

An improvement in the mode of administering the vapour bath, and in the apparatus connected with it; with plans of fixed and portable baths for hospitals and private houses, and some practical suggestions on the efficacy of vapour, in application to various diseases of the human frame, and as may be beneficial to the veterinary branch of medicine [sic].

Contributors

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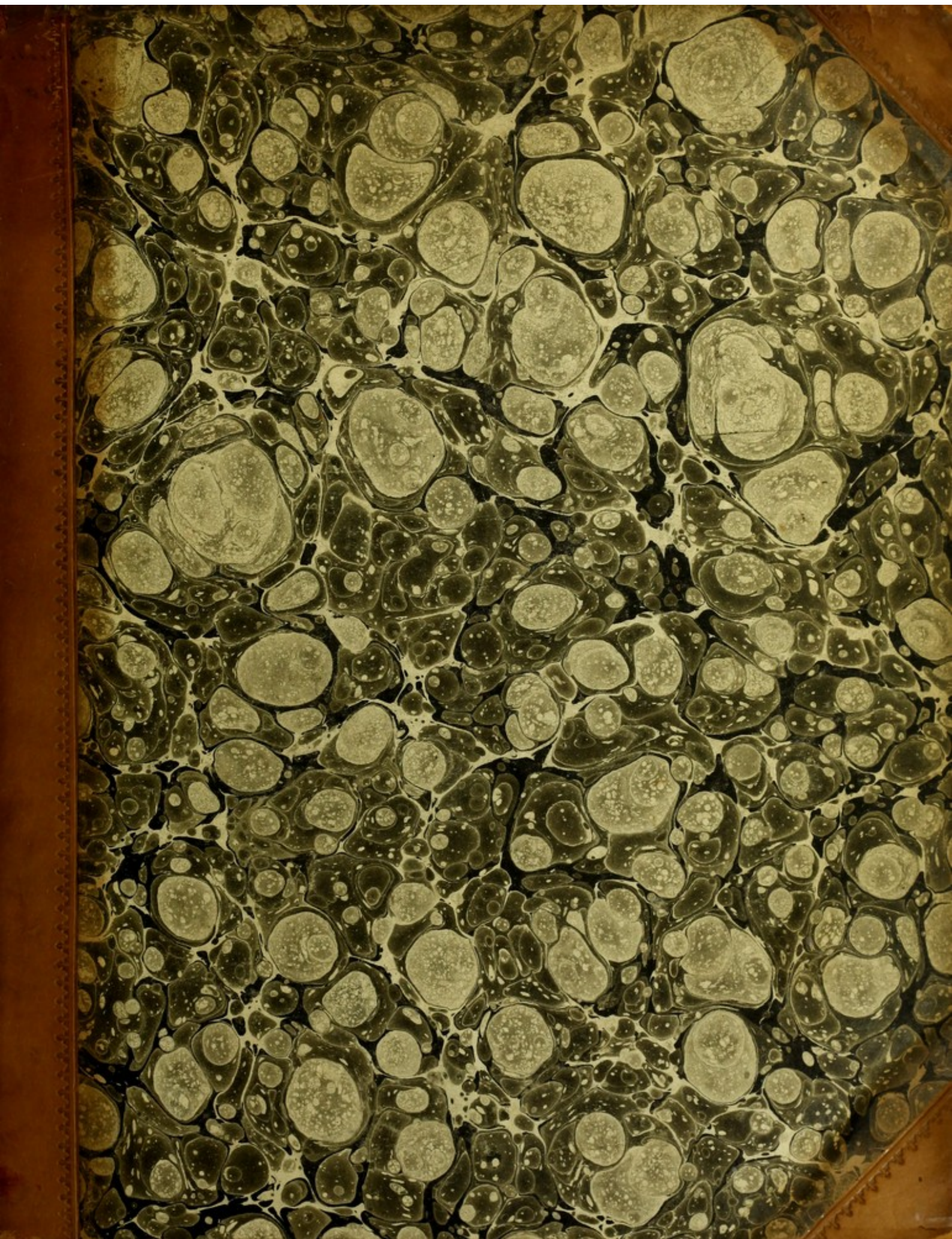
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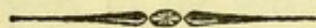
PRACTICAL OBSERVATIONS
ON THE USE OF
OXYGEN, OR VITAL AIR,
IN THE
CURE OF DISEASES :
TO WHICH ARE ADDED
A FEW EXPERIMENTS
ON THE
VEGETATION OF PLANTS.



BY

D. HILL,

FELLOW, AND ONE OF THE COUNCIL OF THE LONDON MEDICAL SOCIETY, AND
HONORARY MEMBER OF THE MEDICAL SOCIETY AT GUY'S HOSPITAL.



PART I.

Sed ne verba dare nos discat quispiam, et assertiones speciosas tantum facere sine fundamento, et non
justa de causa innovare : tria confirmanda veniunt : quibus positis, necessario hanc sequi veritatem, et
rem palam esse arbitror.—Harvey, Exercitatio Anatomica de Motu Cordis, caput nonum.

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1800.

PRACTICAL OBSERVATIONS

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ON THE VEGETATION OF PLANTS

BY

JOHN HUNTER, ESQ. F.R.S. &c.
HONORARY MEMBER OF THE MEDICAL SOCIETY AT GUY'S HOSPITAL.

PART I.

LONDON:

Printed and Sold by G. G. and J. W. B. at the Sign of the Sun in Pall Mall, and by T. Cadell, Strand, and W. D. B. at the Sign of the Sun in St. Paul's Church-yard.

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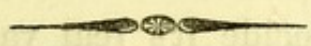
DEDICATION

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TO THE

RIGHT HONORABLE THE

EARL OF EXETER.



MY LORD,

DEEPLY impressed as I am with the importance of the facts contained in the following sheets, I cannot express myself in language equal to my feelings for the honour, which your Lordship has conferred, in allowing me to place them under your protection and patronage.

Exposed as I have been to the formidable combinations of prejudice, I have still had resolution to combat unusual difficulties, fulfilling a duty I owed to myself and the public, and pursuing a new path in science, until I had succeeded to an extent, that has surpassed even my own expectations. Yet I could not resolve to stand forward, and publish on this subject, without feeling the fostering support of a nobleman of your Lordship's rank and independance, in whom great benevolence is united with general science.

Your Lordship has seen what high expectations were formed from the philosophical discovery of oxygen air, when it was first held out to the world, as a cure for many diseases, and yet how soon it's credit was lessened. Whatever might be attributed to novelty on the one hand, or success in some few instances on the other, it was evident, that neither novelty, nor a few solitary facts, could establish it's intrinsic worth; but time and experience must decide it's real value, and appreciate all it's merits.

Flattering myself your Lordship will consider the facts here adduced as interesting in the cause of humanity, and connected with useful science, to no one can I presume they will be more acceptable: with grateful satisfaction therefore I avail myself of the honour of testifying, that I am, with the greatest deference and respect,

Your Lordship's highly obliged,

And most devoted humble servant,

Great Russel-street, Bloomsbury,
November 11, 1800.

DANIEL HILL.

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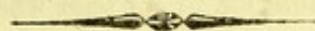
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CALLED upon by the highest motives of humanity, I am desirous, that no longer time should be lost, in making publickly known many important facts, which have come within my knowledge, as a professional man, during the course of several years practice. 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. A., in whose left leg a large gangrenous ulcer had existed for above a year and a half:

and

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 farther 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

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

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 examine the mosaic account of the creation,

as

* ' *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 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 ||.

' 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

* * 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.

¶ ¶ Phil. Trans. Vol. LXXIV. p. 150, 152.

persuaded,

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 sublimity 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.

‘ 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 superiorum motum æmulatus est. Terra enim madida à sole calefacta evaporat, vapores sursum elati condensant,

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 whilst they are burning, and calcining; by means of the air which is, from the atmosphere, CONSOLIDATED, and fixed in them.’

* * 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, 529.

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 dicam) alimentativo, nutriri, foveri, vegetari: Contra in partibus sanguinem refrigerari, coagulari, & quasi effectum 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.

Whoever

‘ * 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

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 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 pro-

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 in it's 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 microcosm, 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.

fessional 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 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 considerations. 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

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 its 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 highly 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

* 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.

from suppuration, or any material alteration of the natural structure. But when the constitution is 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*

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 epileptic 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 fontanel, 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

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,
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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 fontanel, were again united by a firm bony union. The head being reduced nearly to its natural size, on the cause of its 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 its 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 all the secretions, by the skin, kidneys, and bowels. To these effects succeeded the restoration of natural sleep;

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 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 beneficial 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 consolidating 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

* 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.

materials for the secretion and deposition of bony matter*, until the head was reduced nearly to it's 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 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

* 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.

gave little or no relief. On his becoming deaf in one ear, and his eyesight 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 fulness 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 fulness 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

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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 complaints, which had long affected him; and they in-
 “ creased 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,

Dowgate Hill,

July 18, 1798.

“ CHARLES DARE.”

A second

A second case of this disease I have by me, with the daily memorandums of it's 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.

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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
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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 bowels, 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 acknowledgment; 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 constantly 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,

fever, with all its 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 prescription 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,

MR. HILL,

Great Russel-street, Bloomsbury.

RICHARD GRIFFITH.

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 attending to any business whatever. Medical assistance

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 eyelid, 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 eyelids 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

fect 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

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

dies 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 symptom 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

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 favour 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

tural 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 thirty-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

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 swellings 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 circumstances, 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 enlarge-

ment 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

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. 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. Martins-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 producing 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,

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.

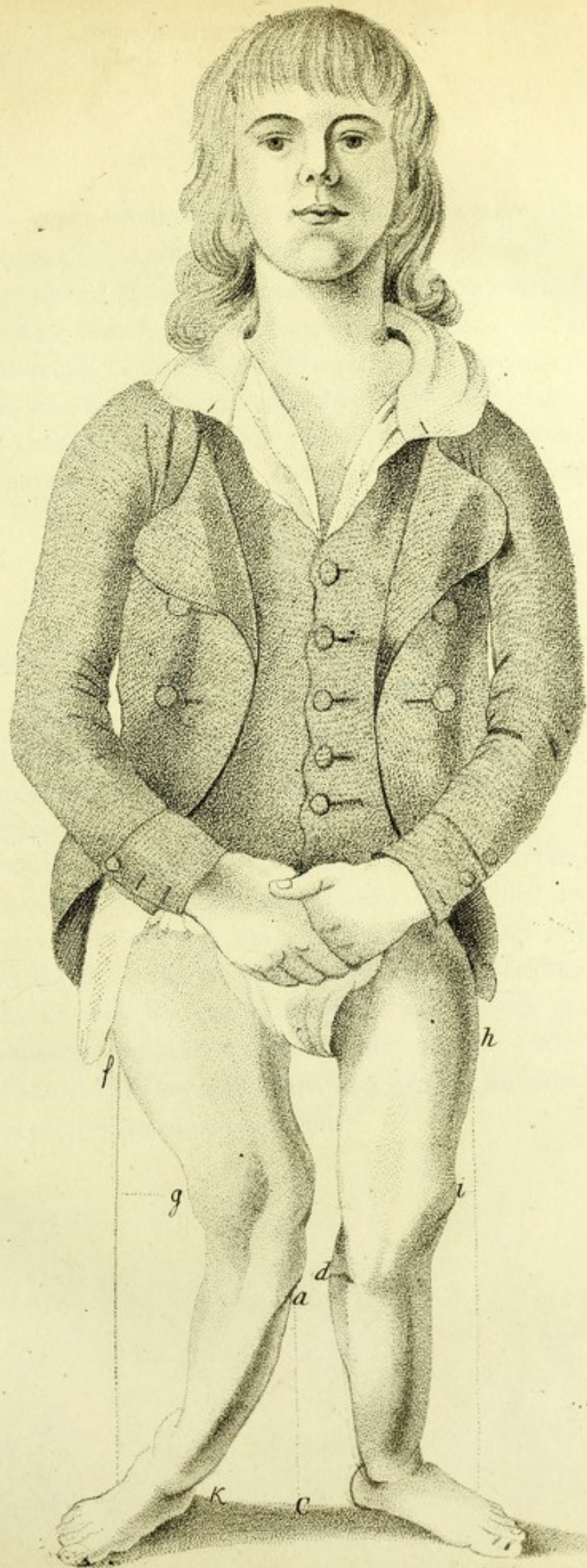
boy. The application to the sores was bruised sorrel, which was not applied, till a change had taken place in the secretion, that I might have clear evidence of the offensive fœtor of the former state of the sores being removed by the use of the vital air; a fact of great moment in all cases of surgery, where the peculiar state of the habit is the cause of the ulcerative process, as in old ulcers, &c.

XIII. *The Case of Thomas Mazej, 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 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 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





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	4 $\frac{1}{8}$	4 $\frac{1}{4}$	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

Fig. 1.

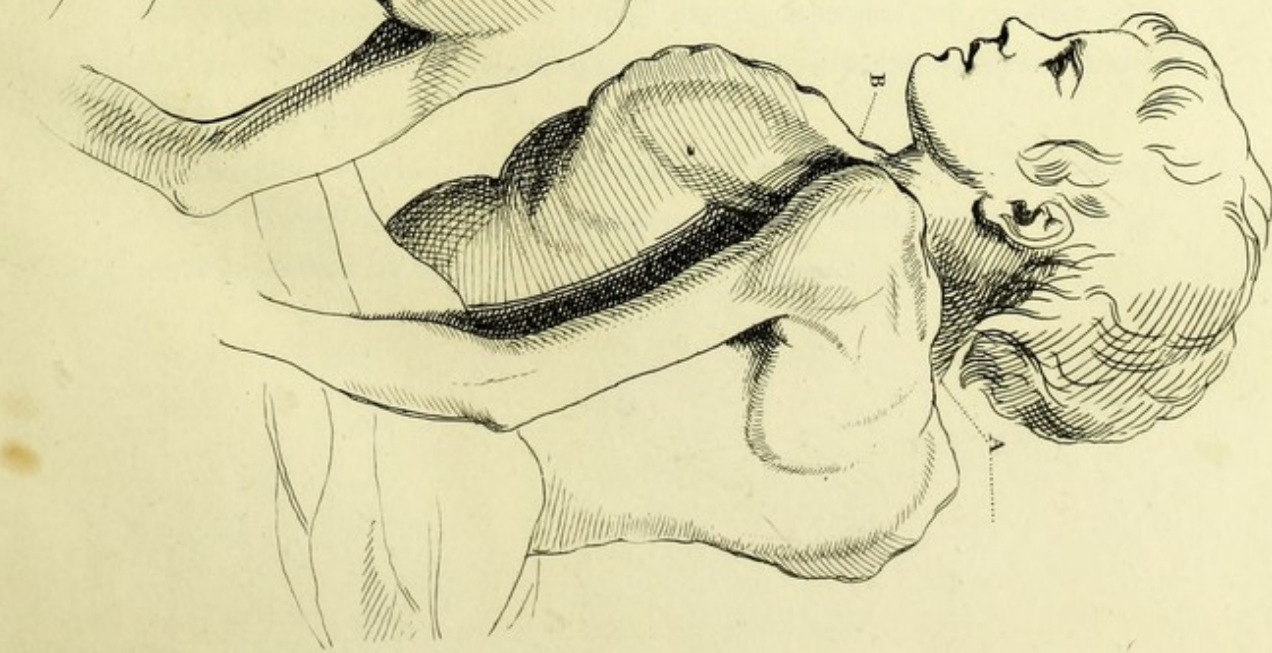


Fig. 2.

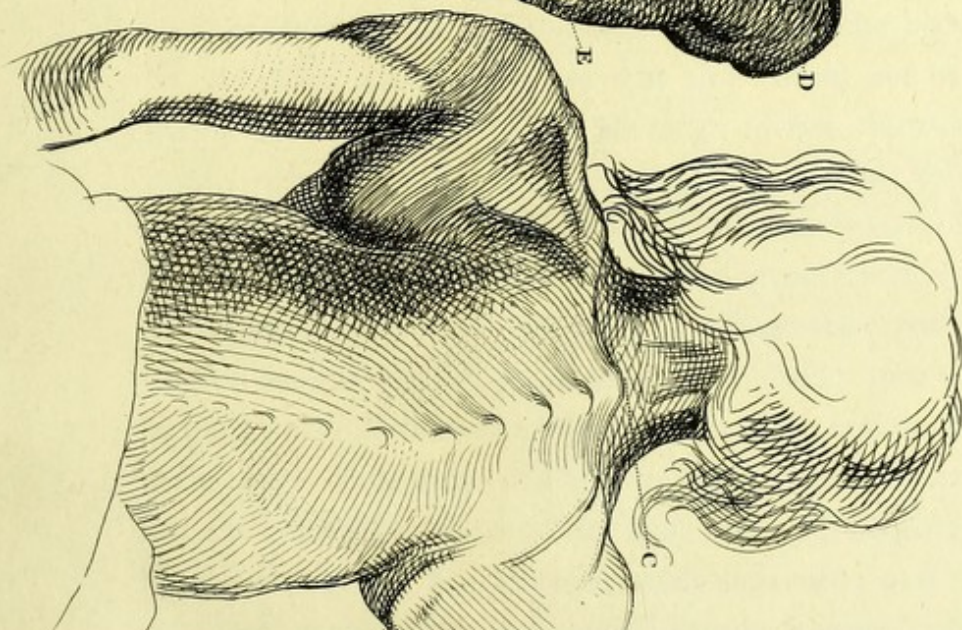
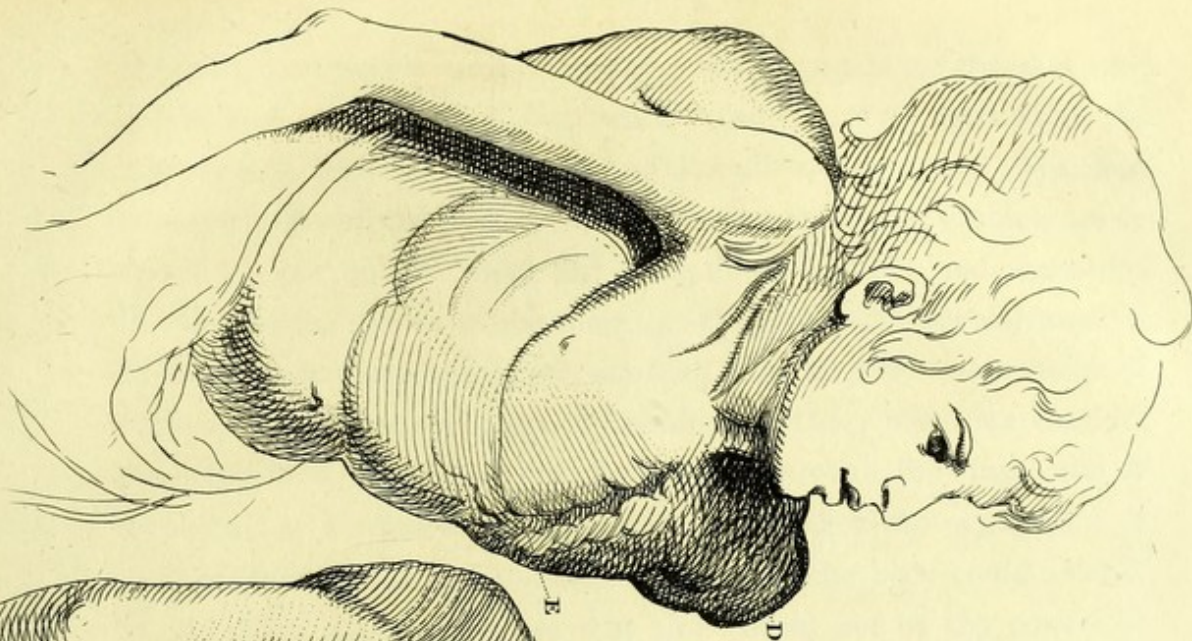


Fig. 3.



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 processes 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 its 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 strength 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

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

“ 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 the 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,

London,

May 2, 1800.

RICHARD GORGES.”

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

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

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

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 Haward, 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

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 shown, 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 perfectly satisfied, from combining anatomical

* See Bennet's child's case.

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 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,

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 principle 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* surface of the lungs, as in the cases alluded to, be applied a purer 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 assist-

* "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 its 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.

ance 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

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, 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 Christmas, 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





J. Sillett. Del.^t 1797.

This progressive improvement was again intirely 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 appearnce; 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 hothouses, 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 hothouses.

To the President & Members
of the Royal College of Physicians
Edinburgh
with the Authors compliments

AN

IMPROVEMENT

IN

THE MODE OF ADMINISTERING

THE

VAPOUR BATH,

AND IN THE APPARATUS CONNECTED WITH IT;

WITH

PLANS

OF

FIXED AND PORTABLE BATHS

FOR

HOSPITALS AND PRIVATE HOUSES,

AND SOME

PRACTICAL SUGGESTIONS

ON THE

EFFICACY OF VAPOUR,

IN APPLICATION TO VARIOUS DISEASES OF THE

HUMAN FRAME,

AND AS MAY BE BENEFICIAL TO THE VETERINARY BRANCH OF MEDICINE.

THE WHOLE ILLUSTRATED BY ELEVEN PLATES.

LONDON:

PRINTED FOR JOHN BOOTH, DUKE STREET, PORTLAND PLACE.

1809.

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IMPROVEMENT
IN THE MODE OF ADMINISTERING

VAPOUR BATHS,

AND IN THE APPARATUS CONNECTED WITH IT;

PLANS

FIXED AND PORTABLE BATHS

HOSPITALS AND PRIVATE HOUSES,

PRACTICAL SUGGESTIONS

RESPECTING THE EFFICACY OF VAPOUR

HUMAN FRAME.

THE WHOLE ILLUSTRATED BY ELZEY BATES.

Printed by Cox, Son, and Baylis, 75, Great Queen Street,
Lincoln's-Inn-Fields.

1801

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TO THE RIGHT HONOURABLE
LORD VISCOUNT MELVILLE.

MY LORD,

Unaccustomed to the language of adulation, which I know your Lordship despises, I shall express the purpose that has led to the present address, in the dictates of simple truth. A just sense of your Lordship's superior talents and of the zeal with which they have been unremittingly employed, during a lengthened series of years in the service of your country, induces me to solicit your protection for the improvement I have made in the mode of administering the Vapour Bath, which I am about to submit to the consideration of the public. It is intended for the general good of mankind, and is particularly calculated to benefit the NAVY;—it is, therefore, with the greater propriety that I address your Lordship on the occasion: your Lordship having, with so much honour to yourself, advantage to your country, and satisfaction to the heroes of the Ocean, presided over that department.

Availing myself of the present opportunity, permit me to offer to your Lordship the tribute of my gratitude, for the liberality and indulgence I once experienced at your Lordship's hands. The period to which I allude is, indeed, remote; but the kindness it embraced is fresh in my memory, where it will be ever cherished.

I have the honour to be, with deference and respect,

MY LORD,

Your Lordship's faithful

and obliged humble servant,

BASIL COCHRANE.

12, *Portman Square*,
10th June, 1809.

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BASIL COCHRANE

12, Portman Square,
10th June, 1809.

*London, No. 12, Portman Square,
28th Nov. 1808.*

WE have examined the improved Models as well as the Baths erected by the Honble. Mr. Cochrane; and we have no hesitation in declaring, that they are constructed with much ingenuity and simplicity, and that they possess, within a small compass, a degree of efficiency, accuracy and variety of application and power, beyond any thing of this nature which we have witnessed. We are, therefore, of opinion, that they would prove an admirable addition to all Naval and Military-Hospital-Establishments. There are few diseases in which, under the superintending care of the judicious Medical Man, they may not, at one stage or another, be useful; and in the prevention of disease, as well as during the periods of convalescence, they will also produce effects highly beneficial.

W. Farquhar, M. D.	W. Heberden, M. D.	M. Garthshore, M. D.
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Thomas Davies,	J. Sanderson, M. D.	John Phillips, M. D.
Thomas Richardson.	Henry Ainslie, M. D.	

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| Thomas Duff | Henry Ainslie, M.D. | John Pollock, M.D. |
| Thomas Richardson | | |

AN

IMPROVEMENT

ON THE

MODE OF ADMINISTERING

THE

VAPOUR-BATH.

THAT every man owes a duty to his fellow-creatures, is a truth not to be denied: and it is equally true that every man is bound to perform that duty to the utmost of his power, according to the nature and extent of his means; nor is the tribute rendered to humanity less acceptable, because trifling in its extent, and humble in its pretensions. It is the intention, and not the act, that gives the point of estimation.

With such impressions, and holding such purposes in view, I have presumed to approach the public, and offer to its judgment some observations on vapour-bathing, which, after a variety of experiments during a period of ten years, I have brought to as much perfection as my confined abilities are capable of giving to it.

I am aware that the application of vapour has been long known, and frequently resorted to, in this country; yet I can safely say that, with me, it was entirely new, as I had scarcely ever heard of the vapour-bath, when necessity directed my attention towards it; and I was totally ignorant of every part of the machinery connected with it, when I first had recourse to its powers,

A very protracted residence in India had considerably deranged my constitution, and I began to feel the painful consequences. My chest was loaded with phlegm: I laboured under a severe, and almost incessant, cough; and my voice, which was feeble and interrupted, sometimes failed me. Accident about this time threw in my way "*Mudge's Inhaler*," and I made use of it with something of a prophetic assurance,

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that

selves desirous only of furthering its views to the full extent of its merits.

When this certificate be considered, it must be held so conclusive as to preclude the necessity, on my part, of saying any thing in favour of vapour-bathing, with a view of raising it in the estimation of the public. It contains the concurrent testimony of physicians of the first talents, and other medical gentlemen of the greatest celebrity in the kingdom. It therefore remains only for me to introduce a few of the many cases that have been relieved by the vapour; and amongst these may be found two or three that will, perhaps, appear extraordinary to those who are not professional men; but as they were under my own inspection, I can vouch for the veracity of their statement. Indeed, to offer mere matters of fact is all that can be expected from me; and it is the only province that I dare assume,

I have already mentioned that I have not any knowledge in medicine, and, consequently, the hints I may throw out must be regarded only as arising from practical observation; and with no other view than that the able physician may employ them, should they be judged worthy of his attention, in such way as to him shall appear best. And here I may be permitted to suggest, that however excellent the vapour-bath may be, and however simple and harmless its powers are in appearance, it should not be administered in any serious disease without the advice of a medical man. This precaution I have made so much the rule of my conduct that, with very few exceptions, all who have been received into the bath have brought such sanction with them. Upon this important point, however, and upon every other in relation to it, I must refer those who, like myself, have not received a medical education, to the observations "On cold and warm Bathing," in the learned and highly celebrated treatise, "*On the chemical History and medical Powers of Mineral Waters*," by Dr. SAUNDERS; and to a luminous and very comprehensive "*Essay on Warm and Vapour Baths*," by Dr. KENTISH. And I beg of those gentlemen to accept my sincere thanks for their polite attention towards my humble endeavours, in placing their works into my hands; a kindness that I shall ever remember with the most pleasing sensations.

In the course of my experiments in the application of vapour, I have seen inveterate catarrhs, chronic rheumatisms, contraction of the muscles and stiff joints give way to its influence; and two cases of gout, particularised in another place, have met a cure, at least so far

as any opinion can be conceived from appearances and circumstances. In one instance, calculi have been brought away in great quantity and without any of that agony suffered by the patient on former occasions, previous to his use of the Bath. And it may not be considered by many too trifling to mention also, that the tooth-ach has been dissipated by it in a few minutes.

Such are the complaints that, speaking of my own observations, seem to be within the powers of the vapour-bath. Doctor Kentish treats of many others; and the animated zeal with which he is now prosecuting the subject, directed by the talents he possesses, will doubtless lead to the most important discoveries.

In using the bath I have observed, that the periods most proper are before breakfast, or between ten in the morning and three in the afternoon; as after repletion the patient has generally complained of more heat and languor than at other times. But this possibly may be the case only, with those whose appetite is good; because when that has not been the case, I have not perceived any difference in reference to time. In the early stage of experiment, it was usual to allow the patient to remain in the bath from fifteen to thirty minutes; but, better advised by my medical friends, this practice was discontinued and from five to ten minutes were deemed sufficient, as a profuse perspiration is induced in the course of three minutes. Carrying that advice further, the degree of heat was reduced from 130 to 110 or 120 degrees and communicated, not gradually as formerly, but by shocks, varying this mode, however, according to circumstances and the particular situation of the patient. The same friends assisted me in rectifying another error. Instead of allowing the patient to continue in bed two or three hours after bathing, closely covered up and taking warm liquors to encourage perspiration, he remained there only a quarter of an hour, and then lightly covered; and, since reading Dr. Kentish's essay, he has been rubbed very dry and suffered to go, almost immediately into the fresh air: unless the weakened state of his frame, from the violence of indisposition, has rendered an indulgence necessary; or in cases that required friction, and in those cases my servants perform that operation according to the mode adopted in India, there called shampoing, and which might be learnt by any person, with great ease, in an hour. Having touched on shampoing I shall trespass to remark, that it is capable of more beneficial effects than will be imagined upon a slight consideration of a mean so trifling in its seeming. The Indians hold it in the highest estimation

resort to it continually, both as a luxury and as a remedy. After much fatigue and in excessive lassitude, it is the first of restoratives; and it is excellent in disposing to sleep, having frequently succeeded after opiates have failed. These are facts to which I can speak from my own experience, and from what I have witnessed in others. The enlightened mind, therefore, ever directed to the discovery of facilities in aid of known application, may not regard these observations as altogether unworthy notice; but will, on the contrary, give to their object the credit due to its promise, and employ it to every purpose of which it shall be found susceptible. It is to this end that I have travelled a little out of my path. Returning to the point whence I have digressed I have to submit, in regard to the effect produced by different degrees of heat upon different persons, that when gradually given to 105 the patient, after remaining in the bath fifteen minutes, has suffered much from languor, which increased on going to bed and having perspiration superinduced by covering and warm drinks; but when the heat has been communicated suddenly and so raised to 110 or 115 degrees and continued only seven minutes, the patient, after having lain down half an hour with only a single blanket over him, or merely rubbed dry, has never complained of any such sensation; on the contrary he has enjoyed a greater than usual flow of spirits. In another instance, in which the patient continued in the vapour, gradually introduced, nearly half an hour at 120 degrees, the effect produced seemed distinct from what had appeared on other occasions. Mr. Moser, the person I have above mentioned, was affected with a lumbago and his pains were so excessive, that he walked with great difficulty: after taking the bath in the above state and for the same length of time, was put to bed where he lay an hour in a highly provoked perspiration that ultimately became so profuse that, to use his own words, it ran from him in streams and completely drenched the blankets that were under him. The circumstance alarmed him, and he supposed that he never should be able to rise again: or that, if he did, it would be in such a state of debility as to destroy every hope of recovering his health; but, after indulging in those gloomy thoughts some time, he fell into a profound sleep and slept undisturbed and perfectly tranquil for several hours, and when he awoke he, to his great joy perceived, that he had left all his complaints in the bath: that his health was renovated; and that he was as capable of returning to the labours of his avocation as at any one period of his life.—Medical gentlemen will consider these apparently opposite results from nearly similar causes; and their opinion will be a guide to the
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the uninformed. In tracing the virtues and capacity of the vapour in its varieties, those gentlemen will I am convinced also ascertain, whether it may not be extended beyond the external surface and introduced with similarly good effect internally; and whether it might not be much better in sore throats than the *inhaler* which requires more exertion than merely receiving into the throat a stream of vapour thrown into the mouth. In offering these trifling suggestions, as well as in advancing the few equally trifling remarks that are scattered in this paper, I experience the utmost diffidence and bow with deference; and if they should be, as probably they are, superfluous, I am sensible they will be treated with liberal indulgence. To be instrumental in assisting my fellow creatures when in an agony of pain, and to give comfort to a bed of sickness by soothing its sufferings, has been and ever will employ my anxious thoughts. On the present occasion I can have no other view. I have brought the bath, at a very considerable expence and with labourious attention, to the state in which I now submit it to the public; and if I should at some future period learn that it produces general benefit, let the degree be ever so small, I shall be abundantly repaid and greatly rewarded.

In the baths I have constructed, I have united economy with convenience, and that the public may be accurately informed on the subject of the expence to be incurred in establishing them, I have subjoined several estimates delivered to me by the persons whom I have employed; although it is very probable that others may be found to perform the work required upon much more moderate terms; and the annexed plates will convey a tolerably accurate idea of the baths themselves, and of the machinery used in them. In order to be sufficiently explanatory in describing the plates I fear that I have been too prolix; but I was apprehensive that if I had been more concise, I should not be fully understood.

Adverting to the point of economy which I have spoken of as joined with the convenience of the bath, I may say that in houses required to be heated the expence of fuel may be diminished: and the vapour may at the same time be diverted to culinary purposes. In public hospitals and houses the saving would be exceeding great, and to elucidate the fact I have only to state, that Mr. Moser in his proposition to erect baths for the Middlesex hospital, has offered to receive his payment from the diminution that will be occasioned in the expenditure of coals.

In the plates are given the different baths and all the machinery that I have been able to devise, and these may be altered, increased, or diminished according to circumstances.

The baths in plate 3, are as well adapted to a ship as to a house, and the vapour can be generated in the manner shewn in plate 6: or in the ship's boiler, to which leaden pipes might be easily united, or the flexible tubes, as in plate 2, fig. 8, 9, might be substituted; and the whole could be stowed away in a very small compass. So that when the hardy sailor, after having for many hours braved the inclemency of the severest weather in the coldest climates, shall find himself benumbed deprived almost of every power and incapable of further exertion, may by five minutes application of the vapour thus prepared for him, obtain every desired relief and be restored to the capacity of returning to his arduous duties. Nor is the benefit confined to the Northern regions; in those countries where the rays of a perpendicular sun dart upon his head, diminishing his strength by enervating his whole system: in those countries where disease in different forms makes its attacks without a warning, and with so much fury as to open the door to death before the Physician can check its progress; in such countries and weighed down by such oppression, he will experience equal salutary effects from it. Doctor Vietch, to whose friendly attentions and valuable suggestions for several months I am infinitely indebted, is fully impressed with the belief that the yellow fever, which has operated and still continues the most dreadful ravages in the West Indies, may be divested of a great part of its malignity, if not totally subdued by the assistance of the vapour bath. He is on his passage to Antigua where, as head of the Naval Hospital there, he will have an opportunity of proving how far his ideas upon this subject are well founded.

In giving the ninth plate my principal object was to point out to the proprietors of Hotels and those of Taverns, where the mail and stage Coaches put up, how conveniently at a trifling expence, they might occasionally convert every room of their dwellings into steam baths, for the health and comfort of travellers and others frequenting them. Possibly they may upon a consideration of the hints I have thrown out, in relation to the vapour bath, perceive that the accommodation would not only be gratifying to their customers, but, in more instances than seen at the first blush of the thing, a source of extensive emolument to themselves. If, however, they should not be disposed to adopt the plan which this plate holds out, they may be more favourable towards
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the portable bath, sketched in plate 6, 7, which is particularly well calculated for private families. Mr. Higgingbotham, proprietor of the Hotel in Jermyn Street, is erecting one of these in consequence of the signal and unexpected benefit he received from a few applications of the vapour; his case, which was the Gout, will be seen detailed, amongst those with which I shall close the task I had assigned to myself, and is the most extraordinary of the whole.

The bath represented in plate 2, fig. 4, is, in my conception, essential to every bathing room of sufficient dimensions to admit it: as it sometimes occurs that the patient is incapable of sitting in a chair: or it may be otherwise desirous that he should receive the vapour in a recumbent posture; or lastly, the cold or tepid bath may sometimes be recommended. It is necessary only to add, that in this bath the vapour will reach 110 degrees, and if required it can be covered with flannel as in plate 3.

Our venerable Prelates, whose power to do good is equalled only by the benevolence of their disposition may in their respective dioceses: and the Man of feeling, on whom Heaven has bestowed abundance, in his neighbourhood, greatly relieve the sufferings of the afflicted poor, by establishing general or portable vapour-baths. The poor are so circumstanced, by exposure to every change of the weather, that they are more subject than others to the Ague; and I have heard many medical gentlemen express an opinion, that vapour might be very efficacious both in the cold and hot fit. I have endeavoured to procure a patient under this complaint, but without success.

In the course of my experiments it occurred to my mind, that the vapour would be of great advantage to that useful animal the Horse; which has the strongest claims on our attention, if not on our gratitude. I therefore consulted gentlemen, more conversant than myself with his complaints and the remedies applicable to them, and the very warm encouragement they gave to my proposition, led me to contrive the bath that appears in plate 9. On one point I had myself sufficient knowledge, namely that to throw a horse into a perspiration was extremely difficult, and required much more time than can always be bestowed on him; and I had ascertained that the vapour would effect the purpose in a few minutes. Mr. Hall, proprietor of the stables in Halkin Street, Grosvenor Place, has erected a bath for the purpose, according to the plan that I suggested to him, with sanguine expectations of great success in the use of it. Possibly there are some who may

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feel

disposed to ridicule the idea, but whilst endeavouring to further the cause of humanity, in obedience to its dictates, I shall encounter every thing that unkindness may urge with the greatest indifference. In speaking at all upon the subject of vapour-bathing, I have done no more than perform as I conceive, an incumbent duty; and therefore, do not look for applause, which is due only to merit; and I would fain hope that satire and sarcasm will be disarmed of their asperity, when they learn, that my sole object is to throw my mite into the treasury of Medecine, with an anxious wish that it may be acceptable to those, who make the good and happiness of mankind their study and care.

C A S E S.

— *Squire*, aged 49, whose habits of life were of an active nature, had lived regularly and been, generally, exempted from disease. For the last four months he had experienced a severe chronic rheumatism, that seized upon almost every joint of his body, particularly the knees and shoulders, the former of which were much swollen: his body was emaciated, his pulse weak; and he was unable to walk, or even to raise his arms above his head. He had taken the most approved prescriptions, without any more than trifling temporary benefit. He received the vapour bath thrice generally, at intervals of two three and four days; after which he was able to walk without a stick, and use his arms freely. Persevering in the use of the bath for some time longer, the desired effect was produced, and he is now perfectly well.

The vapour-bath, in this instance, was always attended with an increase of appetite; and, indeed, such has generally been the case in every other.

William Styles, coachman, aged 30, of a robust constitution, contracted a very severe cold which continued upon him about a week; and one day whilst cleaning his master's carriage he was taken with a shivering fit, accompanied by great pains in his joints and great uneasiness. The general bath* was immediately ordered: in the course of an hour he was placed in it, and remained there about 12 minutes, with the temperature of 120 degrees, inhaling the vapour as much and as long as possible. In six minutes he found himself much at ease, and in 12 minutes his complaints were completely removed.

Diana Drisden, employed in the kitchen, of a strong constitution, contracted a violent cold, which, as is usual in such cases, she neglected. The symptoms were a hard cough and difficulty of breathing, with a swelled face; she also complained of much head-ach, and pains in all her joints. She did not report the state of her health untill the third day of her illness, when she was immediately ordered the general bath, in which she remained 15 minutes, at the temperature of 120 degrees, keeping her mouth in a position to inhale the vapour. She was then wrapped up in the bell tent flannel gown, and treated as was the coachman in the preceding case. The next

* Pl. 1. fig. 1.

next morning the swelling in her face was much reduced ; her cough easier ; she breathed freely ; and the pains in her joints had left her.

The following night she went through the same operation, and next morning found herself perfectly well.

Henrietta Brown, housekeeper, suffered still more severely than *Diana Driscoll*, from the same cause : the same remedy was applied to the one as had been used by the other, and with equal success. It is to be observed that *Henrietta Brown's* symptoms were the most alarming, as she had lost her voice ; which was, however, restored to her in the course of ten minutes after she had been in the bath.

David Pollock, an upholsterer, aged 29, had for four months been afflicted with a chronic rheumatism. His hands, his ankles, and knees, were affected by stiffness, pain, and swelling ; his right hand was extremely painful and absolutely useless to him. Changes of weather and motion very much distressed him ; and he felt relief, only, from the warmth of his bed. His constitution had suffered considerably ; and there also appeared some affection of the heart, or of the large vessels in its vicinity. His breathing was difficult ; he had not been able to lie in the horizontal position for the last six days, nor capable of attending to his business during the whole of his indisposition. He had lived freely at former periods of his life ; and on this account, and in consequence of his complaints, had taken a great variety of medicines, but to very little purpose.

Under the dictation of circumstances and appearances, the vapour was administered with very great caution. The first application afforded immediate relief to the complaint of his chest ; and the general effect was such that, although his coming to my house from his own had employed him nearly two hours, that he returned home in fifteen minutes. The difficulty of breathing was removed, and he has, after the first experiment, invariably enjoyed a good night's rest in any position.

In this case, by fourteen applications, sometimes generally, at other times topically, the Patient was restored to health, and to his ordinary powers.

Mr. Higginbotham, master of the British Hotel, Jermyn-street, aged 52, had been afflicted with the gout for the last twenty years ; experiencing two regular paroxysms every year. He is a tall, lusty man, of a full habit, and has always lived well, but by no means intemperately.

His attacks, which were preceded by spasms and depression of spirits, generally

generally continued from six to ten weeks ; and, as he himself declared, the misery and torture he endured was scarcely supportable.

He had a fit in January last, when the swelling in the right hand was excessive. A tolerably accurate idea of the back part of it may be formed, by imagining a large abscess on the point of rupturing. Both feet were much swollen and inflamed : the knee of the left leg and both elbows much affected ; but the pain of the right elbow was particularly severe.

In this situation he was advised to try the vapour-bath, which he did topically on the 24th of January, keeping his right hand and feet in it for 15 minutes, at a temperature as high as he could bear it.—This single experiment produced a wonderful effect : his pains were considerably diminished ; his joints lost much of their stiffness : he had some refreshing sleep at night ; and the next day he was able to walk a little, which he had previously been unable to do.

On the 26th of January he had both his hands and feet in the bath, and experienced still further relief ; but contracting a severe cold, his progress was considerably retarded.

Thus circumstanced, he was directed to take the bath generally, at 120 degrees ; after which he lay, wrapped up in flannel, for half an hour, taking a little warm wine and water to keep up the perspiration.

The next morning the swelling in his hand had considerably subsided : his cold disappeared : he was able to walk without his crutches ; and in the subsequent part of the day he had the free use of his right hand.

He repeated the experiment soon afterwards : he slept very soundly during the succeeding night ; and the next day found himself perfectly recovered, free from gout and cold, and in that state he still continues.



William Dean, butler to Sir John Macpherson, aged 45, complained of extreme irritability, and of pains and stiffness in his knees, symptoms that were much increased by the change of weather. In this way he had suffered during the winter season, with slight intermissions, nearly twelve years. He was generally lame, and incapable of carrying himself erect. His complaint, which originated in exposure to severe vicissitudes of weather, whilst on the Continent, was not accompanied by fever : his appetite was good ; and after becoming completely warm in bed, his pains generally subsided.

In this case the topical bath was taken, at intervals of two days, three times, and twenty-five minutes each time, on a rising gradation from 96 to

120 degrees; his health was, by these means, in every respect perfectly restored, and he is now free from pain and every kind of inconvenience.

John Westbrook, aged 49, suffered under chronic rheumatism, particularly in the shoulders and ankles, accompanied with a degree of pain so considerable, as to incapacitate him from following his trade, that of a gardener. His complaints were of about twelve months' standing, and to procure relief had taken a variety of prescriptions without any permanent benefit. Exercise invariably gave him much uneasiness; and he always felt himself easier when warm in bed, than when exposed to the influence of the open air.—The vapour was applied six times topically, and twice generally; and at each time his appetite improved. The joints, on every application gained an accession of pliancy and powers of action: his night's rest became progressively better; and he is now able to pursue his usual labours with his former vigour.

John Dayley, aged 34, a painter, had during three months lost the use of his hands, and in consequence had been rendered incapable of following his trade. His secretions were, however, regular and his appetite was good; yet his countenance and skin clearly shewed that some hurtful cause had acted on his constitution.

In this case the vapour-bath was applied locally fifteen times, with the best success: he has recovered the use of his hands: his complexion has resumed its healthy appearance; and he is again able to follow his trade.

Mr. Prosser, head waiter at the Thatched House Tavern, aged 58, had long endured excessive pain in the region of the kidneys, and thence down his groins. His groins across the lower part of the abdomen were hard and swollen, and gave to him the sensation of great weight and pressure downwards. He frequently passed calculi, and always with agony; at length he was seized with something of palsy, that attacked him on one side, so that he lost the powers of his arm, thigh and leg. In this state he received the vapour generally, and almost immediately afterwards discharged a quantity of calculi and sand, with infinitely less pain than on former occasions, and he felt something relieved in other respects. Thus encouraged, he persisted in the use of the vapour, with the intermission of sometimes one, two, three and four days, at a temperature varying between 110 and 115 degrees, as suggested by circumstances, for upwards of three months; and is now restored to his health, and the use of his limbs. All his pains have been in a considerable degree dissipated: the swelling in his groins and belly have disappeared, and he no longer complains of any uneasiness there.

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He still has recourse to the bath occasionally, which he finds greatly contributes to strengthen his system, now relieved from the incumbrances that only a few weeks ago rendered existence miserable. The last time he received it, five or six days ago, he expressed himself in the warmest terms for the blessings he had derived from its powers.

R. Macdonald, Esq. of Staffa, during the course of three weeks suffered excessive pain from an inflammatory complaint in his eyes. He reflected on the property of heat, conveyed through the medium of water, as holding out some promise of benefit, and accordingly placed his head into the bath, so as to receive the vapour locally. The relief was as great as it was sudden, and one experiment proved sufficient. He has not since felt any pain: the inflammation has entirely subsided; "his sight is," as he himself expresses, "completely restored; and his eyes are as strong and well as ever they were."

Captain Ellis, 25th Dragoons, had for nearly four years been afflicted with a rheumatism, accompanied by a shooting pain apparently in the bone of one of his legs, that deprived him entirely of his nightly rest, and he walked with difficulty. As a last resort he tried the bath, and in four general and two topical applications was entirely recovered.

From Dr. Meyers to the Honourable Basil Cochrane.

Dear Sir,

Your very polite attention to me, and the very beneficial as well as agreeable accommodation your kindness has afforded me, by the use of your invaluable and improved vapour-bath, when suffering under severe lameness and indisposition, from late and repeated attacks of the gout, demand from me my most particular acknowledgement. The utility of the bath to invalids of various classes, is too obvious to urge me to enter into a minute detail of your very useful invention. By your machinery, vapour of any degree of heat, whether medicated or not, may be conveyed with facility and comfort to any part afflicted, and, when required, to the whole body. Every one conversant with the innumerable ills that await the human frame, must have deplored, with me, the difficulty, the inconvenience, the loss of time and, in some cases, the utter impossibility to obtain a warm-water-bath in the sick bed-room, and when obtained, how insufficient and difficult the management. All this is effectually obviated by your ingenious contrivance; for in a room of very limited dimensions, your vapour-bath, to any degree of heat, may be introduced to answer every purpose the practitioner may have in
view;

view; and it is so portable that a servant may transport it from one room to another, at a minute's notice. The inspection will convince any one; it will therefore be unnecessary for me to dwell any longer on the subject, as you so generously intend making your plan public. The expense to obtain your apparatus will be within the power of many: I have no doubt, therefore, of its general adoption in private families, on a small scale, and in hospitals, for the use of the poor, on a larger one. After eighteen weeks painful confinement to my chamber, by a most unrelenting fit of the gout, I was induced by your invitation, and the persuasion of several of my medical friends, to be put into my carriage to inspect your vapour-bath. I saw it, approved it, and immediately used it, and repeated it for eight times, about the heat 120° of Fahrenheit's thermometer, and continued its operation each time twenty minutes. On my first trial, I was directly solaced and eased from pain, and am now enabled to pursue my wonted and professional occupations with ease and comfort. I can now without assistance get in and out of my carriage, though on my first visit to you I was unable to do the one or the other without much help; and it was with difficulty and by the use of crutch-sticks I got through your hall! My general health, since my first visit to you, has much improved: the exercise, the variety that has since engaged my mind, the change of air, from close confinement, has conjoined to restore me, under Heaven, completely. I am, therefore, fully satisfied of the excellence of your vapour-bath, and its general utility in a variety of complaints to which the animal economy is subject, when judiciously administered. But I will now conclude this long letter, without adding any thing more on this subject, as I trust the world will soon be in the possession of your plan, which will indeed be a blessing to the suffering part of the community, and which by due management may and will become a lasting benefit to mankind—and, I had almost said to the brute creation also.

I am, with every sentiment of respect and regard for your philanthropy,
my dear Sir, your obedient and humble servant,

*John-street, America-square,
6th June 1809.*

JOSEPH HART MEYERS.

Honble. Basil Cochrane.

EXPLANATION OF PLATE I.

Fig. 1. The machinery employed in generating and distributing vapor and dry

air. The boiler is fitted with a horizontal cylindrical tank, the ends of which are closed by hemispherical heads. The tank is fitted with a central vertical shaft, which is supported by a bearing at the top and a bearing at the bottom. The shaft is fitted with a flywheel at the top and a crank at the bottom. The crank is connected to a piston rod, which is attached to a piston in a cylinder. The cylinder is fitted with a valve at the top and a valve at the bottom. The valve at the top is fitted with a valve gear, which is operated by a cam on the shaft. The valve at the bottom is fitted with a valve gear, which is operated by a cam on the shaft. The boiler is fitted with a safety valve at the top and a pressure gauge at the side. The boiler is supported by a brickwork foundation.

Fig. 2. The machinery employed in generating and distributing vapor and dry air. The boiler is fitted with a horizontal cylindrical tank, the ends of which are closed by hemispherical heads. The tank is fitted with a central vertical shaft, which is supported by a bearing at the top and a bearing at the bottom. The shaft is fitted with a flywheel at the top and a crank at the bottom. The crank is connected to a piston rod, which is attached to a piston in a cylinder. The cylinder is fitted with a valve at the top and a valve at the bottom. The valve at the top is fitted with a valve gear, which is operated by a cam on the shaft. The valve at the bottom is fitted with a valve gear, which is operated by a cam on the shaft. The boiler is fitted with a safety valve at the top and a pressure gauge at the side. The boiler is supported by a brickwork foundation.

Fig. 3. The machinery employed in generating and distributing vapor and dry air. The boiler is fitted with a horizontal cylindrical tank, the ends of which are closed by hemispherical heads. The tank is fitted with a central vertical shaft, which is supported by a bearing at the top and a bearing at the bottom. The shaft is fitted with a flywheel at the top and a crank at the bottom. The crank is connected to a piston rod, which is attached to a piston in a cylinder. The cylinder is fitted with a valve at the top and a valve at the bottom. The valve at the top is fitted with a valve gear, which is operated by a cam on the shaft. The valve at the bottom is fitted with a valve gear, which is operated by a cam on the shaft. The boiler is fitted with a safety valve at the top and a pressure gauge at the side. The boiler is supported by a brickwork foundation.

Fig. 4. The machinery employed in generating and distributing vapor and dry air. The boiler is fitted with a horizontal cylindrical tank, the ends of which are closed by hemispherical heads. The tank is fitted with a central vertical shaft, which is supported by a bearing at the top and a bearing at the bottom. The shaft is fitted with a flywheel at the top and a crank at the bottom. The crank is connected to a piston rod, which is attached to a piston in a cylinder. The cylinder is fitted with a valve at the top and a valve at the bottom. The valve at the top is fitted with a valve gear, which is operated by a cam on the shaft. The valve at the bottom is fitted with a valve gear, which is operated by a cam on the shaft. The boiler is fitted with a safety valve at the top and a pressure gauge at the side. The boiler is supported by a brickwork foundation.

Fig. 5. The machinery employed in generating and distributing vapor and dry air. The boiler is fitted with a horizontal cylindrical tank, the ends of which are closed by hemispherical heads. The tank is fitted with a central vertical shaft, which is supported by a bearing at the top and a bearing at the bottom. The shaft is fitted with a flywheel at the top and a crank at the bottom. The crank is connected to a piston rod, which is attached to a piston in a cylinder. The cylinder is fitted with a valve at the top and a valve at the bottom. The valve at the top is fitted with a valve gear, which is operated by a cam on the shaft. The valve at the bottom is fitted with a valve gear, which is operated by a cam on the shaft. The boiler is fitted with a safety valve at the top and a pressure gauge at the side. The boiler is supported by a brickwork foundation.

A. The boiler.

Fig. 6. The plan of the boiler and atmospheric cylinder.

a. The boiler.

b. The atmospheric cylinder.

c. The pipe in which the atmospheric air is contained.

d. The ground steam pipe.

e. The safety valve.

f. The manhole.

g. A plate fastened by strong screws, opened only when it becomes necessary to clean out the boiler.

EXPLANATION OF PLATE I.

FIG. 1. The machinery employed in generating and distributing vapour and dry heat.

a. a.—A tube for the introduction of atmospheric air, received from the outside of the house, where a grate is fixed for that purpose. This tube entwining round the upper part of the boiler, b, which it enters at c, renders the air it contains heated. From the boiler it passes into the pipe d, which communicating with the grand steam-pipe, e, by a cock, f, the heat is continued so as to warm several apartments.

g.—The safety valve regulated by the balance, h. From this valve branches a tube, i, to throw off the superabundant vapour.

j.—The manhole worked by a balance, k, to which are fixed two rods: at the extremity of one of them, l, that passes into the boiler at m, is fixed a flat stone, n, of a circular shape, which, resting upon the surface of the water, keeps it at its desired height, by occasionally procuring a fresh supply, the other rod, o, turning the cock, p, fixed in a pipe, one part of which, q, connects with a cistern, and the other, r, enters the boiler at s.

t.—A pipe from the grand steam-pipe, e, having three branches, u, v, w. u. heats the closet x.

v, w, applicable to culinary purposes, and serving y, y, culinary utensils.

z.—A case of masonry, thrown open to shew the situation of the boiler, the atmospheric air-tube and the hydrometer, n.

A, a.—The stove.

FIG. 2.—The plan of the boiler and atmospheric air-tube.

a.—The boiler.

b.—The atmospheric air-tube.

c.—The pipe in which the atmospheric air-tube is contained.

d.—The grand steam-pipe.

e.—The safety-valve.

f.—The manhole.

g.—A plate fastened by strong-screws, opened only when it becomes necessary to clean out the boiler.

Fig. 2.

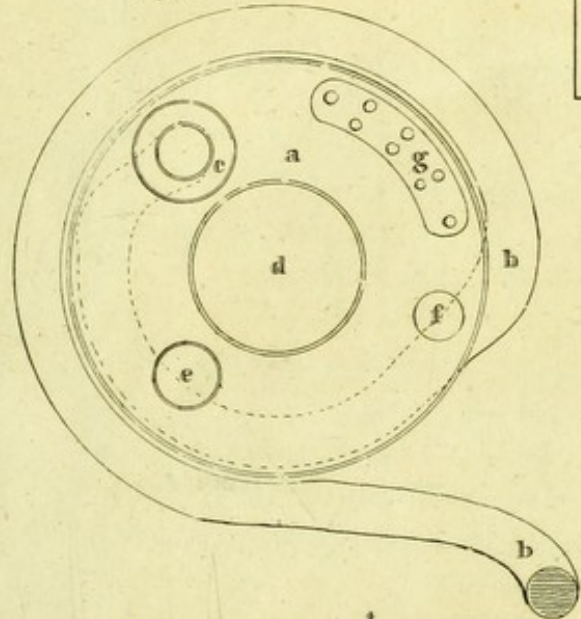
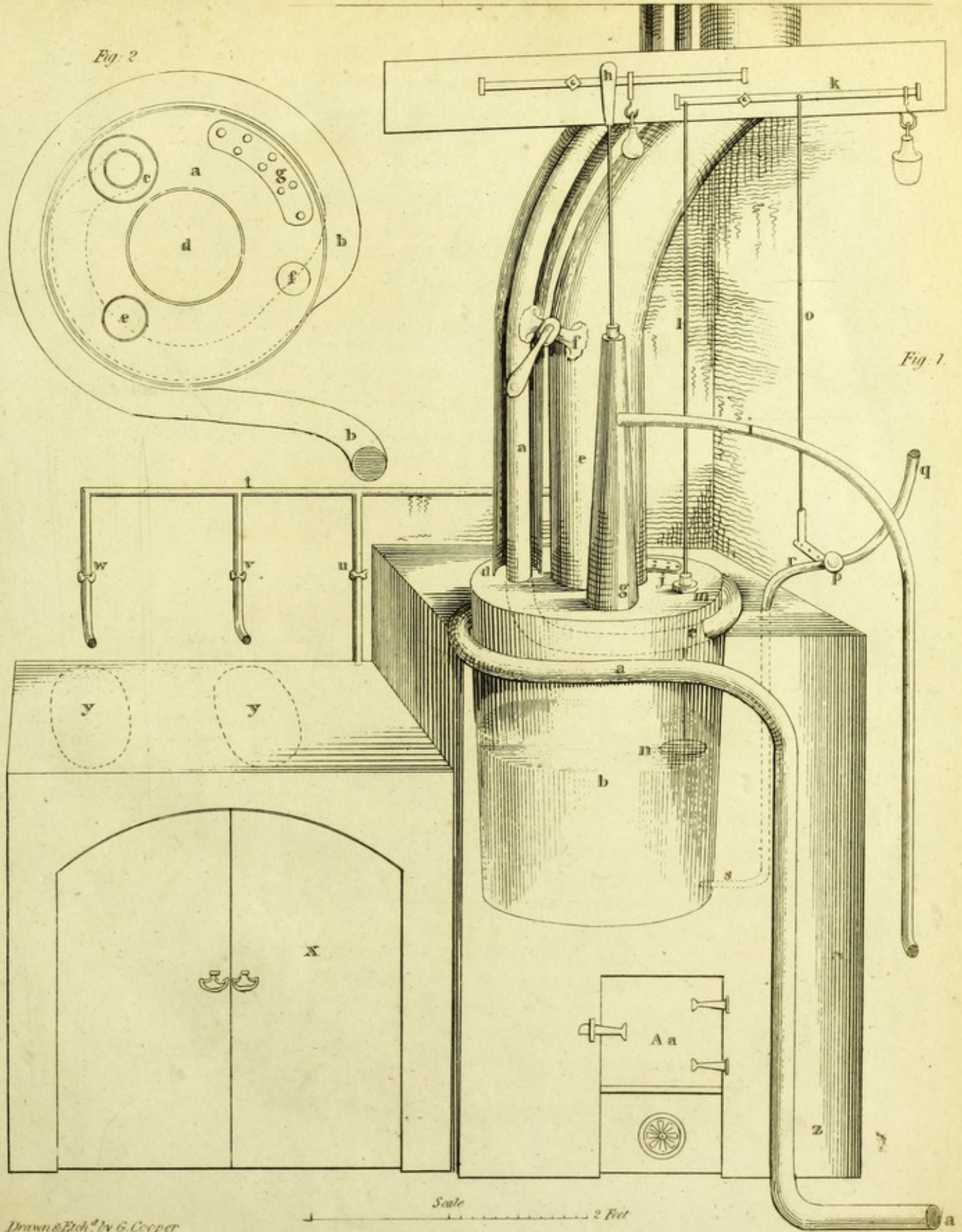
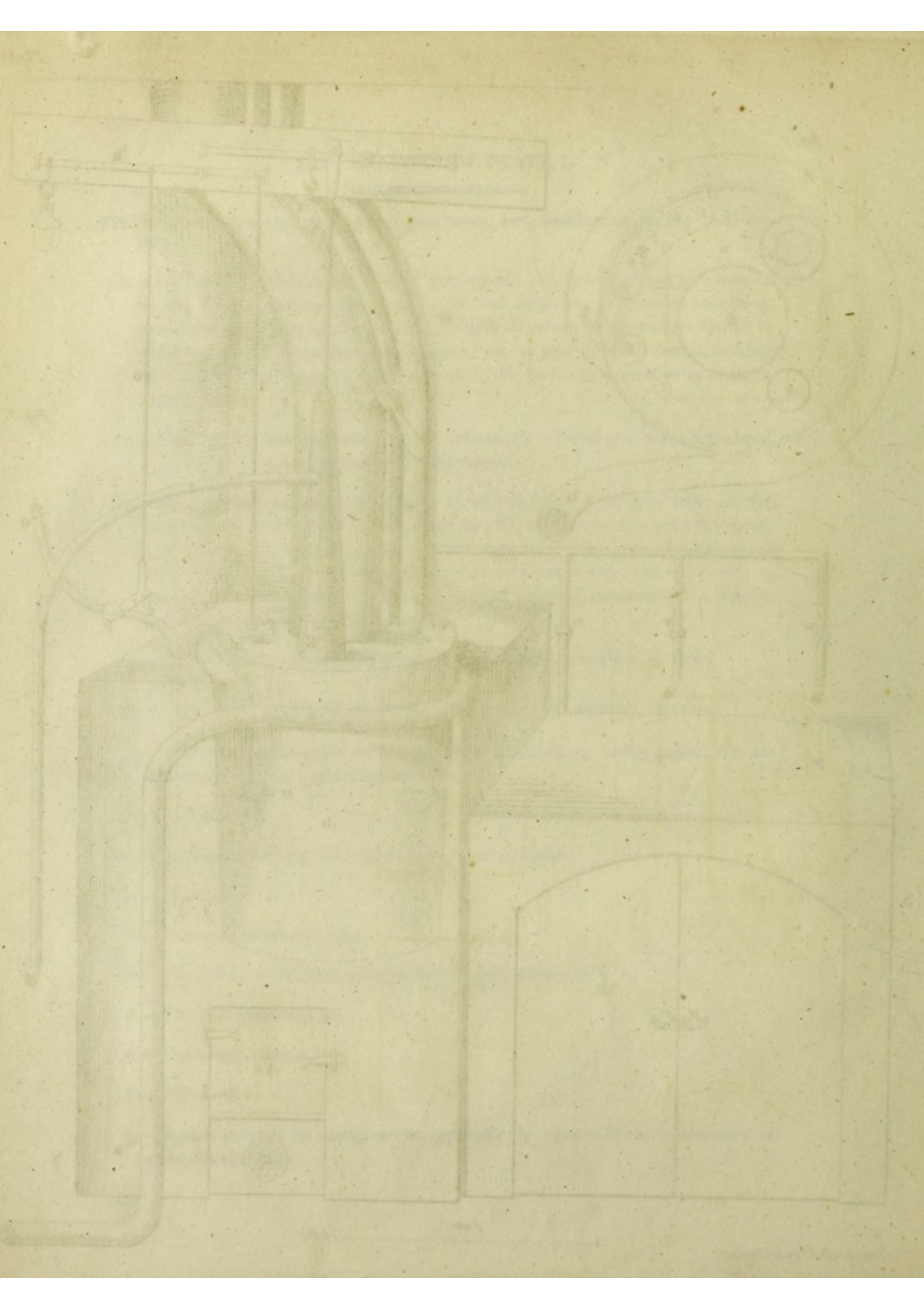


Fig. 1.



Drawn & Etch^d by G. Cooper

Pub^d by John Booth, April 1800, Duke Street, Portland Place, London.



EXPLANATION OF PLATE II.

FIG. 1.—The steam-receiver, covered with net-work of strong whip-cord, with the stool and foot-stool, covered in like manner with net-work.

a.—The receiver.

b.—The aperture through which the steam passes into the receiver.

c, c, c.—Knobs, three of which are on each face of the receiver, for the purpose of fastening the flannel-baths, so as to prevent the escape of the vapour.

FIG. 2.—A plan of the receiver described in Fig. 1.

a.—A tube, perforated on the upper part, through which the vapour passes into the receiver.

b.—A joint which unscrews for convenience.—This tube, which projects from the aperture, b, Fig. 1, receives the vapour from the grand steam-pipe, Pl. 1. Fig. 1.

FIG. 3. A thin plate of perforated white copper, fitted into the receiver for the purpose of diffusing the vapour in the flannel bath.

a, a.—Two knobs by which to raise the plate.

FIG. 4.—A bath of marble, or of any other sufficient substance, to be filled with cold, hot, or tepid water.

a.—A tube with three branches to heat the bath by steam.

FIG. 5.—A frame of cane-work, occasionally placed over Fig. 4. When a patient, who is to receive the vapour generally, is either too weak to sit, or is desirous of indulging in luxury, he reclines on this frame, belonging to which is a pillow of the same materials, and receives the vapour issuing through the frame, from the water below, which is heated to 180 degrees, in a very short space, by means of the tube noticed in Fig. 4.

a, a.—A part of the frame with hinges, for the convenience of taking water from the bath.

FIG. 6.—An index by which the heat is to be regulated, and is therefore graduated with great nicety.

FIG. 7.—An index, to correspond with another in the room where the bath servant attends, to convey short orders, such as *increase the fire; hot water, &c.*

FIG. 8.—A flexible tube when the bath is to be received topically. It was constructed under instructions given by Mr. Dobson, of Dean-street, who is capable of making it so as to preserve flexibility, and retain the vapour: it is eight feet in length, and may be longer if required.

b.—A cock situated in a metal tube for regulating the vapour, instead of the index Fig. 6.

FIG. 9.—A joint of the flexible tube, with a small pipe.

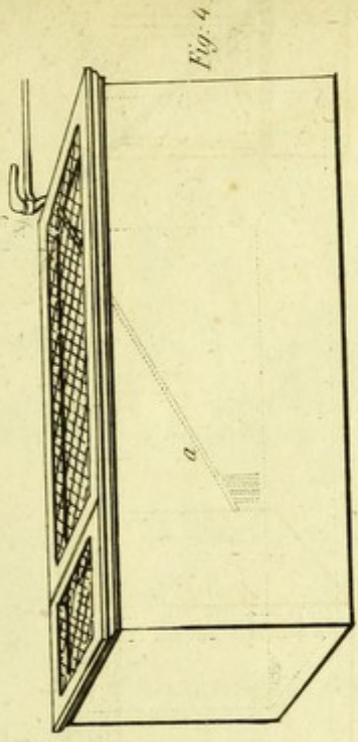


Fig. 4

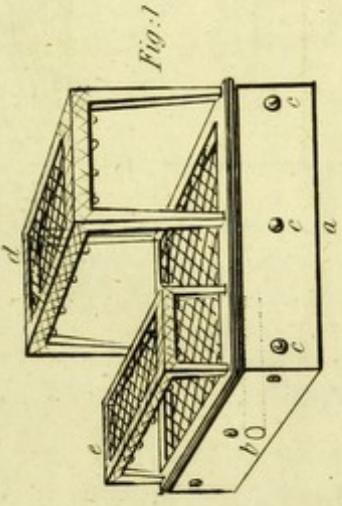


Fig. 1

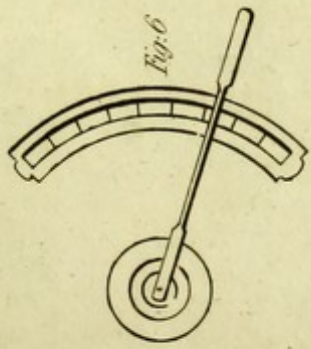


Fig. 6

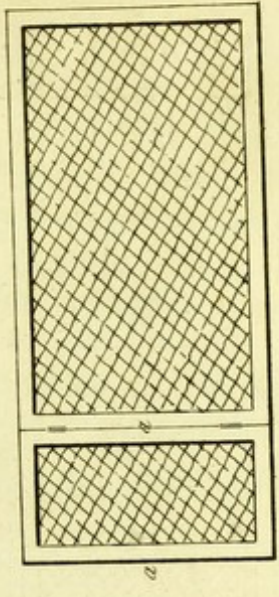


Fig. 5

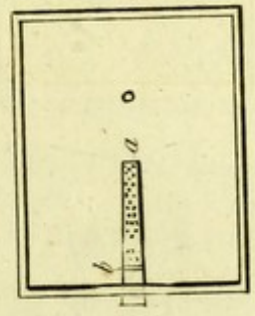


Fig. 2

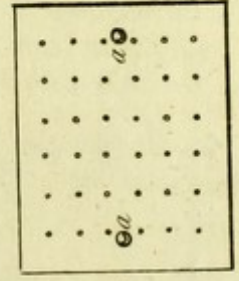


Fig. 3

Scale
6 Feet

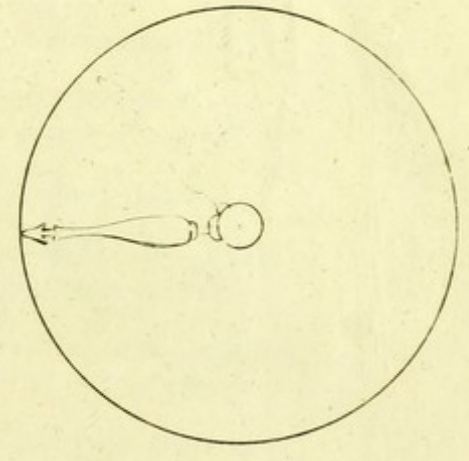


Fig. 7

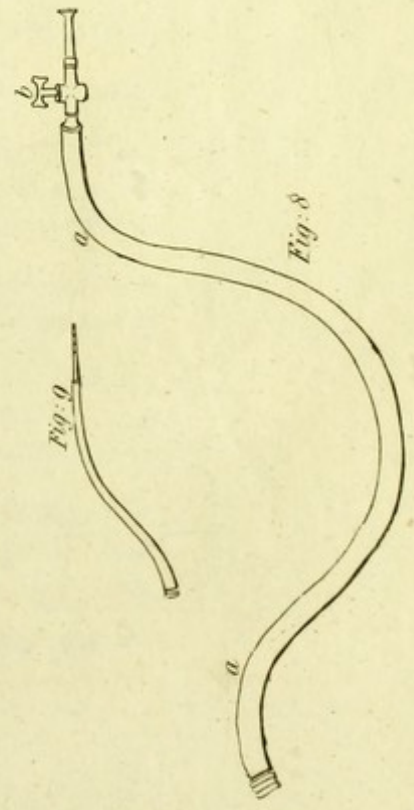


Fig. 8

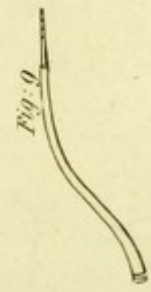
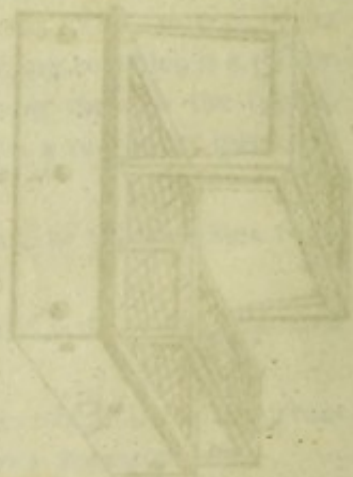
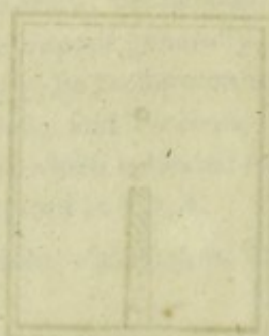
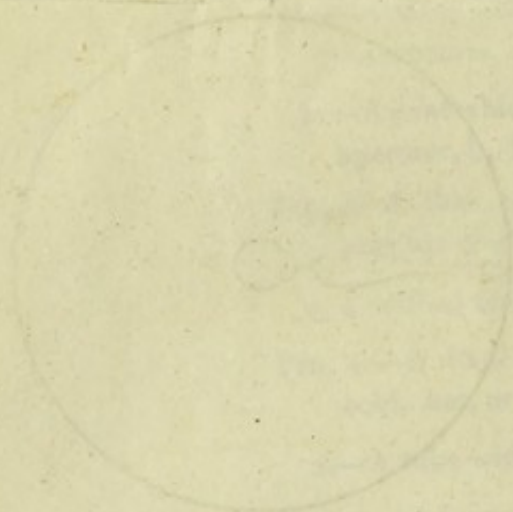
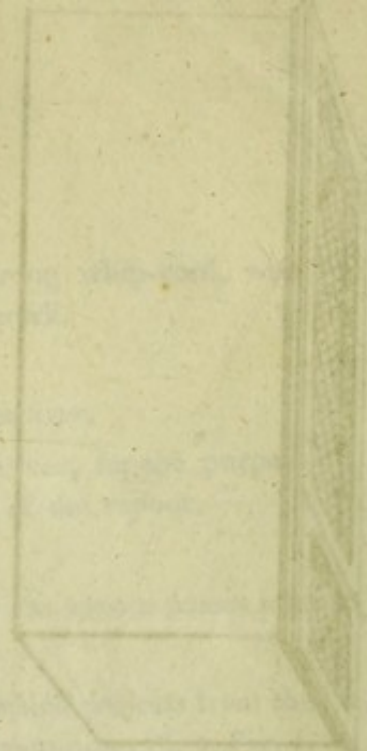
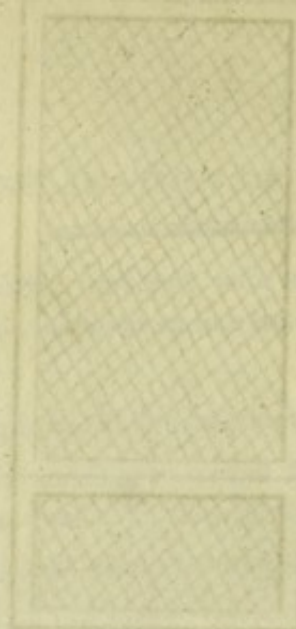


Fig. 9



EXPLANATION OF PLATE III

A description of various Patent Baths, being the substance of the following...

FIG. 1.—The general bath suspended to a cross-bar, a, by ropes, b, the spring...

d, d.—Whalebone hoops by which the funnel is sustained, as is not the case in...

e.—The receiver.

f.—The aperture through which the steam passes into the receiver. The rest of...

g.—Where the bath is drawn over the neck of the patient.

FIG. 2.—The situation of a person in the bath, as shown in Fig. 1, with the neck...

FIG. 3.—A bed of funnel, and profile of a face, nearly of the position in which...

FIG. 4.—A topical bath.

a, a.—Whalebone hoops, as in Fig. 1.

b.—The funnel-bath drawn round the lower, c, instead of the neck, as in Fig. 1.

FIG. 5.—The funnel wrapper used by the patient immediately on putting the bath...

FIG. 6.—A topical bath of funnel, extended by hoops, as Fig. 1; but sustained...

d, d, d.—Opening into the bath for the head, arms or legs, in local affec...

FIG. 7.—A description of Fig. 6. On the opposite side of the bath, two or three...

d, d.—Whalebone, of which the hoops are constructed.

EXPLANATION OF PLATE III.

A Representation of various Flannel Baths, having the appearance of transparency, to the end that they may be the more easily explained and better understood.

FIG. 1.—The general bath suspended to a cross-bar, a, by ropes, b, b, that spring from two pieces of thick whalebone, c, c, fixed within the flannel.

d, d.—Whalebone hoops by which the flannel is extended so as not to come in contact with the bather.

e.—The receiver.

f.—The aperture through which the steam passes into the receiver. The rest of this figure is explained in Pl. 4.

g.—Where the bath is drawn round the neck of the bather.

FIG. 2.—The situation of a person in the bath, as shewn in Fig. 1, with the stool and foot-stool, as described in Pl. ²~~3~~, Fig. 1.

FIG. 3.—A hood of flannel, and profile of a face merely to shew position. This is used by the bather as a covering to the head, which appears bare in Fig. 2.

FIG. 4.—A topical bath.

a, a.—Whalebone hoops, as in Fig. 1.

b.—The flannel-bath drawn round the loins, c, instead of the neck as in Fig. 1.

FIG. 5.—The flannel wrapper used by the bather immediately on quitting the bath. It is made full, in the shape of a cone at the upper part for the head; and when a person is enfolded by it, it has the appearance exhibited under this figure.

FIG. 6.—A topical bath of flannel, extended by hoops, as Fig. 1; but suspended by a single tape, or rope, and its upper part shaped like a dome.

b, b, b, b, b.—Openings into the bath for the head, arms or legs, in local affections. Those openings, which are five or six inches in length, have running tape at their extremities, to draw close round the part to be bathed.

FIG. 7.—An illustration of Fig. 6. On the opposite side is seen a patient with his head, one leg, and one arm in the bath; the two latter supported by a network, a, a.

b, b.—Whalebone, of which the dome is constructed.

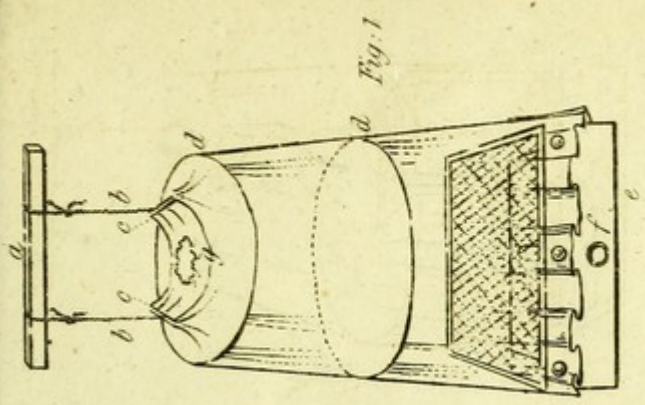


Fig. 1

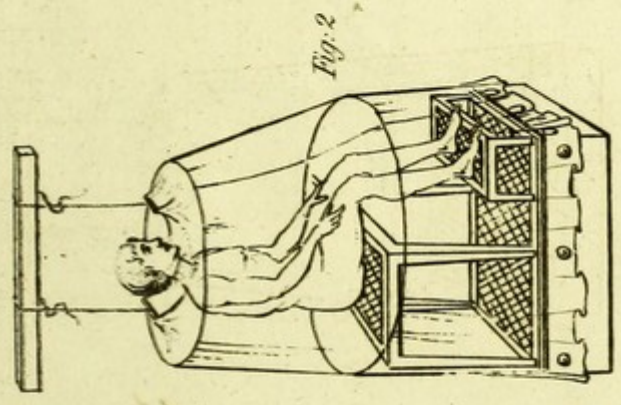


Fig. 2

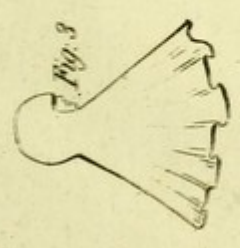


Fig. 3

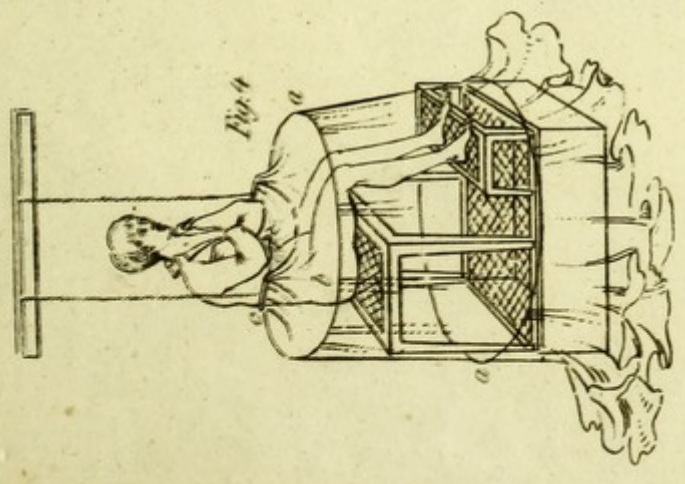


Fig. 4

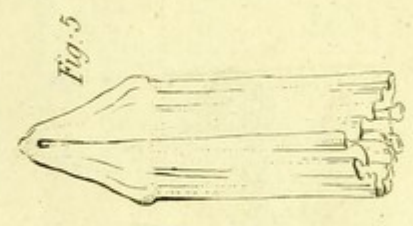


Fig. 5

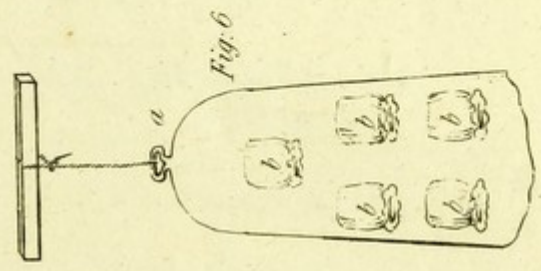


Fig. 6

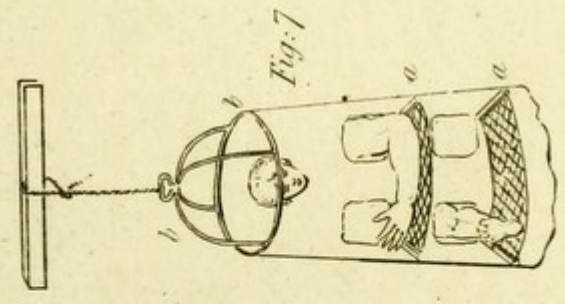
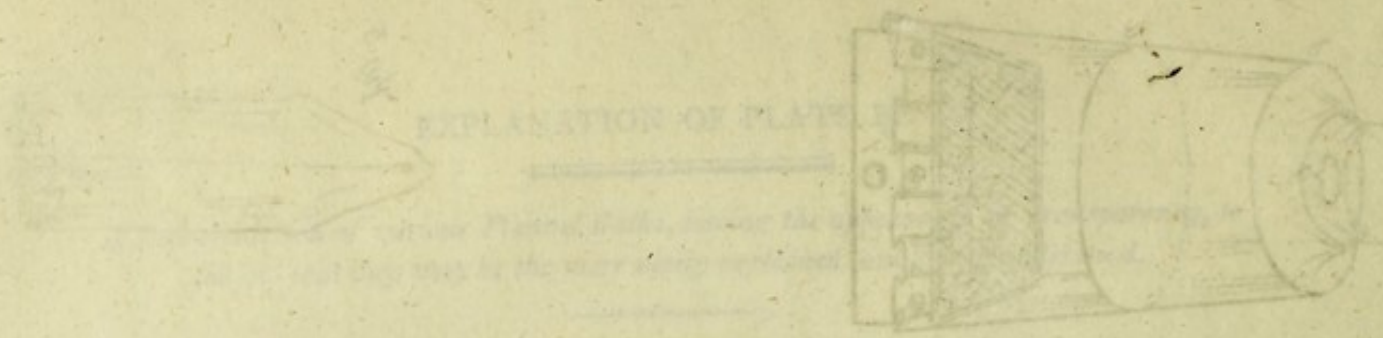


Fig. 7

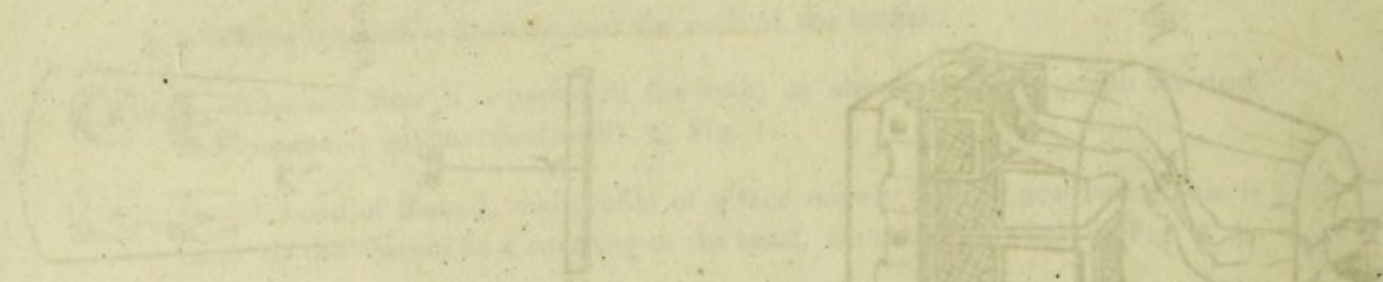
Scale 4 Feet

EXPLANATION OF PLATE



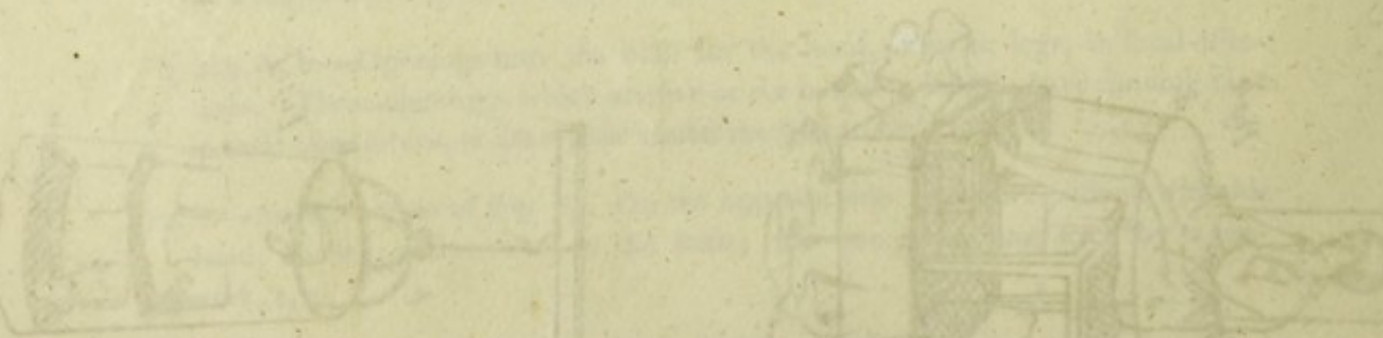
Faint, illegible text describing the component, possibly mentioning 'Plating' and 'the wire'.

Additional faint, illegible text, possibly describing the manufacturing process or material.



Faint, illegible text describing the component, possibly mentioning 'the wire' and 'the hole'.

Additional faint, illegible text, possibly describing the manufacturing process or material.



Faint, illegible text describing the component, possibly mentioning 'the wire' and 'the hole'.

EXPLANATION OF PLATE IV.

Plans and an Elevation of a Bath in the Middlesex Hospital.

FIG. 1.—The elevation, containing two baths, a, b, c; the middle part, b, being the partition.

d.—A dressing-room.

e.—A water-closet.

FIG. 2.—Plan of the bath-room.

FIG. 3.—Plan of the consultation-room.

FIG. 4.—Plan of the kitchen.

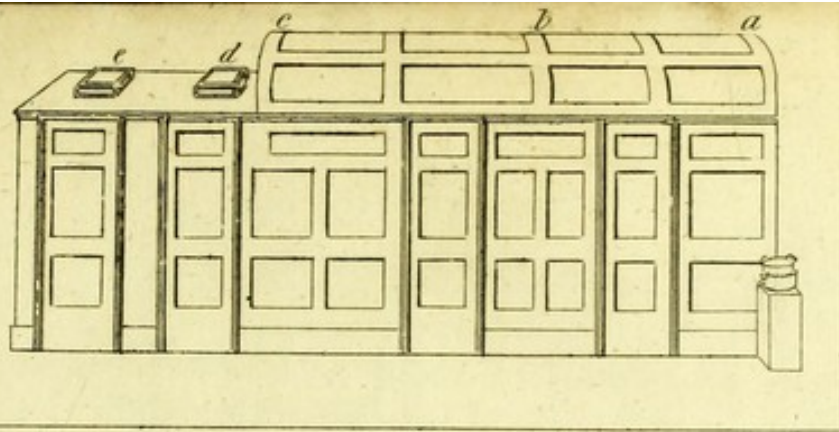


Fig. 1

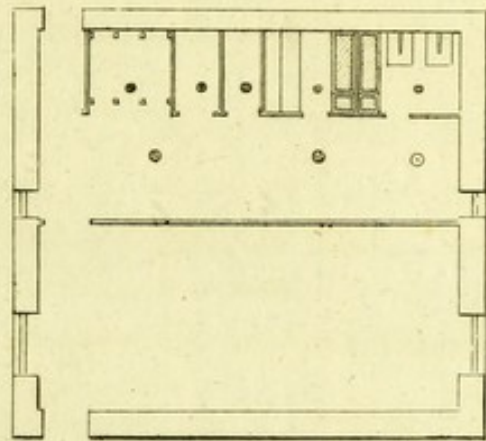


Fig. 2

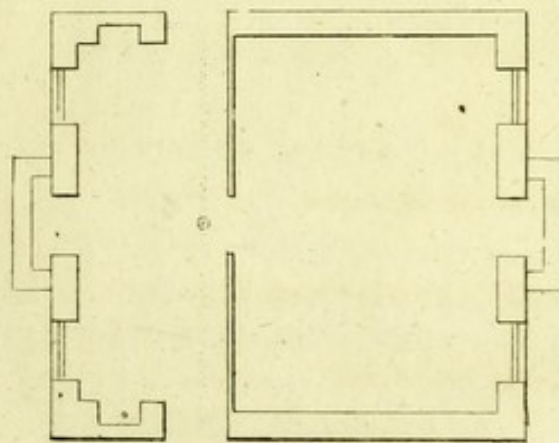


Fig. 3

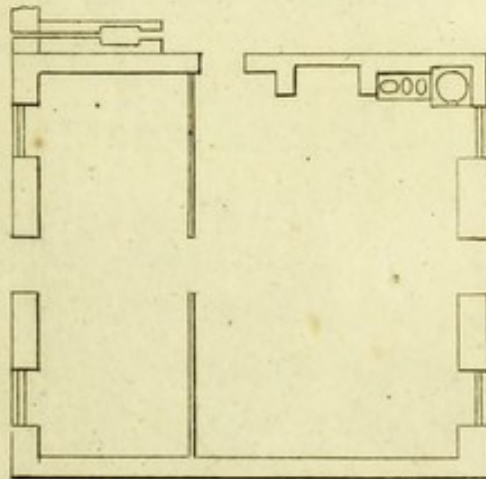
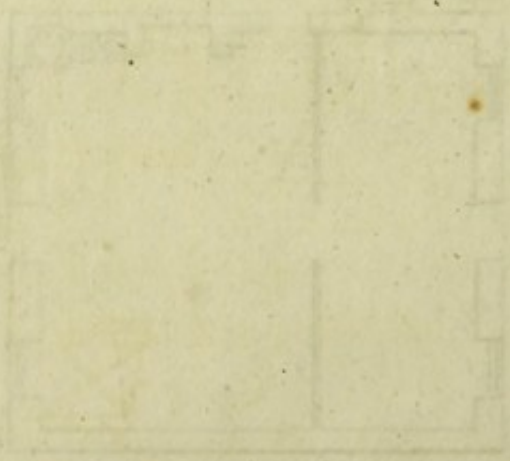
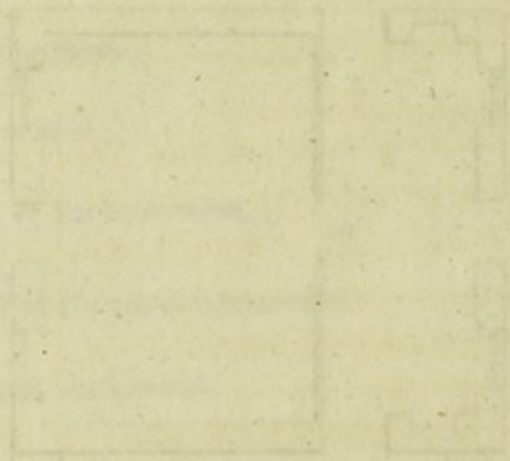


Fig. 4

Scale 40 Feet

Drawn & Etch'd by G. Cooper

Pub'd by John Booth, April 1804, Duke Street, Portland Place, London



EXPLANATION OF PLATE V

Fig. 1.—The apparatus, upon an extensive scale, installed for an Hospital.—The apparatus here shown is the Miller's Hospital.

Fig. 2.—A. The machinery, or mechanism, described in Fig. 1, Fig. 1. The apparatus is the Miller's.

B.—A view of the rotating mechanical system.

C.—A detail of the rotating system.

D.—A detail of water, heated by the heat, or for the purpose, and of the boiler, and other portions of the boiler.

E.—The steam and hot air pipes, shown in Fig. 1, Fig. 1, and through the floor.

Fig. 3.—The condensation-room, into which the steam and hot air pass, in Fig. 1, shown at B, and around it, being the apparatus, and the apparatus.

Fig. 4.—The hot air mechanism, or apparatus, of the former part, under the floor, and below the room, or space, of the boiler, B, B, B, B, and the steam-pipe, shown at E, passes along the walls, through a partition, and apparatus, at A.

Fig. 5.—Two steam-coils, with their stops and hot-water, at the top of Fig. 1.

Fig. 6.—The boiler with the apparatus, described in Fig. 1, Fig. 1.

Fig. 7.—A detail of the steam-pipe, with the boiler, at A.

Fig. 8.—The pipes, marked 1 and 2, and a detail of the apparatus, at A, and the boiler, at B, is a partition that is in the boiler, and the boiler.

The boiler contains the heat for heating and raising steam, the upper portion of the boiler, marked, the vapor being condensed at A, and the lower, and the boiler, contains the heat for heating, or being on the boiler, B, B, B, B, and the boiler, as the heat is condensed, and raised, or as it is raised.

Fig. 9.—The cold water-tank, and B. B. the cold water, supplied from the boiler, at A.

Fig. 10.—A detail of the apparatus, at A, and the boiler, at B, and the boiler, at C.

Fig. 11.—A detail of the apparatus, at A, and the boiler, at B, and the boiler, at C.

Fig. 12.—A detail of the apparatus, at A, and the boiler, at B, and the boiler, at C.

Fig. 13.—A pipe to clean the water-tank.

Fig. 14.—A pipe to the light and dressing-room.

Fig. 15.—A detail of the apparatus, at A, and the boiler, at B, and the boiler, at C.

EXPLANATION OF PLATE V.

An Apparatus, upon an extensive Scale, calculated for an Hospital.—The Apartments here shewn are in the Middlesex Hospital.

FIG. 1.—A. The machinery, in miniature, described in Plate 1, Fig. 1. The situation is the kitchen.

b.—A vessel for receiving condensed vapour.

c.—The conductor of the condensing vapour.

d.—A boiler of water, heated by the stove, e, for the common use of the patients, and other purposes of cleanliness.

f.—The steam and hot air pipes, seen in Pl. 1, Fig. 1, that pass through the floor at g.

FIG. 2.—The consultation-room, into which the steam and hot air pipes, in Fig. 1, enter at h, and extend to i, heating the apparatus in their passage.

FIG. 3.—The hot air and steam-pipes here branch off; the former passing under the floor, and heating the room by means of the pataras, j, j, j, j, j, j; and the steam-pipe entering at k, proceeds along the wall, at l, through a partition, m, and terminates at n.

o, o.—Two steam-receivers, with their stools and foot-stools, as m. Pl. 2, Fig. 1.

p, p.—Two baths with their cane-work, described in Pl. 2, Fig. 1.

q, q.—Branches of the steam-pipe, with their cocks, r, r.

✂ The points marked 1 and 3 form into a close apartment, as in Pl. 4, Fig. 1; and the point, 2, is a partition that divides it into two distinct rooms.

The one contains the bath for general and topical uses; the other partakes of the Russian method, the vapour being admitted at s, soon fills the room, and the patients receive it sitting, or lying on the benches, t, u, going from one to the other as the heat becomes too violent, or as it decreases.

V. 1.—The cold shower-bath, and D. d. the cold shoot, supplied from the cistern, X.

V. 2.—A cistern supplied with heat from a pipe, w, for the hot shoots.

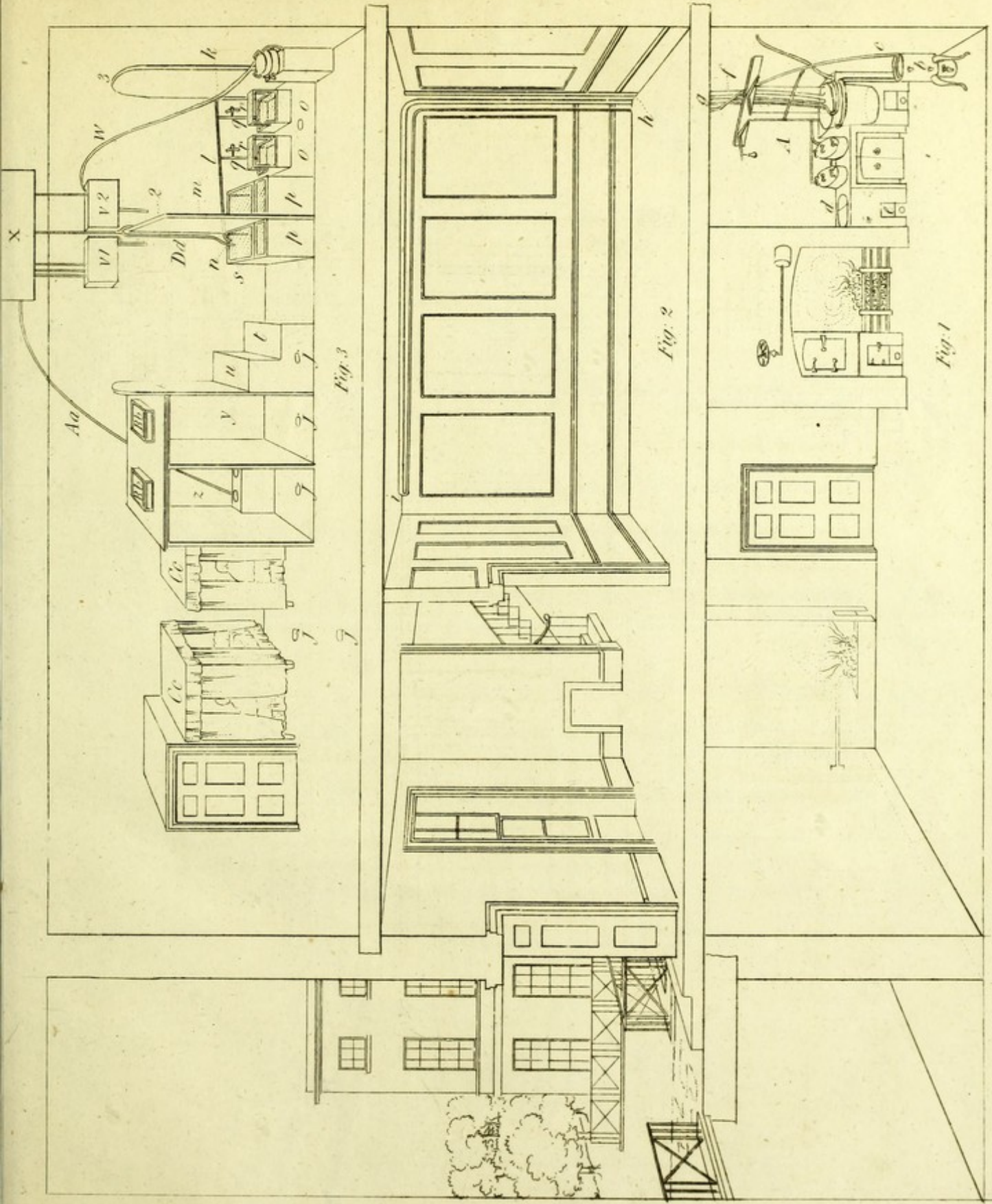
Y.—A dressing-room, heated by its patara, j.

Z.—A water-closet.

A. a.—A pipe to clean the water-closet.

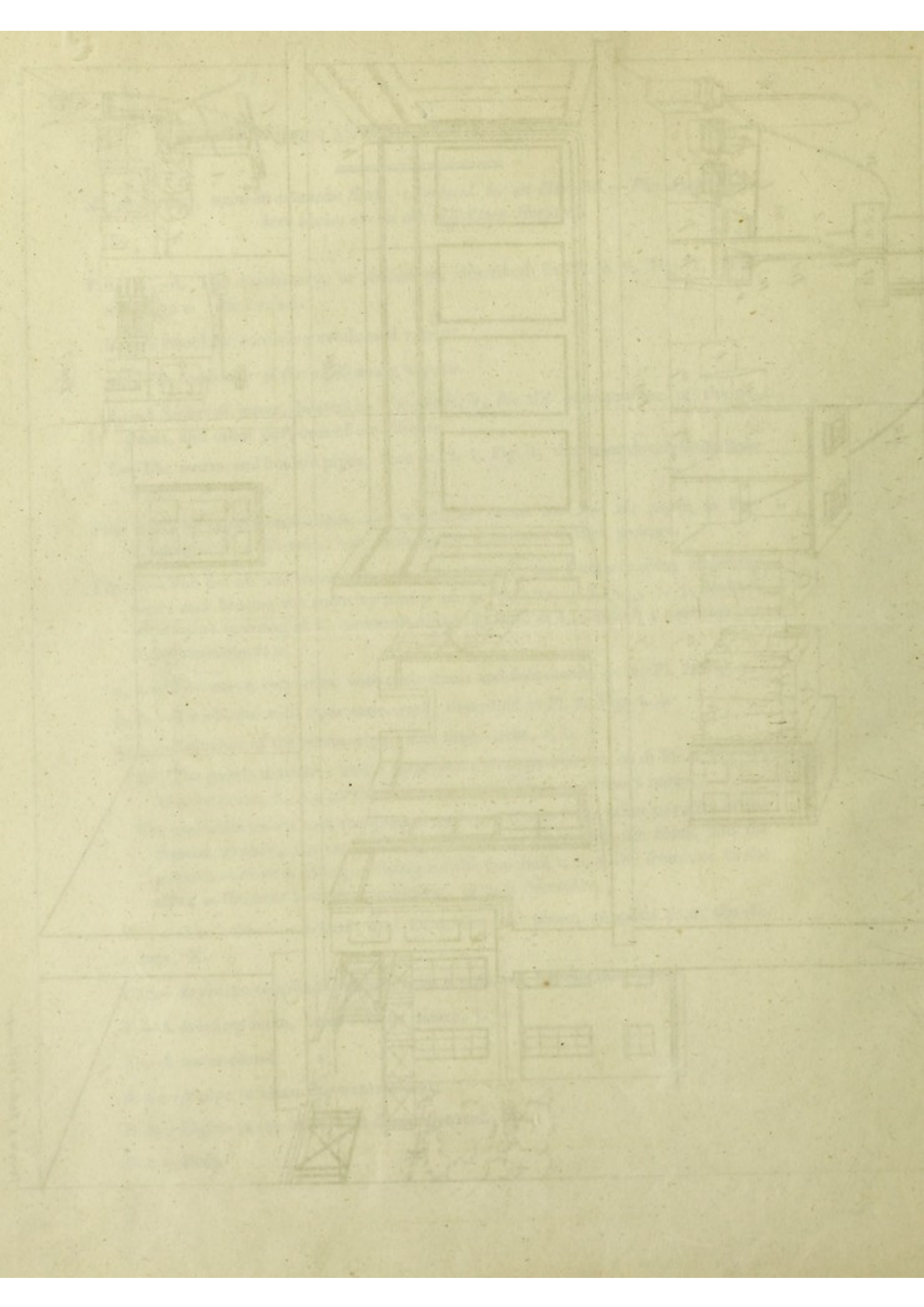
B. b.—Lights to the closet and dressing-room.

C. c.—Beds.



Drawn & Etched by G. Cooper

Pub^d by John Booth, April 1849, Duke Street, Portland Place, London



EXPLANATION OF PLATE VI.

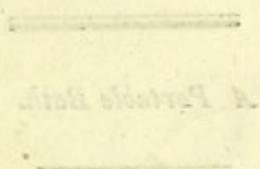


FIG. 1.—The boiler.

b.—The receiver.

c.—The steam-pipe, which enters the receiver at d.

e.—A cock for regulating the heat of the vapour in the receiver, by means of a rod, f.

g.—A spherical vessel, of power, which opens at h. Its purpose is to contain herbs, when a medicinal vapour is required; when used the steam-pipe screws to it at i.

k, l.—Joints in the steam-pipe, united by an union-screw.

m, n, o, p.—Bots for supporting the frame-work, or round the exterior of which flannel curtains are suspended. The bots are removable at pleasure.

FIG. 2.—A plan of the receiver described in *Fig. 1.*

This apparatus is particularly well calculated for on board a ship; and the medical gentleman, in applying it, will perceive that it may be carried through the decks, and conveyed to any part of the vessel, either above or below.

EXPLANATION OF PLATE VI.

A Portable Bath.

FIG. 1.—a, The boiler.

b.—The receiver.

c.—The steam-pipe, which enters the receiver at d.

e.—A cock for regulating the heat of the vapour in the receiver, by means of a rod, f.

g.—A spherical vessel, of pewter, which opens at h. Its purpose is to contain herbs, when a medicated vapour is required; when used the steam-pipe screws to it at i, i.

k, k.—Joints in the steam-pipe, united by an union-screw.

l, l, l, l.—Posts for supporting the frame-work, m, round the exterior of which flannel curtains are connected. The posts are removable at pleasure.

FIG. 2.—A plan of the receiver described in ~~Fig 6.~~ *Pl. 2. Fig 2:*

☞ This apparatus is particularly well calculated for on board a ship; and the medical gentleman, in applying it, will perceive that it may be carried through the decks, and conveyed to any part of the vessel, either above or below.

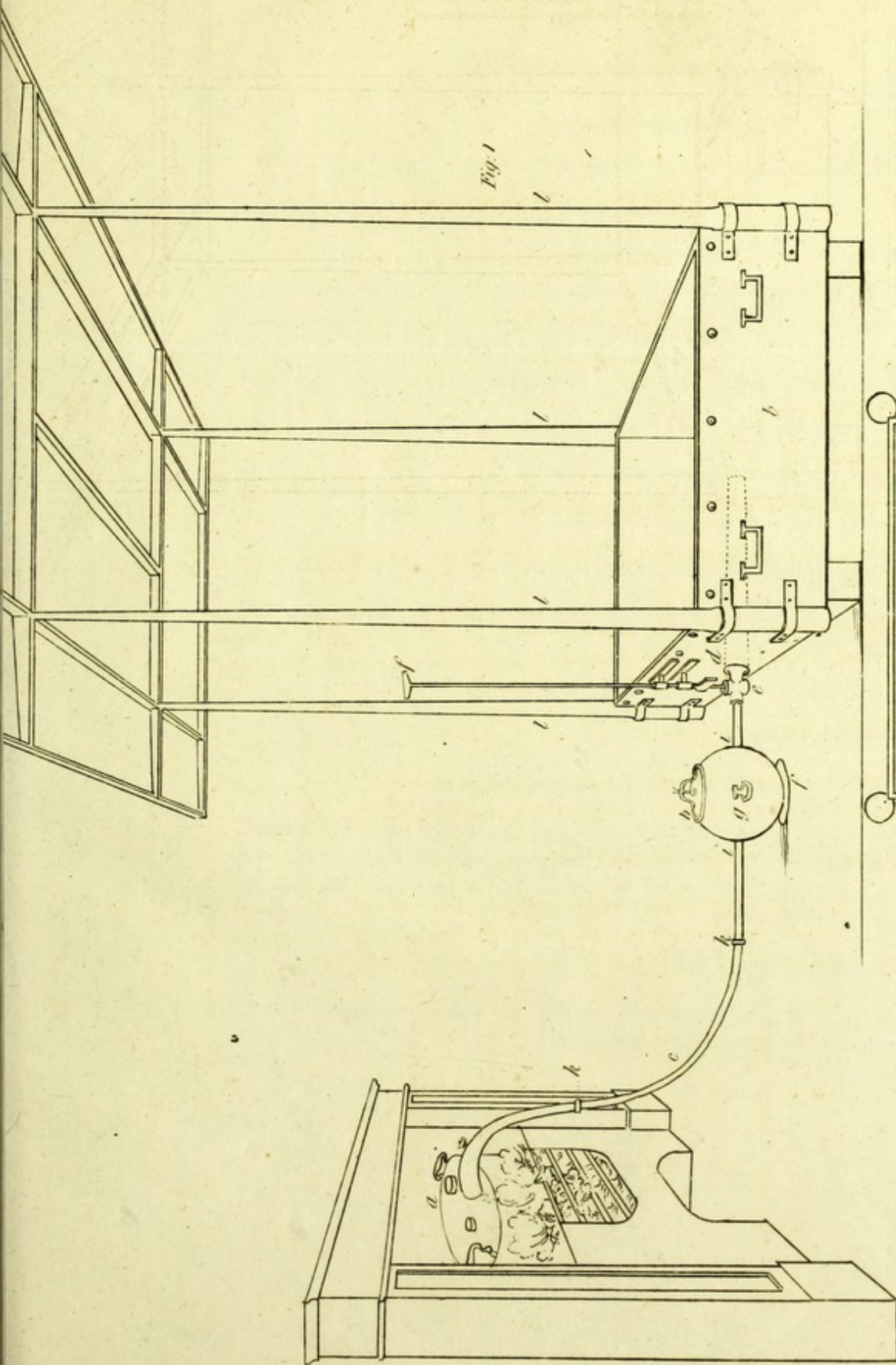


Fig. 1

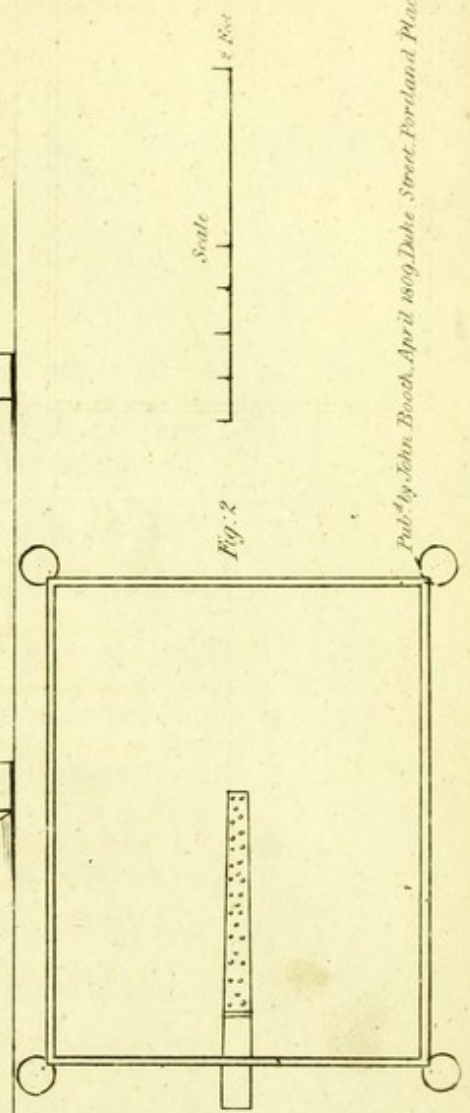
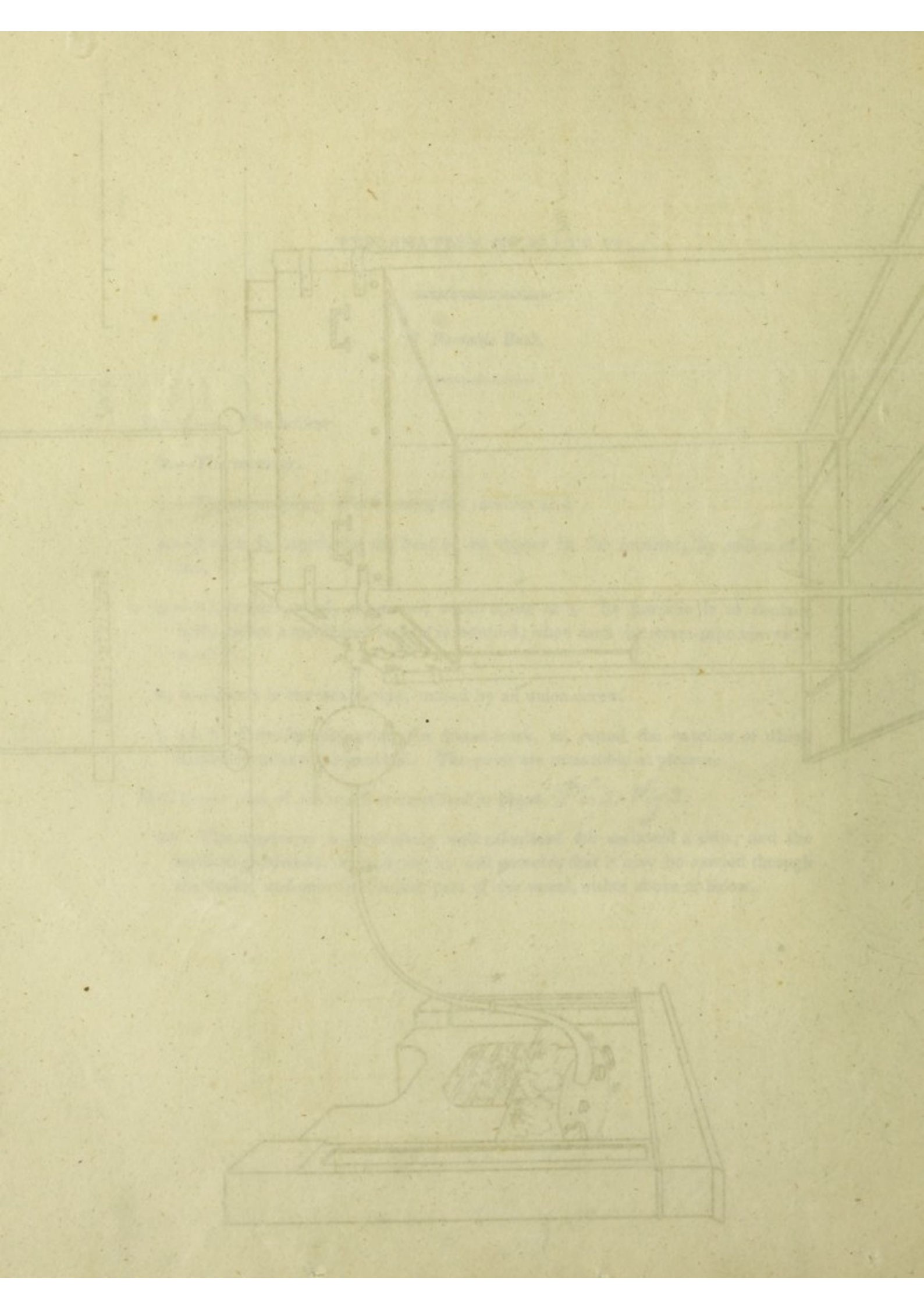


Fig. 2

Drawn & Etch^d by G. Cooper

Pub^d by John Booth, April 1869, Duke Street, Portland Place, London



EXPLANATION OF PLATE VII

A Portable Bath, with the apparatus and apparatus

Fig. 1.—A patient receiving the vapour topically.

a.—The funnel bath, drawn round the patient's neck, &c. In this bath the vapour is supposed to be introduced; passing from the lower through the medicinal vessel, described in Fig. 6, the conducting tube enters the vapour chamber, &c. &c. & emerges on the opposite side, &c. &c. and is introduced into the funnel bath, &c.

Fig. 2.—The hood described in Pl. 3, Fig. 2.

Fig. 3.—A topical bath, for the breast, hip, knee, &c.

a.—The end to be applied to the part affected.

b.—The aperture, through which the vapour is introduced.

c.—Slight hoops of whale bone, capable of expansion or contraction, to adapt the bath to the part to be bathed.

d, d.—Tapes by which the bath is fastened.

Fig. 4.—An illustration of Fig. 2.

Fig. 5, 6.—Shows how the whole apparatus is expanded and contracted.

Fig. 7.—The patient bathed, and the bath employed, the same as in Fig. 1, except that in this fig. the vapour is introduced at the upper, instead of the lower end of the bath, and the patient guides the tube, so as to receive the vapour immediately on his breast.

a.—The frame work as described in Pl. 6.

Fig. 8.—The exterior of the frame-work, in Fig. 7, with its exterior of funnel looped up at a, to show the topical bath, b.

EXPLANATION OF PLATE VII.

A Portable Bath, with the Apparatus and Appendages.

FIG. 1.—A patient receiving the vapour topically.

a.—The flannel bath, drawn round the patient's loins at, b. In this fig. the vapour is supposed to be medicated: passing from the boiler through the medicating vessel, described in Pl. 6, the conducting tube enters the vapour receiver at c; emerges on the opposite side, at d; and is introduced into the flannel bath, at e.

FIG. 2.—The hood described in Pl. 3, Fig. 3.

FIG. 3.—A topical bath, for the breast, hip, knee, &c.

a.—The end to be applied to the part affected.

b.—The aperture, through which the vapour is introduced.

c, c.—Slight hoops of whale bone, capable of expansion or contraction; so as to adapt the bath to the part to be bathed.

d, d.—Tapes by which the bath is fastened.

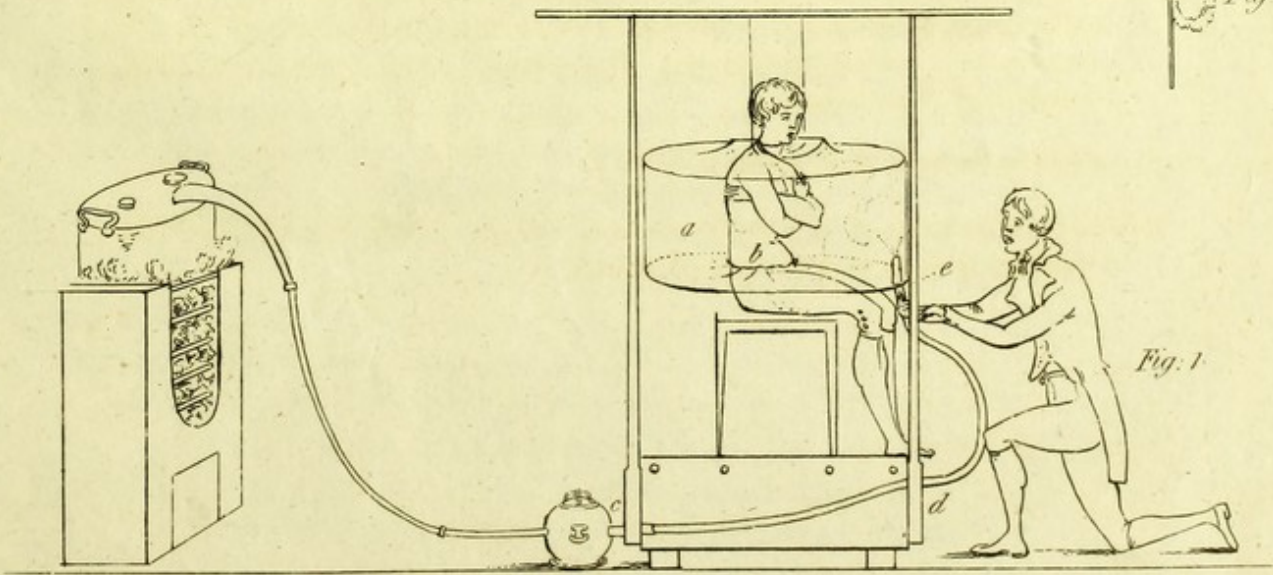
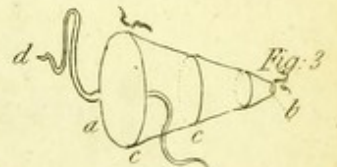
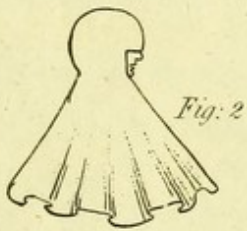
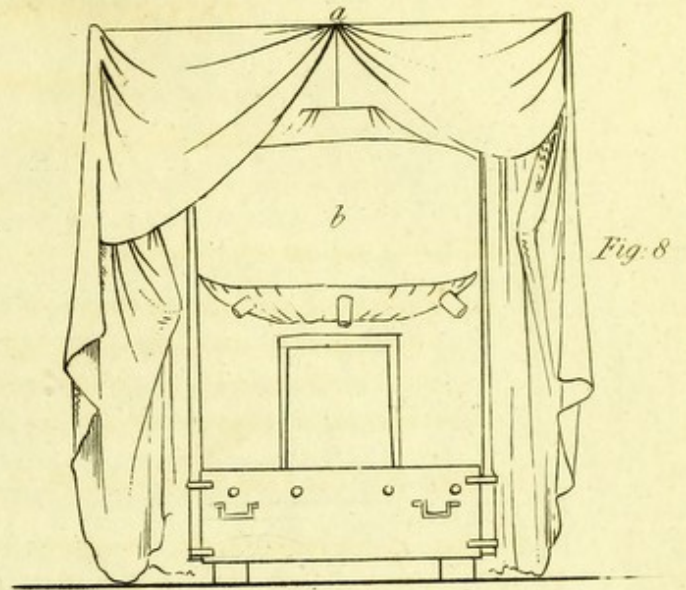
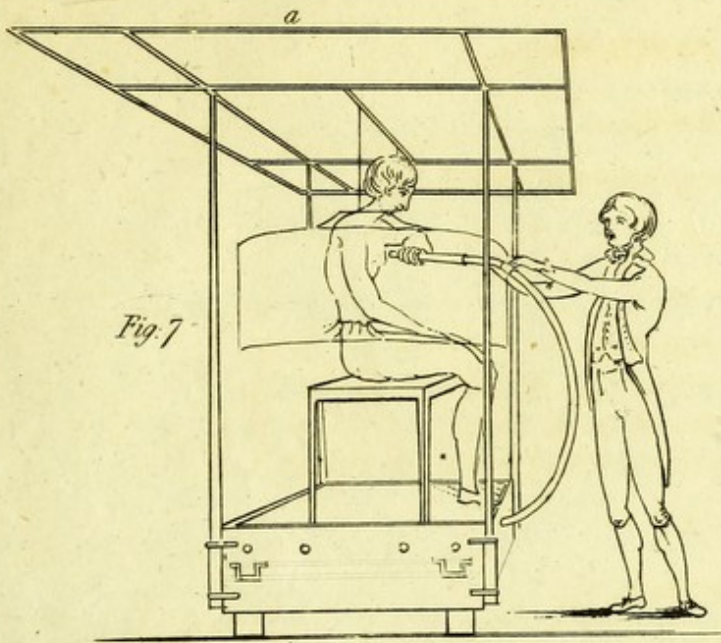
FIG. 4.—An illustration of Fig. 3.

FIG. 5, 6.—Shews how the whalebone is expanded and contracted.

FIG. 7.—The patient bathing, and the bath employed, the same as in fig. 1; except, that in this fig. the vapour is introduced at the upper, instead of the lower end of the bath, and the patient guides the tube, so as to receive the vapour immediately on his breast.

a.—The frame work as described in Pl. 6.

FIG. 8.—The exterior of the frame-work, in Fig. 7, with its curtains of flannel, looped up at a, to shew the topical bath, b.

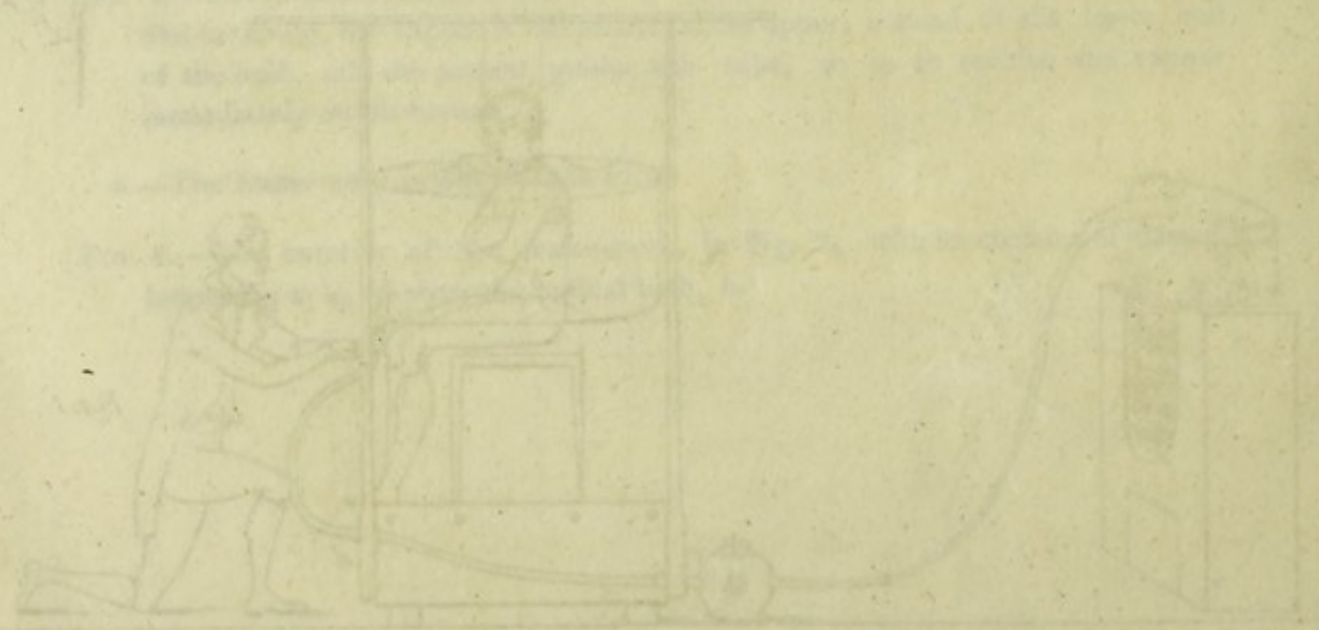
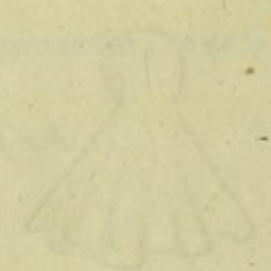
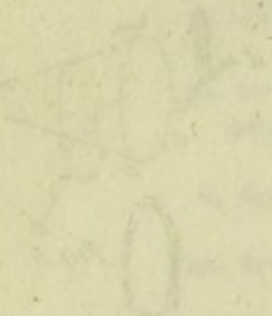
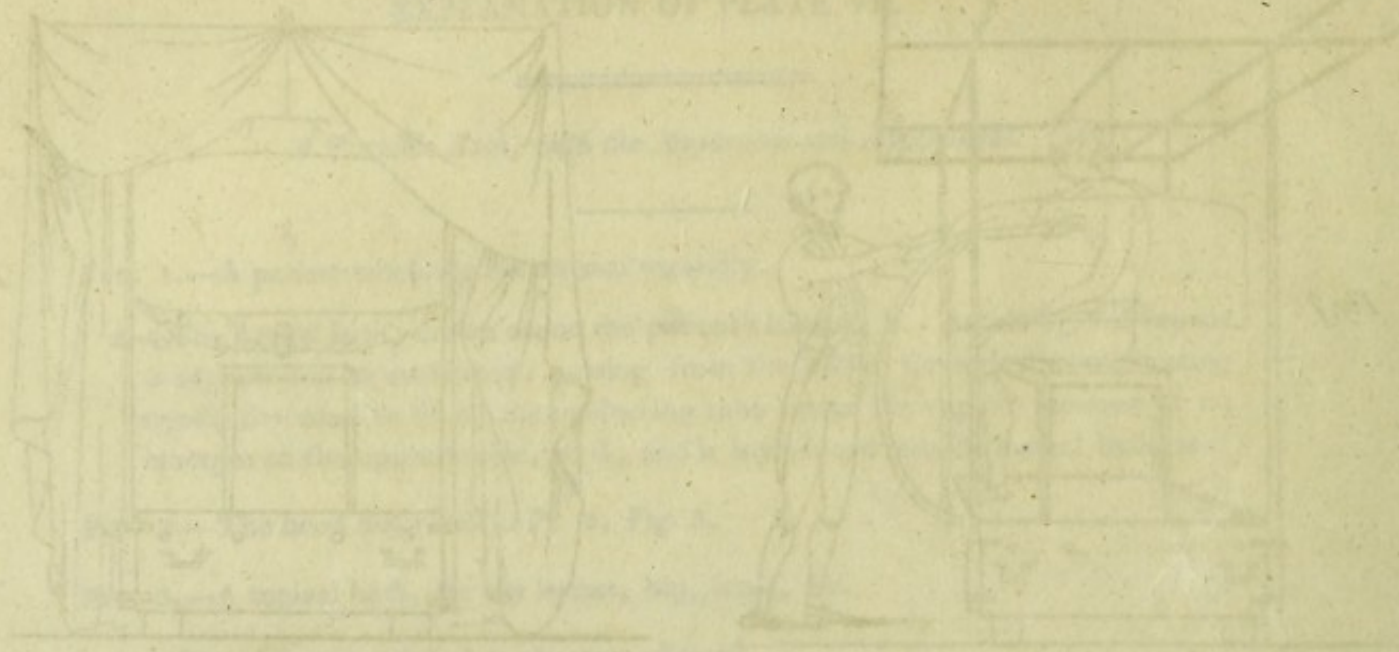


Drawn & Etch^d by G. Cooper

Scale 3 Feet

Pub^d by John Booth, April 1809, Duke Street, Portland Place, London

EXPLANATION OF PLATE VI



EXPLANATION OF PLATE VIII.

Bathing Rooms, one above another, calculated for a Private Family.

FIG. 1. a.—The apparatus described in Pl. 1, Fig. 1; but the pipes for the steam and atmospheric air, are reversed in this Fig.

b.—The grate, mentioned in the description of Pl. 1, fixed on the out-side of the house, for introducing atmospheric air.

c, c.—The case containing the atmospheric air pipe, which, in order to have its heat kept up, receives steam from the grand steam pipe; consequently there must be a canal for carrying off the condensed vapour, and the tube for that purpose commences at d, and proceeding to e, is joined by the tube f, which carries off the superabundant vapour from the safety valve, as described under Pl. 1, Fig. 1

g.—The vessels for receiving the condensed vapour.

h.—A cold bath, supplied with water from a pump, i, by a pipe, k, k, which has a cock, l.

This pump also supplies the upper room with water conveyed through the pipe, m.

n.—Waste water pipes that meet at o.

p.—A tube through which cold water is carried into the boiler as in Pl. 1, Fig. 1.

FIG. 2.—A skeleton of the bathing room with its apparatus.

a, a.—The ends of the room, or box, made of timber plank.

b.—A cross bar, to which the flannel baths are suspended.

c.—The receiver.

d.—The pipe, by which the vapour is immediately thrown into the receiver.

e.—The index or regulator.

f, and g.—The levers, applicable to the regulator. In the position seen in the plate, *i. e.* f thrown up, and g down, the vapour is conducted into the marble bath, h, by the tube, i, i; when reversed, that is, g thrown up, and f brought down, the steam ceases in the marble bath and enters the receiver, c.

k.—A cistern, supplied by the pipe, m, from the pump, in Fig. 1.

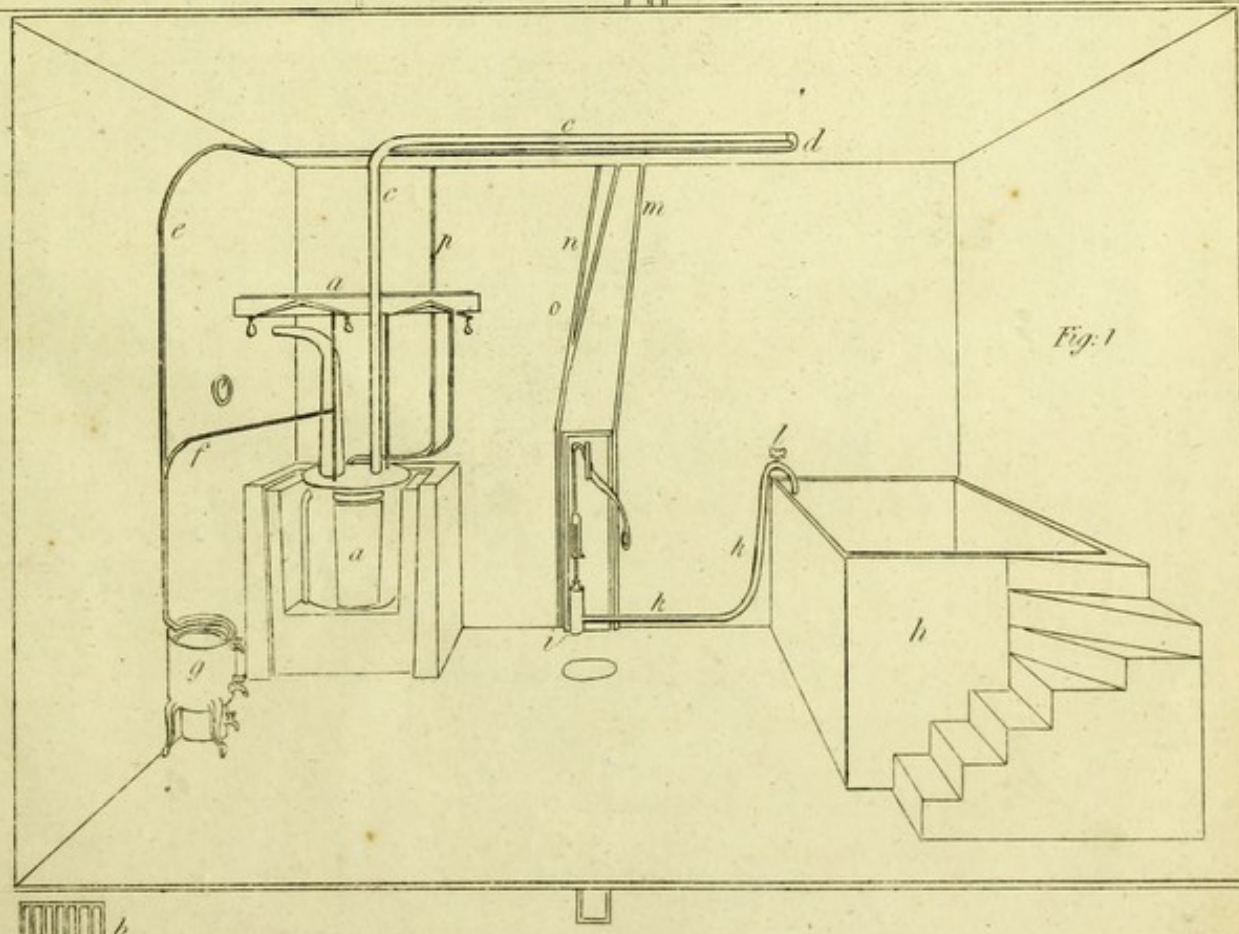
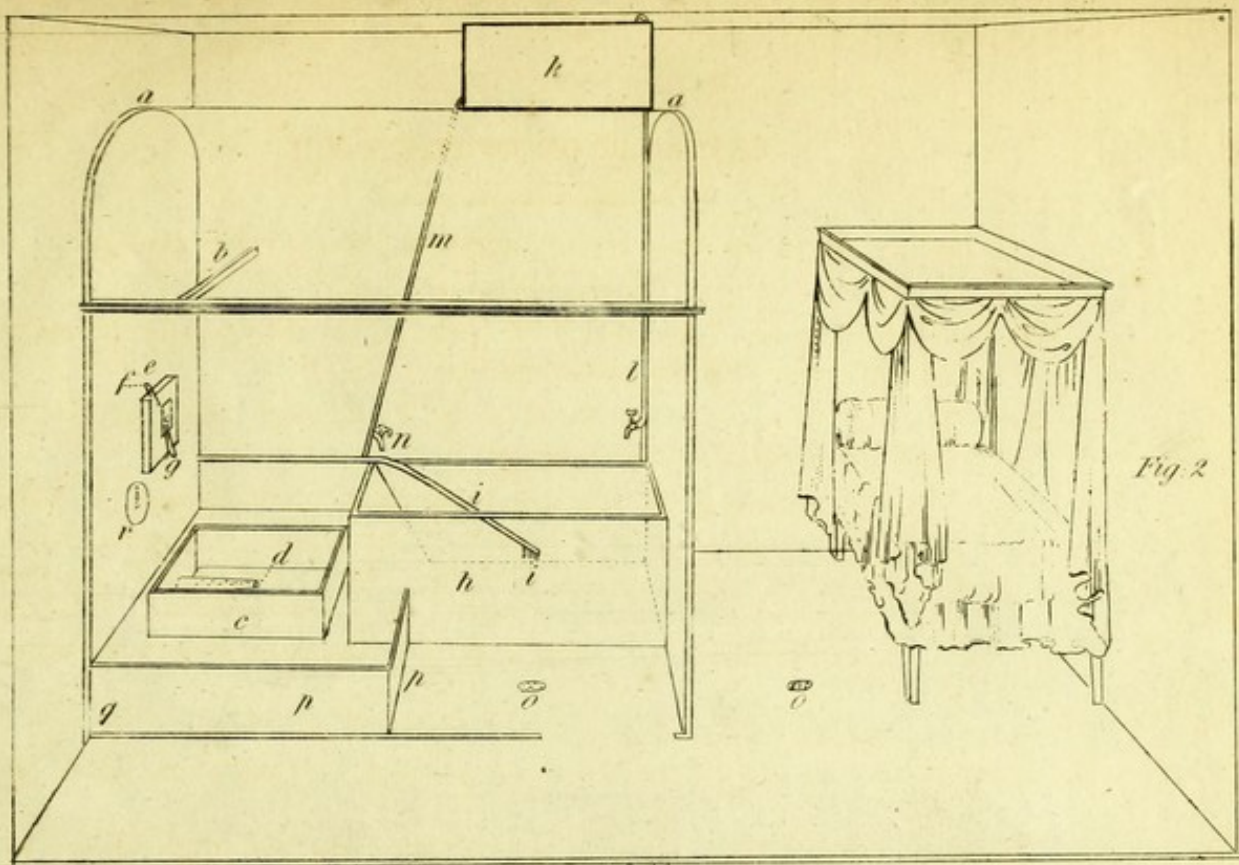
l.—A branch from the cistern, k, to supply the bath, h.

m, m.—A pipe from the cistern, k, that, passing through the floor of Fig. 2, enters Fig. 1 at n, and supplies the boiler with cold water, upon the principle described in Pl. 1, Fig. 1. It also supplies the bath, h, with cold water, by a cock, n.

o, o.—Pataras, heated from the heated atmospheric air pipe, c, in Fig. 1.

p, p.—A raised plank that joins the bath, h, and the end of the bath room, a, a, at g, to prevent the condensed vapour from spreading over the floor.

r.—An index for orders, described in Pl. 2, Fig. 7.



EXPLANATION OF PLATE IX.

This Plate exhibits the interior of a House, from the Kitchen to the Garret; and is intended to shew that the Vapour can be conveyed from the latter to the former.

a.—The apparatus, as m, Pl. 1, Fig. 1.

b, b.—Pipes, from the grand steam-pipe, to heat closets and serve culinary utensils, as in Pl. 1, Fig. 1.

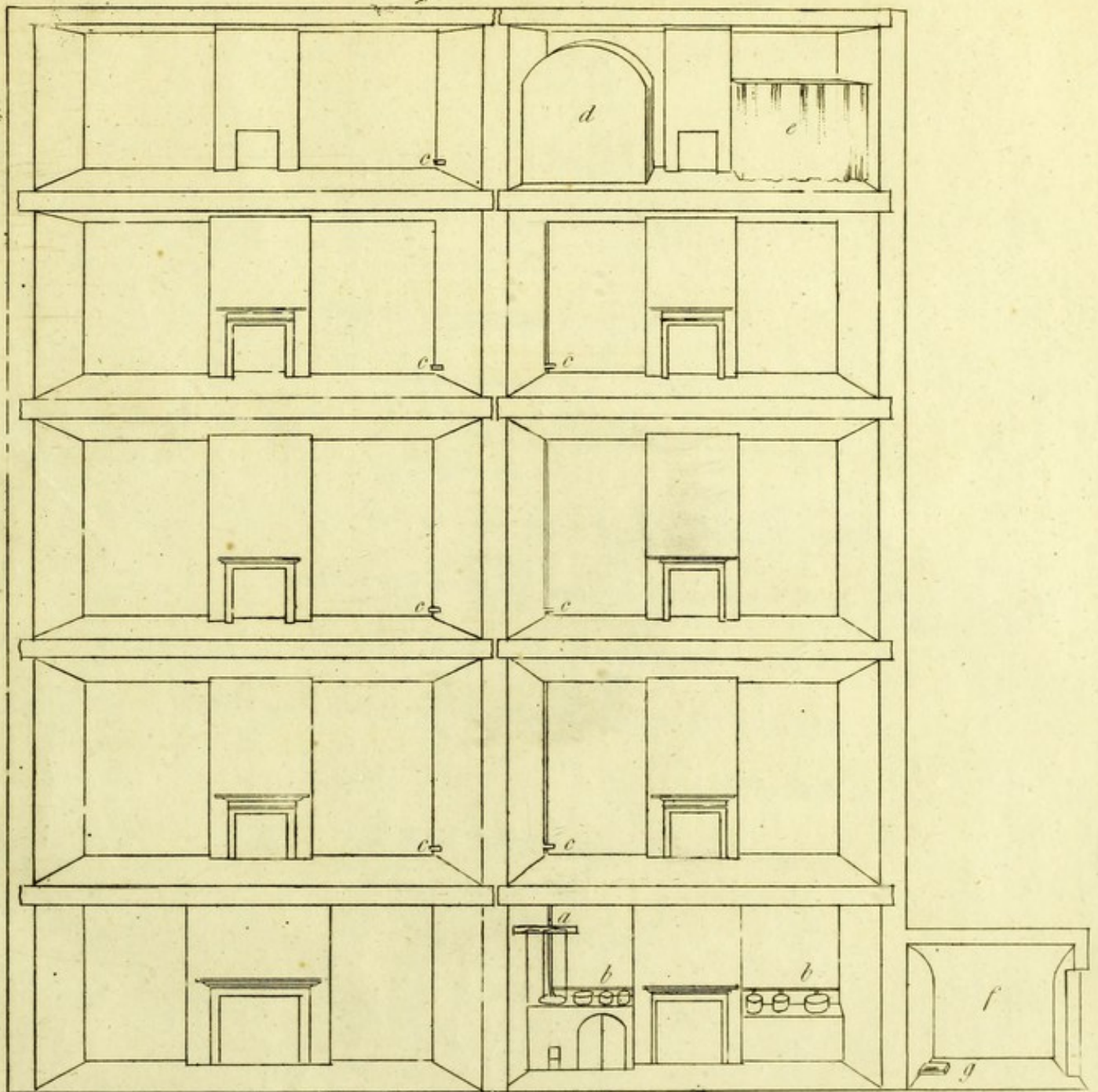
c, c, c, c.—Tubes from the steam-pipe, for conducting the vapour into the bath.

d.—The box, or bathing-room, as in Pl. ⁵3, Fig. ³2; with this difference, that here it is closed, as in Pl. 4, Fig. 1.

e.—A bed, as in Pl. 5, Fig. 3.

f.—A stable, or temporary building near the kitchen, for bathing horses.

g.—The receiver, as in Pl. 2, Fig. 1.



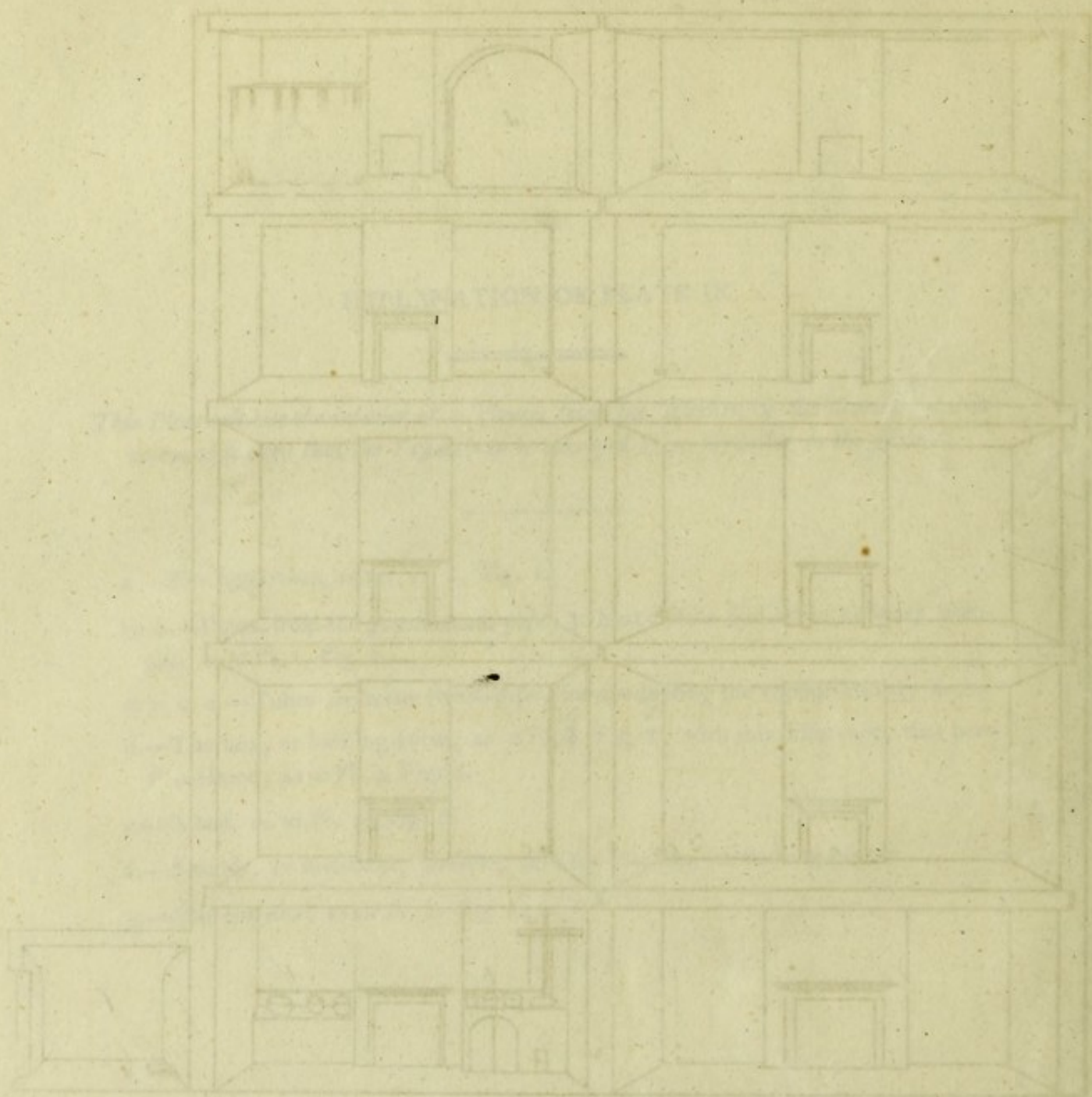
Scale

140 Feet

Drawn & Etched by G. Cooper

Pub.^d by John Booth, April 1809, Duke Street, Portland Place, London

9
1787



EXPLANATION OF PLATE X

This Plate shews the Plan of the Kitchen, the temporary Building adjacent to it, and the Garret in Pl. 9.

FIG. 1.—The plan of the kitchen, and temporary building.

FIG. 2.—Plan of the garret.

a, Shews how the vapour is introduced into the bath, Fig. 9, d.

b, The bed-place.

c, A space curtained in round the bed-place.

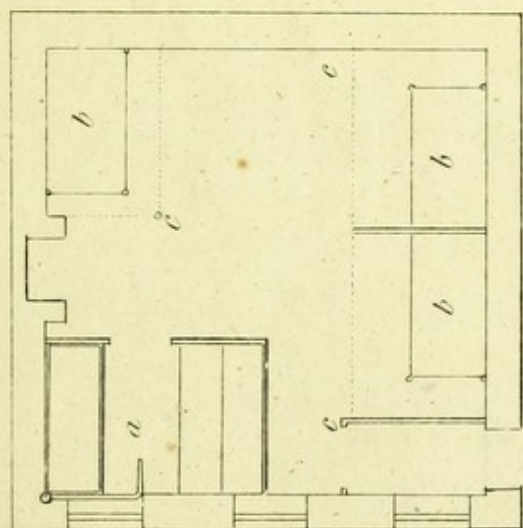


Fig. 2

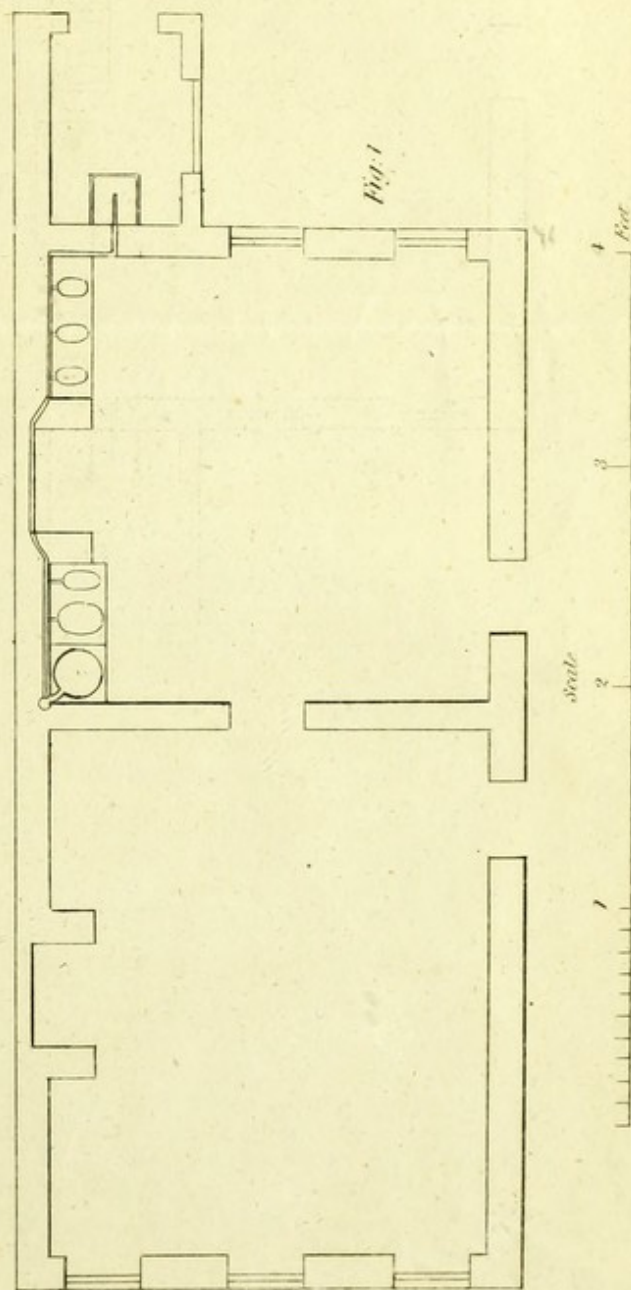


Fig. 1

Scale

4 Feet

EXPLANATION OF PLATE XI

Representing a Bath upon the most improved basis, with portable apparatus.

Fig. 1. The bath, constructed upon a common Bath frame.

- a.—The receiver.
 - b.—The aperture, for the introduction of the vapour.
 - c.—The neck-work covering, on which to rest the pipes, &c. in topical applications.
 - d.—The handle, for working the steam, &c.
- On either of these frames children, or the aged or infirm, may be placed, as they are sufficiently strong to support their weight.

Fig. 2. The boiler with its stove. It can be heated, by pieces of dry wood, in five minutes. It contains five pints of water, with sufficient space left for the operation of the vapour.

- a.—The boiler.
- b.—The safety-valve.
- c.—The notice-pipe, which shows when the water is nearly evaporated.
- d, a.—A funnel for supplying the boiler with water.
- e, a.—A cock for drawing the water off.
- f.—The tube for conveying the vapour into the receiver.
- g.—The regulating cock.
- h.—The stove.
- i.—Flue.

Fig. 3. The apparatus of Fig. 1, when covered with a funnel.

- a.—An aperture, for the light, tight and fire, defended by pieces of stialphore.
- b, and projecting five or six inches; with an extension of funnel, c, for the purpose of clearing it occasionally.
- d.—An aperture for the air, shoulder, head and breast.
- e.—An aperture for a thermometer.

Fig. 4. A boiler.

- a.—The boiler, instead of its stove or furnace.
- b.—The safety-valve, which may also be employed for throwing vapour into hot-houses.
- c.—The tube by which the boiler is supplied with water.
- d.—The neck of the pipe, that conveys the vapour into the receiver, with its cock, e.
- f.—A cock, for drawing off the water.
- g.—The flue, composed of joints.

Fig. 5. A metal vessel, with joints, a, b, to be adapted to a flexible tube, c, for conveying vapour to any part of the frame.

- d.—The surface of the vessel, perforated throughout with small tubes, between each of the joints, a metallic vessel perforated in this manner, which serves to diffuse as well as to conduct the vapour.

Should medicated vapour, through the medium, be required, the materials to be taken out, and the proper parts introduced, as in the following space.

For the two boilers above mentioned, Mr. Lloyd, of the Strand, has patented, and his condition upon which he grants licenses to any person, to make or use, and a part of the

Fig. 6. Hippocrates's boiler, for generating vapour on being a shell, and a part of the

- a.—The boiler.
- b.—The safety-valve.
- c.—A tube for conveying the vapour below the desk, which, for that purpose, is perforated at d, and following the course of the dotted line e, enters the receiver at f.

* Edward Lloyd has no objection to grant his license to any Manufacturer who chooses to make his Patent Boiler, for the use of Mr. Cochrane's Steam Bath, upon the following terms: that it is to be the same Patent Boiler, the size not to exceed 3 feet long, even inches, for every horse size, not exceeding 6 inches, the valves and fittings, and all other parts, to be made of brass, and the fittings to be made of iron. On the Patent Boiler, as he has, made, on application to Edward Lloyd, No. 178, Strand, near Temple Bar, London.

EXPLANATION OF PLATE XI.

Representing a Bath upon the most diminished Scale, with portable Apparatus.

FIG. 1. The bath, constructed upon a common Bedet frame.

- a.—The receiver.
- b.—The aperture, for the introduction of the vapour.
- c, a.—Net-work covering, on which to rest the legs, &c. in topical applications.
- d, a.—Similar net-work for the arms, &c.

☞ On either of these frames children, to the age of two or three years, may be placed, as they are sufficiently strong to support their weight.

FIG. 2. The Boiler with its stove. It can be heated, by pieces of dry wood, in five minutes. It contains five pints of water, with sufficient space left for the operation of the vapour.

- a.—The Boiler.
- b.—The safety-valve.
- c.—The notice pipe, which shews when the water is nearly evaporated.
- d, a. Funnel for supplying the Boiler with water.
- e, a. Cock for drawing the water off.
- f.—The tube for conveying the vapour into the receiver.
- g.—The regulating cock.
- h.—The stove.
- i.—Flues.

FIG. 3. The appearance of FIG. 1. when covered with flannel.

- a.—An aperture, for the leg, thigh and hip, distended by pieces of whalebone b, b, and projecting five or six inches: with an extension of flannel, c, for the purpose of closing it occasionally.
- d.—An aperture for the arm, shoulder, head and breast.
- e.—An aperture for a Thermometer.

FIG. 4. A Boiler.

- a.—The Boiler inclosed in its stove or furnace, b.
- c.—The safety-valve, which may also be employed for throwing vapour into hot-houses.
- d.—The tube by which the Boiler is supplied with water.
- e.—The neck of the pipe, that conveys the vapour into the receiver, with its cock, f.
- g.—A cock, for drawing off the water.
- h.—The flue, composed of joints.

FIG. 5. A metal vessel, with joints, a, b, to be affixed to a flexible tube, c, for conveying vapour to any part of the frame.

- d.—The surface of the vessel, perforated throughout with small holes: between each of the joints is a metallic retarder perforated in like manner, which assists in diffusing as well as in checking the vapour.

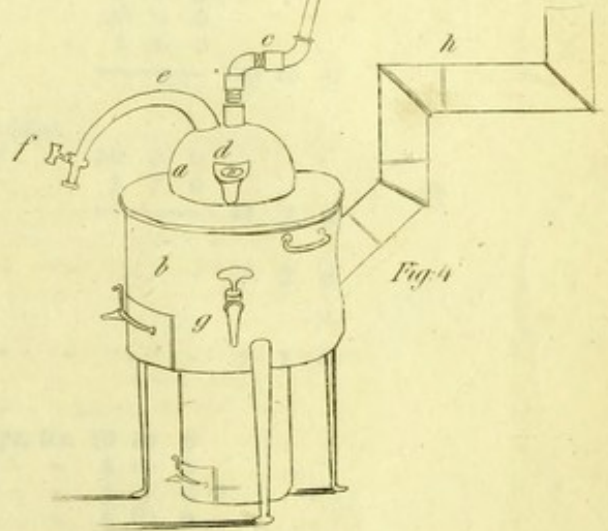
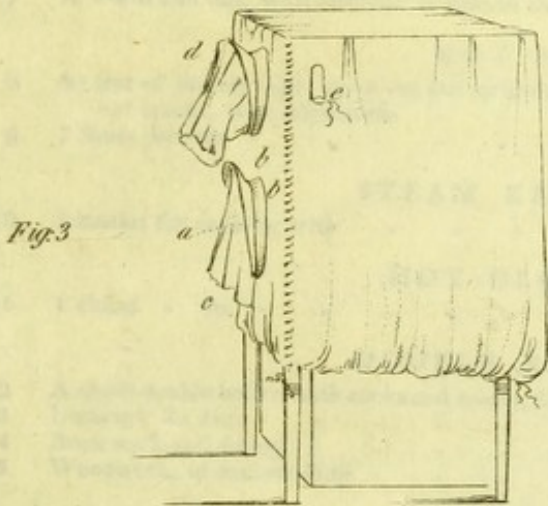
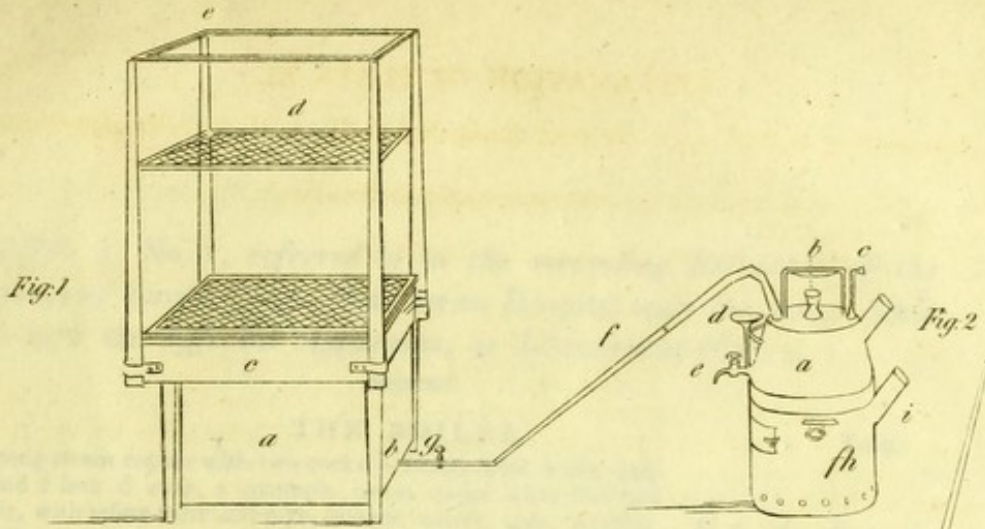
Should medicated vapour, through this medium, be required, the retarders to be taken out, and the proper herbs introduced, as there is sufficient space.

☞ For the two Boilers above mentioned, Mr. Lloyd, of the Strand, has a patent; and the conditions upon which he grants licences to manufacture them are annexed.*

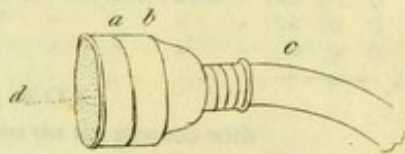
FIG. 6. Represents a Boiler for generating vapour on board a ship, and a part of the ship's deck.

- a.—The Boiler.
- b.—The safety-valve.
- c.—A tube for conveying the vapour below the deck, which, for that purpose, it penetrates at d, and following the course of the dotted line e, enters the receiver at f.

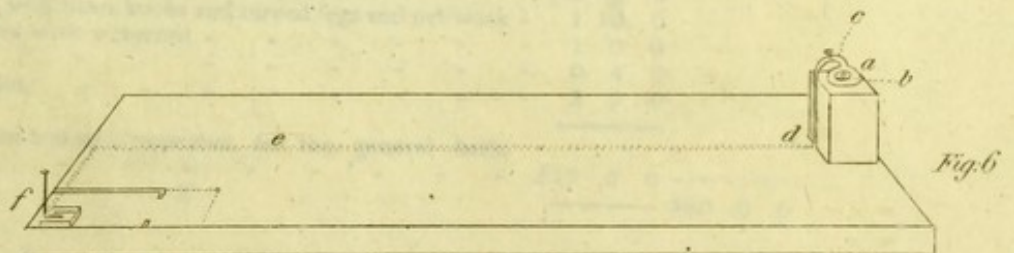
* *Edmd. Lloyd* has no objection to grant his Licence to any Manufacturer who chuses to make his Patent Boilers, for the use of *MR. COCHRANE'S* Steam Bath, upon the following terms; that is to say, for every Patent Boiler, the size not to exceed 3 gallons, seven shillings; for every larger size, not exceeding 6 gallons, ten shillings and sixpence; and all above that dimension, twenty one shillings; to be paid to the Patentee. Or the Patent Boilers may be had, ready made, on application to *Edmd. Lloyd*, No. 178, Strand, near Norfolk Street, London.



Scale 12 Feet



Scale 3 Inches



Drawn & Etched by G. Cooper

EXPLANATION OF PLATE XI

Fig. 1. A side view of the apparatus for the distillation of water.

The apparatus is composed of a receiver, boiler, and condenser.

The receiver is a glass vessel, which is placed under the condenser.

The boiler is a glass vessel, which is placed under the receiver.

The condenser is a glass vessel, which is placed under the boiler.

The receiver is connected to the condenser by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

The receiver is connected to the boiler by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

The receiver is connected to the boiler by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

The receiver is connected to the boiler by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

The receiver is connected to the boiler by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

The receiver is connected to the boiler by a tube.

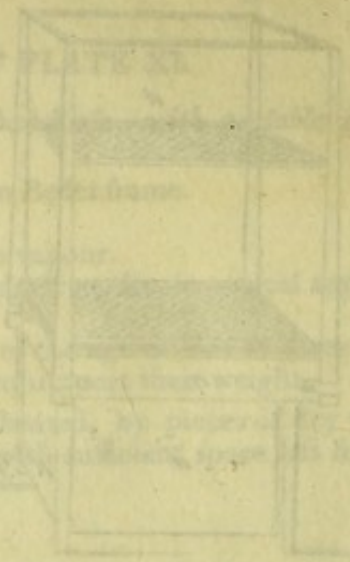
The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

The receiver is connected to the boiler by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.



The receiver is connected to the boiler by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

The receiver is connected to the boiler by a tube.

The boiler is connected to the condenser by a tube.

The condenser is connected to the receiver by a tube.

17

ESTIMATE A, No. 1, referred to in the succeeding Estimates, of the
 Expence of constructing a Bath for an Hospital upon the large Scale
 and with the different Apparatus, as delineated in Plate 5.

No.	THE BOILER.	Total.
1	A strong steam copper with two cocks, a double head, 3 feet deep and 2 feet 6 over, a manhole worm round ditto for cold air, with safety valve and pipe, leavers, valves, rods, weights, &c. - - - - -	£. s. d. £. s. d. 50 10 0
2	70 feet of steam pipe from the boiler to baths, from 9 inches to 1½ inches diameter - - - - - at 4s. 6d. per foot	15 15 0
3	10 cocks, wanted for different parts - - - - - at 7s. 6d. each	3 15 0
4	260 feet of lead pipe for water, waste, and various uses and sizes, joints, &c. - - - - - at 2s. 6d. per foot	32 10 0
5	A set of ironwork, for the boiler, complete - - - - -	8 15 0
6	Brickwork and fixing - - - - -	10 0 0
7	A worm and tub, with reservoir to receive the waste steam - - - - -	5 10 0
		126 15 0
	HOT AIR.	
8	80 feet of double pipe, to convey hot air from the boiler to different rooms, with large cocks - - - - - at 9s. per foot	36 0 0
9	7 Brass pateras - - - - - at 21s. - - - - -	7 7 0
		43 7 0
	STEAM KETTLES:	
10	2 kettles for cooking with - - - - -	7 7 0
	HOT CLOSET.	
11	1 closet - do. - - - - -	7 7 0
	DOUBLE BOILER.	
12	A small double boiler, with cocks and covers, for cooking soups, &c. - - - - -	10 10 0
13	Ironwork for ditto - - - - -	5 10 0
14	Brickwork and fixing - - - - -	5 5 0
15	Woodwork, to enclose ditto - - - - -	3 10 0
		24 15 0
	BATH ROOMS.	
16	The front, circular top, cross partitions, benches top of water closet, skylight, with fourteen squares of glass for ditto, hinges, locks, handles to the whole: materials and men's time - - - - -	145 10 0
17	Lead, for the rooms, and laying down ditto - - - - -	24 10 0
18	Plugs for ditto - - - - -	0 9 0
		170 9 0
	STEAM BOX.	
19	1 wainscot steam box and moulded frame, on the top strained with whipcord - - - - -	4 4 0
	lined with tinn'd copper, plates inside, copper pipes, &c. - - - - -	8 5 0
		12 9 0
20	1 wainscot stool, with brass knobs and turned legs and net work - - - - -	1 10 0
21	1 footstool strained with whipcord - - - - -	1 0 0
22	1 plug - - - - -	0 4 0
23	1 leaver with index - - - - -	2 2 0
		17 6 0
	Total cost of one steam box and apparatus, for the general bath, carried forward - - - - -	£17 5 0
	E	380 0 0

18 *Estimate of the Expence of constructing Vapour Baths, &c.*

				Total.	
		£.	s. d.	£.	s. d.
No.	Brought forward	-	17 5 0	380	0 0
	Total cost for the local bath	-	-	-	-
		-	£17 5 0		
24	For which is required a wainscot frame slope, canopy, and a square frame, strained with common netting slung with lines	-	2 6 0		
			<u>19 13 0</u>	36	18 0
25	Cold, tepid, or hot bath.				
	1 deal bath, lined with copper, and frame at top, and lined with tinn'd copper	-	19 19 6		
	1 ditto, for the room embracing the Russian method	-	19 19 6		
			<u>39 19 0</u>		
CISTERN.					
26	A large cistern with lead-work plugs and leaders	-	18 2 0		
	Cocks and batts, &c.	-	4 18 0		
			<u>23 0 0</u>		
HOT CISTERN.					
27	A hot cistern, lined with lead	-	-	7	10 0
SHOWER BATH.					
28	A shower bath and frame	-	-	5	15 6
UPPER HOT CLOSET.					
29	Enclosure for a steam hot closet	-	2 18 0		
	A hot closet, ditto inclusive, 2 feet wide, 2 feet deep, 2 feet 6 high	-	6 0 0		
	A steam top for ditto	-	4 4 0		
			<u>13 2 0</u>		
WATER CLOSET.					
30	A deal seat and riser	-	3 3 0		
	2 Copper pans	-	4 4 0		
	20 feet of soil pipe	-	6 0 0		
			<u>13 7 0</u>		
CURTAINS AND RODS.					
31	A set of cotton curtains complete, to enclose the bath rooms	-	18 12 0		
	A set of rods and standards, for ditto	-	9 15 0		
			<u>28 7 0</u>		
32	Sundries which cannot be accounted for	-	10 10 0		
	Men's time, fitting and fixing the whole apparatus complete	-	30 0 0		
			<u>40 10 0</u>		
				588	8 6
	Amount cost of one complete set of flannels, as per estimate, No. 5	-	-	14	4 0
				<u>602</u>	<u>12 6</u>
	Total	-	£ 602	12	6

An ESTIMATE, No. 2, of the Expences of constructing a Bath for a Private Family, with the different Apparatus, as delineated in Plate 8.

No.	THE BOILER.		
1	Steam copper as per estimate	-	A. No. 1 - 50 10 0
2	30 feet of steam pipe	-	do. No. 2 - 6 15 0
			<u>57 5 0</u>
	Carried forward	-	£57 5 0

Estimate of the Expence of constructing Vapour Baths, &c. 19

No.		Brought forward	£. s. d.	Total. £. s. d.
3	6 cocks - - - - -	A. No. 3 - - -	57 5 0	
4	160 feet of lead pipe - - - - -	do. No. 4 - - -	2 5 0	
5	1 set of iron works, for the boiler, complete, do. No. 5 - - -	do. No. 5 - - -	20 0 0	
6	Brick work and fixing - - - - -	do. No. 6 - - -	8 15 0	
7	1 worm and tub, with reservoir to receive the waste steam, do. No. 7 - - -	do. No. 7 - - -	10 0 0	
			5 10 0	103 15 0

HOT AIR.

8	20 feet of double pipe, as per estimate -	A. No. 8 - - -	9 0 0	
9	2 brass pattaras - - - - -	do. No. 9 - - -	2 2 0	
			11 2 0	

BATH ROOM.

16	The front circular top, with 2 squares of glass for ditto, hinges, bolts, handles, materials, and men's time - - - - -		52 10 0	
17	Lead for the room, and laying down ditto - - - - -		6 0 0	
18	1 plug for ditto - - - - -		0 4 6	
			58 14 6	

STEAM BOX.

19 } to } 23 }	One steam box and apparatus, as per estimate, A. No. 19 to 23 -		17 5 0	
24	One frame for the local bath - - - do. No. 24 - - -		2 8 0	
			19 13 0	
25	Cold, tepid, or hot bath - - - - - do. No. 25 - - -		19 19 6	
23	1 lever with index - - - - - do. No. 23 - - -		2 2 0	
			22 1 6	

CISTERN.

26	A small deal cistern - - - - - do. No. 26 - - -		6 10 0	
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SHOWER BATH.

28	A shower bath - - - - - do. No. 28 - - -		5 15 6	
----	--	--	--------	--

COLD PLUNGING BATH.

	A cold bath of bricks, tiled bottom, terraced inside - - -		22 10 0	
--	--	--	---------	--

PUMP.

	A pump and fixing - - - - -		7 7 0	
--	-----------------------------	--	-------	--

WELL.

	A well, or reservoir, to supply the pump with water from the public pipes		16 10 0	
32	Sundries which cannot be accounted for, men's time, fitting and fixing the whole apparatus complete - - - - -		25 0 0	

	Amount cost of one complete set of flannels, as per estimate, No. 5		298 18 6	
			14 4 0	

Total £313 2 6

An ESTIMATE, No. 3, of the Expence of constructing a Portable Bath, with the different Apparatus, as delineated in Plate 6 and 7.

No.	THE BOILER.	Total.
	A copper boiler containing 16 quarts, independent of the room for steam, with safety valve, manhole cock for do. - - -	£. s. d. 3 13 6
	Lead pipes and union screws and leading from the boiler to the bath - - -	3 13 6
	A pewter ball, with a screw top and safety valve, other screws and retarders handles for do. &c. - - - - -	5 0 0
		12 7 0

THE FLEXIBLE PIPES.

	7 feet of flexible pipe, a wire worm for ditto, lined with oil skin and covered with cloth, on the outside, a brass cock tinned, a pewter pipe and screw to ditto, with retarders - - -	3 6 0
	2 feet of small flexible pipes, with screws complete - - -	0 14 0
	A nest of screws with globical ends, with holes and retarders to fit on the large hose - - - - -	2 2 0
		6 2 0

STEAM BOX.

24	One steam box and apparatus as per estimate, A. No. 24 -	19 13 0
	8 iron rings, tinned screws for the corners of the box, to ship the pillars, in men's time, &c. - - - 2 14 0	2 14 0
	A wainscot framed double tester lath, supported by four round pillars, brass caps - - - - - 2 18 0	2 18 0
	A short copper pipe with cock, a jointed brass handle in front, to turn the steam into the bath, a brass screw cap, to admit the lead pipe through the steam box, 2 pair of brass handles on the box - - - 3 11 0	3 11 0
		9 3 0
		28 16 0
		47 5 0
	Amount cost of one complete set of flannels, as per estimate, No. 5,	19 17 0
		67 2 0

The cost of an extra patent copper steam-engine, made by Edward Lloyd and Co., No. 178, Strand; as in plate 11, containing 13 quarts (independent of the room for steam) with dome head, copper crane-neck, with stop cock and connecting screw; condensing valve, with extra double jointed elbow-shifting pipe, replenishing pipe, with brass cap and flush screw; also screw water cock, mounted in a strong wrought iron plate furnace, with elbow pipe, &c. complete - - - - - 9 9 0

Which, if preferred, the above boiler will be unnecessary, deduct cost 3 13 6

The difference will be - - - - -	5 15 6
	Total £72 17 6

An ESTIMATE, No. 4, of the Expence of constructing a Small Portable Bidet-Bath, with the different Apparatus, as delineated in Plate 11.

£ s. d. £. s. d.

THE BOILER.

A patent steam boiler, made by <i>Edward Lloyd and Co. No. 178, Strand</i> ; containing five pints (independent of the room for steam) with brass funnel and air tight screw, safety valve, hot water cock, notice pipe, brass steam cock and pipes. Iron furnace with tin bidet-pan and retarders complete	-	-	-	3	16	0
---	---	---	---	---	----	---

THE BATH.

A mahogany box, top, bidet and pan	-	-	-	2	12	0
A wainscot moulded frame, strained with netting, for the top of the bidet when the pan is removed	-	1	2	4		
Four wainscot turned pillars, with strong iron tinned rings and straps for the corners of the bidet	-	1	19	0		
A wainscot tester frame, strained with netting	-	1	3	8		
				4	5	0
					6	17
					10	13
Amount cost of the flannel bath, as per estimate, No. 5	-	-	-		2	9
					Total	£13 2 0

ESTIMATE, No. 5, cost of the Flannels for the Steam Bath.

THE GENERAL BATH.

4½ yards of white bath-coating flannel, 2 yards wide, at 10s. per yard	-	2	2	6
2 whalebone hoops, and 4 bearing pieces	-	1	3	0
Making, with tape	-	0	13	0
				3 18 6

THE HOOD.

½ yard of white-bath coating flannel, 2 yards wide at 10s. per yard	-	0	5	0
Making ditto	-	0	1	6
				0 6 6

BELL TINT.

4½ yards of white bath-coating flannel, 2 yards wide, at 10s. per yard	-	2	2	6
Making ditto	-	0	5	0
				2 7 6
				6 12 6

THE LOCAL BATH.

6 yards of white bath-coating flannel 2 yards wide, at 10s. per yard	-	3	0	0
6 whalebone hoops, for the arm and leg holes	-	0	5	0
Making, with tape	-	0	17	0
				4 2 0
				Carried forward
				£ 14 6
				/0

FLANNELS—continued.	Brought forward	-	10 14 6	Total:
THE UPPER BATH.				
3½ yards of white bath-coating flannel, 2 yards wide, at 10s. per yard	-		1 15 0	
3 whalebone hoops and 4 bearing pieces	-		0 11 6	
Making, and tape	-		0 11 0	
			<hr style="width: 100%;"/>	2 17 6

THE BREAST BATH.				
½ yard of white bath-coating flannel, 2 yards wide, at 10s. per yard	-		0 5 0	
2 whalebone hoops and two straight pieces	-		0 2 6	
Making, and tape	-		0 4 6	
			<hr style="width: 100%;"/>	0 12 0

Total expence of one complete set of flannels for private family, as per estimate, No.2, £14 4 0

THE CURTAINS FOR THE PORTABLE BATH:				
9½ yards of white bath-coating flannel, 2½ yards wide, at 10s. per yard	-		4 17 6	
Making, binding, and tape	-		0 15 6	
			<hr style="width: 100%;"/>	5 13 0
Total expence of one complete set of flannels for a portable bath, as per estimate,				<hr style="width: 100%;"/>
No. 3	-		-	£19 17 0

THE PORTABLE BIDET-BATH.				
3 yards of white bath-coating flannel, 2 yards wide, at 10s. per yard	-		1 10 0	
6 whalebone hoops for the arm and leg holes	-		0 5 0	
Making, cords, laces, and tape	-		0 14 0	
			<hr style="width: 100%;"/>	2 9 0

