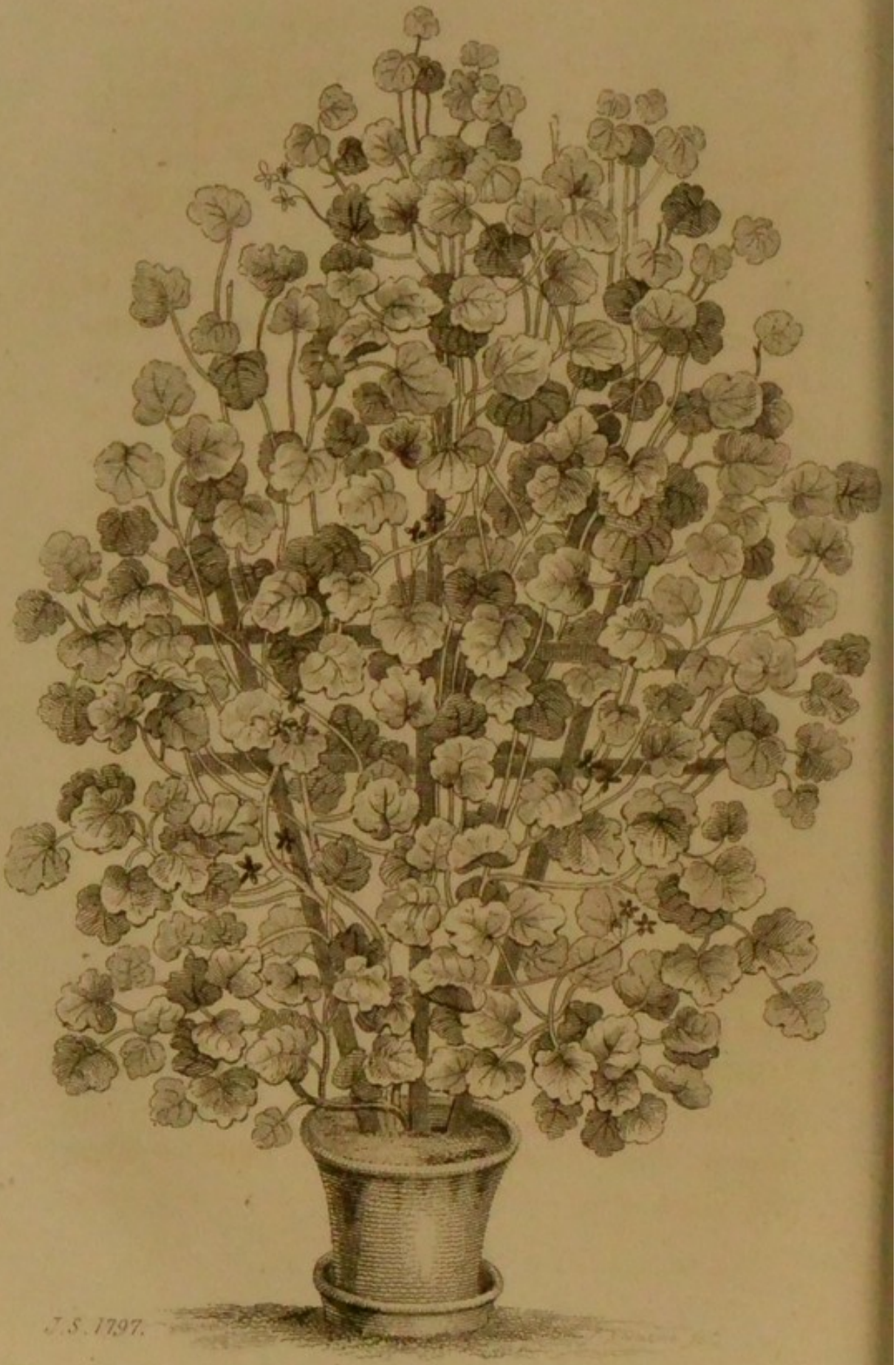
soil, and around the roots of plants, will give vigour to their powers of vegetation, far beyond what has heretofore been experienced.

Plate IV is a common Geranium, which was procured early in June, 1796. It was then not more than eighteen inches high at the utmost, with a moderate show of flowers on it's highest branches.

My house, in Great Russel-street, is situate near several large breweries, and this plant, as all others during eight successive years had done, soon drooped, and showed the badness of the air for vegetation, for by the middle of July it was become so weak, and disfigured by the great decay of it's leaves, as to be condemned for removal.

Having a strong persuasion, that *vital air*, in some way or other, gave life to plants, and supported them as well as animals, I first determined to make a trial on this plant by a particular contrivance, which I shall hereafter explain. In the course of a week I was much gratified, for my plant not only recovered it's vigour, but it began to grow in every branch, and from a sickly yellow it soon regained it's natural green. Three young bottom shoots in particular, of about twelve inches high, grew in six weeks to be the very highest part of the plant. See plate IV. Thus by the middle of September, my plant was full of vigour, producing at the same time a fine crop of flowers,

J.S. 1796.


J. S. 1797.

with some of the largest leaves I had ever before seen.

	Height.	
	Feet.	Inches.
September, 1796, see Plate IV.	2	9
Ditto. 1797, see Plate V.	5	10

Here are two appearances showing the vigour of a plant, which, under very unfavourable circumstances, by the use of *vital air* grew much stronger than usual under the best management, and in the most favourable situation.

In the first place, the earth, and pot in which this plant grew, weighed not more than five or six pounds; and it was placed nearly facing the east, in a room where a fire was never kept longer than six hours in a day. The frost, of course, would often penetrate to the plant; and that of Chrismas, 1796, was so severe, as to sink a thermometer immediately behind the plant several degrees below the freezing point. Much ice was found in the same room, and by a temporary removal into a warmer room, during this severe frost, it was with difficulty kept alive, but with the loss of the greater part of it's leaves.

In the mean time, by changing the pot, I again restored the plant to a great degree of beauty, by March, 1797, when the leaves and flowers were abundant.

This progressive improvement was again entirely destroyed a second time by a frost. Some time in April, the room smoking, my servant very incautiously opened the window, and left my plant exposed several hours to a severe frosty air: the flowers died, and the leaves were as much injured as before; but I found the living principle so invincible, on this, as on several other occasions, that the plant soon recovered it's former appearance; during this summer it bore three more crops of flowers; and a fifth was visible, when the drawing was taken, as appears in the plate, but less numerous than the others.

This plant, the pelargonium zonale of the Hortus Kewensis, the geranium zonale of Linnæus, has seldom or never been known to grow to any size in the confined parts of London, yet mine is now above twelve feet high, and in the fullest vigour.

To prove the power of oxygen or vital air, in promoting vegetation, I have been making experiments these five or six winters on the roots of Hyacinths, when placed on common flower glasses in New River water, by immersing an ounce vial filled with vital air, in the middle of the glass, with it's mouth downwards; and although an eminent nursery and seedsman in Fleet-street had twice purposely supplied me with various rare double sorts, which he assured me were seldom or never

known to blow in water alone, yet every experiment has completely succeeded, producing larger, more numerous, and more beautifully coloured flowers than usual, while the leaves have been often two or three times the size of those otherwise cultivated with the utmost care. During the progress of the vegetation thus produced, the vital air in each bottle has been seen gradually to be consumed, and by the time the flowers in each had blown, from half an ounce to six drams of vital air had been taken up, or absorbed by the water, and through this medium had given energy to the vegetable life of these several roots and flowers. I have been enabled also to render melons of a much higher flavour, than is common in our climate, and under other very unfavourable circumstances of management.

From these experiments I have no doubt, but that in hot-houses, and common gardening, oxygen air may be used, with a proper apparatus, to great advantage, not only to promote fructification, but very much to heighten the flavour of many fruits. I am persuaded, likewise, it will tend to diminish the ordinary consumption of fuel, by enabling plants to vegetate in full vigour in a more moderate temperature, than is commonly kept up in hot-houses.

This geranium has been uninterruptedly flourishing for eighteen years, in great vigour. And

to prove the importance and power of this experiment on vegetation, several of its flowers have matured seed, capable of producing new plants.

D. H.

APPENDIX.

I HAVE here stated four cases of disease, which from their extent in producing all the miserable features of hectic influence, and its consequent exhaustion of bodily strength, and nervous power, that to any but the wilfully blind, I should presume, must carry conviction of the power and efficacy of vital air. In the above cases the facts prove, that it can make the heart act with renewed powers, as the pulse from a weak, quickened action, is gradually brought to a slower strong one. Thus by a kind of chemical agency, it produces an animation and warmth in every part of the body; all the common vital functions are by degrees restored to a general and healthy standard. The blood is more florid, and with its life, the secretions, from extended diseased surfaces, either in the bones or soft parts, the former soon losing their fœtid, ichorous qualities, as the pus is changed to a mild and healing process, and the absorption, or deposition of bony matter, is a result seldom produced by any known remedies. I could adduce numberless cases in detail; and, if any thing, stronger in extent and danger, which have been recovered. I shall mention one or two in particular.

The case of a Miss Waring, niece to a late eminent surgeon at St. Thomas's Hospital, and partly from this circumstance her sufferings and long illness, of near three years, were known to half the Medical Men and

Surgeons in London, whom she had at various times consulted. Her case was a diseased knee-joint, with a preternatural enlargement, or kind of necrosis of the head of the tibia. The amputation of the limb was considered the only remedy to save her life, yet by this same mode of treatment she was recovered, has since married, and is at this time able to walk without any instrument, as Mr. Offley, her brother-in-law told me a few months since.

Another instance is the son of Admiral Sir Herbert Sawyer, a case no less dangerous, and more complicated, with extensive ulcerations in every direction through the knee-joint. I would refer to Mr. Cline in both these cases, as he attended each of them with me. Sir Herbert Sawyer's son was a case recommended by Col. Cooper, and the late Mr. Bastard. The humane and professional talents of Col. Cooper, and his anxious exertions to all his friends, are too well known to need any encomium on my part; I cannot but express a grateful sense of many instances of his kindness, zeal, and friendship.

No. I.

Sarah Parks, Daughter of John Parks, formerly Coachman to Sir Thomas Plummer.

This child at eight months old, was afflicted on the left cheek with a small tumour, which gradually enlarged, until it broke into a troublesome sore. Soon after another tumour appeared on the right cheek; this became no less distressing. No medical or surgical aid had any effect in either of these sores; but on the contrary,

the disease extended to the bones of the upper jaw, and by degrees affected the bones of the lower jaw in two distinct points, and from the delicate state of the child's habit, the ravages of the disease were at length extending to the bones of the ear, to the outer orbit of the right eye; and in all eight sores, connected with an affection of some bone of the head. The misery of this child was not limited here, but the body, the arms, the legs, the thighs, and knee-joint, in all amounting to twenty-five sores, more or less, with one in the head, deeply seated in the bones and lymphatics, rendered her an object of the greatest misery and horror during a period of two years and a half. Various medical men of character saw the child, and directed such medicines, and surgical treatment as the nature of the case seemed to require; and amongst these the child was for two seasons placed in the Hospital at Margate; in the first instance, after some months she was improved in her health, but far from being cured; in the second instance she was no way better, and on her return the child, now above three years old, was placed under my care. The hectic arising from so many irritating and exhausting sores, rendered this particular case, such as is seldom to be found in any part of London. Having no other view, but to try how far (in this miserable disease) the oxygen air might assist the debilitated constitution, I had recourse to the usual alterative mode, and by degrees the hectic pulse lessened, and by constant attention to the bowels, and ordering such tonic remedies as the state of the constitution seemed to require, in four months the sores gradually improved; she recovered her general health, the greater part of the sores healed, and, except from the delay which must be expected to separate the diseased bones, she was in six

months perfectly cured. A slight degree of fever and hectic irritation returned the following year, but in a few weeks, the same means of oxygen air and same remedies were used; she was again perfectly recovered, and has never had any return, she is now a strong healthy young woman, and has at different times been seen by several medical men and people of rank.

No. II.

No. 55, Crawford Street.

Sophia Porter, No. 16, Adam Street West, near Edgware Road.

This young woman was of a delicate constitution, when about twelve years old she was suddenly seized with a violent fever, accompanied with great pain in the right hip-joint, and became too ill to move, and was soon confined to her bed. No medical treatment removed the disease. After suffering eight months confinement, a considerable tumour gradually formed on the middle and outside of the thigh, deeply seated under the fascia, and another protruded itself in the groin. These swellings remained stationary for some time, until the limb lengthened, and the muscles from the thigh down to the foot, were completely absorbed, shewing an appearance of an extremely thin cadaverous extremity. In this situation she was brought to consult me, and finding the general strength extremely reduced, the pulse 140 beats in a minute, and all the appearance of sinking from disease and debility, I saw no resource but the oxygen gas. By the means of a small carriage she was brought daily to Russel Street. By this plan

she recovered from the hectic symptoms; natural warmth was soon diffused through the thigh and leg. The colour became more natural, the general strength improved, and by degrees there was a regular and gradual increase of the bulk and consequent motion of the limb, and a renewed power slightly to bear upon it, and by a due attention to the state of the bowels, and tonic remedies, in the course of a year the above tumours suppurated, and discharged the usual curdy kind of matter, and in a few months they both healed. The peculiar circumstances at her age seemed now to require attention, a plan of steel medicines were directed; and after a second year, by using these medicines alternately with oxygen gas, she recovered the use of the limb, and the constitution became regular. Some intervening irritations have occasionally happened, but for a long time she has been able to walk two or three miles without any inconvenience whatever, and now lives at 55, Crawford Street, Montague Square.

No. III.

Another case, with all the leading features of exhausted habit, from a disease in the lower jaw-bone, came under my care, in which neither medicine, nor diet, nor change of air, under the directions of several hospital surgeons, had produced the least effect. This was the state and situation of a son of Mr. Jordan, at that time a Medical man in the Borough. When all the remedies and surgical treatment, during a period of near three years, had no good effect, his father brought him to me. His pulse was 140 beats in a minute, the alternate perspirations at night, or diarrhœa, were gra-

dually reducing him to a state of extreme exhaustion, both of bodily strength and nervous power. The appearance of the disease on the angle of the jaw-bone, extending into the mouth, and with all the characteristic swelling, and redness of the whole face, arising from a large carious bone, made him a most distressing object, I only feared some visceral disease, which might be a reason for doubting the full and good effect of the use of the oxygen gas. However no time was to be lost, and I began its use as usual; the pulse in a few day was reduced forty beats in the minute, an occasional use of the chalk mixture lessened the disordered bowels in succession, the perspiration no longer weakened, the tumour became milder in its appearance, the discharge lessened, the fœtor much less offensive, and so rapidly did the absorbents act on the swelling of the soft parts, that in a few weeks a large caries, indeed the whole angle of the lower jaw became visible, and in a few days I was able to remove it, leaving a large opening into the mouth: by uniting tonics in succession with the oxygen air, this sore soon filled up and healed, and I have heard from the father many times since, no return nor any inconvenience has happened from that period. I have now by me the piece of carious bone which was removed.

No. IV.

The Case of Mary Berridge.

This young woman at twenty-three years of age, came to consult me in the beginning of June, 1802, with one of the most malignant ulcers in her leg, which offer to surgical observation. This ulcer had commenced, as

she told me, five years previously to my seeing her, and originated from a cold and severe fever, which was succeeded by a hard tumour in the calf of the leg, extending down the tendo achilles, until by degrees it surrounded all the inferior portion of the leg, accompanied with great inflammation, pain, and considerable contractions of the tendons of the leg and foot. For the first fifteen weeks she was confined to her bed; after suffering nearly a year and a half, she was recommended, by a Mr. Rudge of Elstree, in Hertfordshire, to the Middlesex Hospital, she was attended there four months, during which time she suffered another attack of fever and inflammation, more violent than at any former period, and was of course confined nearly the whole time to her bed. The ulcer became so seriously bad, that on a consultation it was recommended to amputate the leg: this she would not consent to have performed. In September, 1799, she left the hospital as incurable. Country air was recommended, and she went into Bedfordshire. Her health was here improved, and the leg less painful; after some time she returned to Elstree, where she had the occasional advice of a Surgeon of Stanmore; in the spring following she came again to London for advice, and soon after was attacked with much fever, and a violent pain affected the side, left breast, and arm. For this fever and painful symptoms she was bled largely, and had such remedies as soon lessened the violence of the fever and the painful symptoms, except those in her breast, which were considerable when I first saw her; but as she still continued to suffer with the ulcers and contractions of her leg, she became an out-patient at St. George's Hospital, and during her attendance was inoculated for the cow pox. After continuing an out-

patient for six months, and becoming too ill and lame to walk, she obtained a letter of admission into the Hospital; during three months, no advance to cure being observed, she was again recommended to undergo amputation; this however she again refused, and soon after left the Hospital. On leaving the Hospital she placed herself under the care of a Surgeon in Charter House Square, and during four months attendance no improvement was observed, at which time this gentleman died; and in succession she was seen by several eminent Surgeons in different parts of London, until the period she came under my care. At this time a thick, dense, and perfectly black substance surrounded the whole of the muscles of the leg, with intervening deep and painful ulcers, exuding a most offensive ichorous black discharge; the whole of the leg was much contracted, and very hard to the touch, from the foot to the knee. The breast was also very painful and hard, and the general health in every respect in a most exhausted hectic state; and she had little or no sleep but what was obtained by opiates. The natural state of the constitution was far from regular. From this malignant state of the sores, and the long continuance of the disease, with weakness and poverty combined, I had little expectation of a recovery. Under all these distressing circumstances I had recourse to the usual alterative method of giving the oxygen air, and regularly observed the progress of its influence; and in the course of a week I found the pulse more natural, the hectic symptoms much lessened, the sleep refreshing, and all the painful sensations in the leg very much lessened. The fœtor of the sores, and black discharge beginning to change to a more healthy pus, but the hard, black, and thick substance surround-

ing the leg, still the same; but the pain in the breast was lessened, the general swellings, in the other parts, were much softer; and it was her observation, that she passed a considerable quantity of water. In succession, almost daily improvement was observed in the constitution, with an increase of appetite; in about three weeks the actions of the living, or vital principle, enabled the parts to throw off, daily, several large, dense, black sloughs from the old ulcers, fresh granulations immediately followed; and at this time I directed some bark and gentle intervening remedies, to keep the bowels regular; and by these means she was in two months completely cured, and in better health than she ever remembered, and the breast was reduced to its natural and healthy state. Eight other cases of diseased and cancerous breast which have been cured will soon be published.

No. CCXX.

Copy of a Letter addressed to Joseph Sabine, Esq. Secretary to the Horticultural Society.

(Read June 1, 1819.*)*

113, *Great Russel Street.*

Sir,

Having exhibited to the Horticultural Society, on the 2d of April, 1811, as I think, clear proofs of the benefit which may be derived, to the growth and permanent vigour of various plants, including alike the beauty of flowers, and advantages to fruits, which the Committee did me the honour to publish in the fifth part, volume the first, p. 233, of their Transactions, I am again induced to present to this meeting another specimen, which, although it is apparently of less

importance than the former facts and experiments, yet as its nature and appearance are such as may awaken more extended views of this interesting subject, I shall proceed to state, that the present Orange tree, which is now shewn, was last year, to all appearance dead, and was removed into my garden in Russel-street, as no longer deserving regard, and had been exposed many weeks to all common observation lifeless. On examining it, out of respect to the donor, from whom I had received it, I determined to new pot it, and with some common earth from my garden, the plant was again placed in my drawing-room, in a southern aspect, in Russell Street.

I began in July to apply New River water, saturated with oxygen gas, to the soil and roots, and which was kept sparingly, but regularly supplied, for some time. In the course of a few weeks the good effects were clearly discovered; fresh shoots, progressively extended themselves, and during the autumn I was surprised to find them surrounding the old stump with considerable strength; the benefit thus shewn to have been derived from the oxygen gas, in renewing its vigour and restoring it, led me to a further attention. The mildness of the autumn and winter allowed the new branches somewhat to ripen, and the succeeding spring gave further evidence of increased vegetation. Under the present favourable appearance, I am induced to shew the effects to the Society; how far it may be considered as an object worthy of the consideration of the Committee, or the Members of this meeting, I shall leave to their decision. I shall, however, beg to add, that on a cursory consideration of the laws of vegetable life, and indeed the general support of the oxygen principle to all

animated nature, I feel there must be great scepticism not to allow this animating principle to be considered of the greatest importance to the best purposes of this most valuable and honourable Institution.

I presume further to state, that experimental Chemists have greatly enlarged the knowledge we now have, as to the nature and constituent principles of all vegetable matter; I hope I may be allowed, by way of adding some authority to my views, to make an extract from Mr. Brande's most valuable book, entitled a Manual of Chemistry, p. 350, he there states, the latest discoveries. By subjecting different vegetable substances to analysis, M. M. Gay Lussac and Thenard have arrived at the following results.

A. A vegetable substance is always acid, when the oxygen, which it contains, is to the hydrogen in proportion greater than is necessary to form water, or when there is an *excess of oxygen*.

B. A vegetable substance is resinous, oily, or alkoholic, where the oxygen is to the hydrogen in a less proportion than in water, or where there is *excess of hydrogen*.

C. A vegetable substance is neither acid nor resinous, but saccharine, mucilaginous, &c. where the oxygen and hydrogen are in the same relative proportions, as in water, or where there is *no excess of either*. To these results, which appear in most cases to be correct, there are some exceptions, which have been pointed out by M. Saussure (Thomson's Annals, vol. vi.) and by Mr. Daniel, (Journal of Science and the Arts, vol. vi. p. 326.)

From the above chemical analysis, and the known

varied nature of trees and plants, and their products, it may be supposed, that water saturated, either with oxygen or carbonic acid gas, (which has great power on plants) may not be found to be alike proper for every species of plants; but as the oxygen principle is the general support of vegetable life, and no doubt supports their healthy feature, I do conceive, that the varied character of the several products of trees and plants, thus assisted, will enable each species better to perform the common functions of their secreting organs, as ordained by an all-wise Providence; but a practical gardener must well know, that much may depend on the soil, the manure and situation, and these are again assisted by the sun's rays, and the general temperature, by which they are supported and matured.

I have the honour to remain,

Sir,

Your obedient humble servant,

DANIEL HILL, M.D.

Joseph Sabine, Esq.

N. B. The Society did the Author the honour to insert an abridged account of this communication, in the tenth Volume of the first of their Transactions, 1820. The Plant continues in full vigour at this time.

LETTER I.

From the Bishop of London, dated Fulham, December 4, 1800.

THE Bishop of London presents his compliments to Dr. Hill, and returns him many thanks for the present of his Book, which he has not had leisure to read through with that care and attention which the importance of the subject deserves; but from the transient view he has taken of it, it appears to contain some curious cases and extraordinary facts, which well deserve further consideration. In the mean while the Bishop is much gratified with any thing that reminds him of his late worthy friend Mr. Hill.

LETTER II.

From Sir Joseph Banks to Mr. Hill, dated Soho Square, Nov. 4, 1798.

SIR JOSEPH BANKS presents his compliments to Mr. Hill and returns him many thanks for his obliging present of Plates, representing the effect of Vital Air, with the explanation annexed. Sir Joseph would have thanked Mr. Hill sooner had not ill health deprived him of the means of carrying on his usual correspondence; Sir Joseph Banks, however, begs leave to observe, that many more successful experiments must be made before the theory, pointed out by Mr. Hill's experiments, can be fully and substantially ascertained.

LETTER III.

From Sir John Sinclair, Bart., dated Edinburgh, June 27, 1798.

SIR,

I HAD the honour of receiving yours, which I communicated to Colonel Mackay, whose complaint is considerably better; and who thinks from what you state, that it will be hardly possible for you to judge of his case, at such a distance, from any description that can be given of it. Your Letter, however, displays so much candour, and so much knowledge of Asthmatic Complaints, that I have transmitted copies of it to two relations of mine, Lady Margaret Macdonald, who resides in Welbeck Street, and William Bosville, Esq. who resides in the same street, but is now in Yorkshire, both of whom are troubled with the Asthma, and who are likely to avail themselves of your advice.

I remain, with esteem,

Your very humble servant,

JOHN SINCLAIR.

LETTER IV.

From the late Dr. Reynolds, dated Bedford Square, December 11, 1800.

DEAR SIR,

I AM very much obliged by your very polite Letter, and by the kind present of your Publication upon the subject of the medical use of Oxygen Air. That fluid, doubtless, possesses active properties, and under judicious and skilful management may be successfully

employed for the relief of human miseries. Every well authenticated instrument of succour to the afflicted, ought to be received by the faculty with respect and gratitude, as God knows how often we meet with cases which baffle the efforts of the most experienced. One of these cases recorded in your book, I believe to be that of Miss Isabella Kepling, whom I attended along with Dr. Warren, and I have repeatedly heard her say that she had derived great benefit from your assistance. I sincerely wish that you may prosecute this branch of the profession to your own advantage and satisfaction, and to the utility and welfare of the public. I beg my best compliments to Mrs. Hill, and am with great esteem,

Dear Sir,

Your obliged and faithful humble servant,

J. R. Reynolds.

LETTER V.

From the late Dr. Turton, dated London, Adelphi, December 12, 1798.

Sir,

I am much obliged to you for your politeness in sending me the four drawings, and in your permission to keep them.

The manuscripts I return to you. The cases appear strong, and are curious *. I heartily wish you success in establishing observations of such consequence by practical experiments.

I remain,

Sir,

Your faithful and obedient servant,

J. Turton.

* The case of distorted limbs, and Mr. Gorges' diseased knee.

LETTER VI.

From Professor Reich, dated Berlin, March 7, 1802.

(Revised Translation.)

THOUGH, not having met with a suitable opportunity, I have not been able sooner to offer you my thanks for the kind communication of your Treatise on Oxygen Air, they are not less cordial. I now hasten the more to send them, being influenced by the most perfect sincerity, lest I should appear to you to be ungrateful; and since the present opportunity seems to be very convenient. The shortness of the time must be my apology for selecting my native language for this purpose; for though I am not quite a stranger to the English tongue, having already written in it several letters and essays, I still am not possessed of the fluency requisite in order to express my ideas with facility and perspicuity. Will you therefore permit me to correspond with you in future? And should you not understand German (which I am inclined to think, from your having derived your knowledge of my treatise, through the medium of Dr. Parry's translation, to which I am indebted for the great honour of your acquaintance,) I shall write to you in future in English, but I request before-hand your indulgence for the faults which will necessarily occur in my attempts.

The successful treatment of several dangerous diseases, by the inspiration of Oxygen Gas, was known to me before I received your excellent work; and the more delight the singular correspondence of your trials with my experience must give me, and the more pleasure the receipt of your work must afford me, and the com-

mencement of a literary correspondence with a man who, from a happy success in most elaborate experiments, has the most solid claims on the gratitude of his contemporaries and posterity. Our contemporaries may ridicule our endeavours, but posterity, most just, will no doubt acknowledge what conviction already dictates to us, " that the chemical treatment of animal and organized bodies in general is the only true one; and that we can expect from the application of chemical principles, only to the case of diseases, the perfection of physic which has been so long desired." It is true as you state, " that much reflection will yet be necessary to elucidate these important subjects;" the foundation, however, is laid, and your remarkable experiments will contribute more than any thing to draw general attention to the chemical method of treatment. Your country will have, I suppose, in this respect the advantage of mine, as my young countrymen still shew too great a propensity towards Mr. Brown's system, which lulls them into an ignorant indolence, to be likely to do much good by their exertions. Every beardless youth, who has hardly left school, turns author here, and the less knowledge he has of natural philosophy and chemistry, and the more he is acquainted with Kant's unintelligible system of philosophy, and with Schelling's new and indiscernible transcendant idealism, the more eagerly he undertakes the defence of the Scotch reformer's principles, and with the more contempt and indignation he speaks of endeavours like yours and mine, which alone can lead to the true mark. I will not, however, give vent to my spleen, but repeat once more the great pleasure I have derived from your work. I look with anxiety for the particular directions as to the method of applying the Oxygen Air: you will much oblige me by its early communication.

Your theory respecting gangrenous ulcers corresponds entirely with my principles, which long since taught me that the inflammation is connected with the local application of Oxygen Air. I hinted at that in my Treatise, Section 43, saying, " the next cause of all fevers is consequently ether, or lies in the preternatural application of it," &c. That this is the case with inflammatory fevers, is also acknowledged by you. As my work was intended as a sketch of my system, I could not admit of any more prolix explanation, and this gave rise to many mistakes respecting my theory in the minds of my readers. I here conclude, and recommend the bearer of this, M. de Vaxel, High Counsellor to His Majesty the Emperor of Russia, to your kindness, and to request you to accept the assurance of the perfect regard which will always induce me to subscribe myself,

Sir,

Your most obedient servant,

REICH, M. D.

LETTER VII.

Dated Berlin, April 22, 1802.

DEAR SIR,

I DO not doubt but that you will have got the letter, which I have trusted to the care of M. de Vaxel, when he sat out for London in the last month, and I hope that you will have agreed with the sentiments of my heart, which is desiring nothing more than the continuance of your kindness and literary correspondence. I cannot omit assuring you by this opportunity, that it will give me a very great pleasure, if you will be so kind as to send me, as soon as possible, a description of your apparatus, and of the manner of administering Oxygenous Air, which is wanting in your truly valuable pub-

lication. It will certainly give you some satisfaction to know that it has been lately translated into the German language, and extolled by the literary critical medical papers of Germany as much as it deserves to be. They desired that you might early publish a continuation of it, and therein explain the method of preparing and treating the mixture of common and Oxygen Air; and these are the wishes of all those Physicians that are not prevented by prejudice from accepting every good counsel, which is tending to the enlargement of science, as well as to the promotion of human health and happiness. And the number of these is certainly not so small, as the champions of the Brunonian doctrine are pretending. I therefore hope that your experiments will be repeated by the most ingenuous of my countrymen, as soon as you will have the goodness to give a plain description of the hitherto unknown sides of your method; and you may fairly believe, that I shall not be the last in propagating and extending such an easy, and meritorious method of treating diseases. I had yet, at a very early period, (in 1792) begun to make numerous trials of curing various diseases, especially of the lungs, by means of the inhalation not only of the *pure* oxygenous, but also of various other *pure* sorts of air; but having been deceived in my expectation I desisted from continuing them till now, except in putrid and low nervous fevers, where I ever since made use of the acid vapors of common salt and saltpetre, (muriatic and nitric acids); and although Dr. Trotter declares himself, in vol. ii. of his Medicina Nautica, against the fumigations of Dr. C. Smyth, yet I do not hesitate a moment to make a trial of them as soon as I deem it necessary, or have occasion for them. Since the publication of your Treatise I see how far I have ever been from attaining to the true point of view, as

well as to the only efficacious manner of administering Vital Air; and at present I hardly can conceive why it did not come into my, or any other Physician's ideas, to try the use of Vital Air, in a manner coinciding with yours, which is so very plain, simple, mild, and easy, that its not having been tried before your first experiments seems rather to be inconceivable. But such is the condition of the human mind! In pursuing the more distant objects, the nearest are likely to be totally overlooked. Desiring most heartily to get very soon the valuable communications which I have entreated of you, I beg leave to inform you, that you shall have a copy of my Elucidation of my Theory, being now under the press, immediately after its having been published; and that it should be satisfying to my curiosity, if you would have the goodness to send me, occasionally, a copy of Mr. Parry's translation of my Treatise on Fever; I entertain the most flattering hopes of your kind compliance, with my wishes for the everlastingness of our literary intercourse, and entreat you to believe that I shall be ever sincerely,

Your most obedient humble servant,

REICH, M. D.

Certificate annexed to a Letter from the late Mr. John Christian Wachsel, Apothecary to the Inoculating Hospital.

AS a further satisfaction to the public I hereby declare, that the case of Mrs. Bennet's child *, as related in Mr. Hill's book, is accurate and true in every particular. Witness my Hand,

(Signed) JOHN CHRISTIAN WACHSEL.

* See page 19.