An account of the apparatuses for the treatment of rheumatism and diseases of the skin, which have been constructed at the Dublin Skin Infirmary / by William Wallace.

AN

ACCOUNT OF THE

APPARATUSES

FOR THE TREATMENT OF

RHEUMATISM

AND

DISEASES OF THE SKIN,

WHICH HAVE BEEN CONSTRUCTED AT THE

DUBLIN SKIN INFIRMARY.

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TO THE

PHYSICIANS AND SURGEONS

IN

GREAT BRITAIN AND IRELAND,

WHO ARE CONNECTED WITH HOSPITALS,

THIS PUBLICATION,

UNDERTAKEN FOR THE BENEFIT OF SUCH INSTITUTIONS,

IS RESPECTFULLY INSCRIBED,

BY THEIR MOST OBEDIENT SERVANT,

WILLIAM WALLACE.

PUBLISHED BY THE SAME AUTHOR.

RESEARCHES RESPECTING THE MEDICAL POWERS OF

CHLORINE GAS,

PARTICULARLY IN

DISEASES OF THE LIVER.

Second Edition, with Additions.

OBSERVATIONS ON SULPHUREOUS FUMIGATION,

AS A POWERFUL REMEDY IN RHEUMATISM AND DISEASES OF THE SKIN.

Nearly ready for Publication,

A SYSTEM OF GENERAL OR MEDICAL ANATOMY.

CRITICISMS ON THE FIRST EDITION OF THE WORK ON CHLORINE.

"WE take leave of Mr. Wallace's book with entire approbation of the industry and ability which it displays. We consider it to be a good specimen of inductive therapeutics, and to be eminently distinguished by the unassuming manner in which he has promulgated his sentiments."

London Medical Repository, May, 1823.

"Our Author makes many sensible and acute observations on those affections of the Liver which are determined by lesions of other, and sometimes distant organs;—and many important observations on the utility of this medicine in hepatic diseases in particular.....We think we have extracted enough from Mr. Wallace's Work to induce the medical officers of public institutions (who have the best means) to give trial to the Chlorine in the diseases pointed out by our Author."

Medico-Chirurgical Quarterly Review, Dec. 1822.

PRELIMINARY OBSERVATIONS.

IN conformity with the promise expressed in the first edition of my treatise on the medical powers of chlorine gas, I present to the profession a description, illustrated by drawings, of the apparatus invented by me for the application of substances in the state of gas or vapour to the surface of the body.

I conceive that it is entirely unnecessary, on the present occasion, to insist on the value of such apparatuses, or to illustrate by cases their great power in the cure or relief of some of the most obstinate diseases to which we are subject. These are truths, which I have elucidated in other publications; as well by the relation of cases recorded with accuracy, as by legitimate induction from fundamental and established principles of physiology and pathology. Indeed, these truths are now very generally admitted, and the practice of treating disease by the application of gases or vapours to the surface of the body has obtained so many advocates in these countries, since my first publication on the subject, that institutions have been established for the purpose in London and Edinburgh, and apparatuses have been erected, for the benefit of the poorer classes of society, in many of the provincial hospitals of England, Scotland and Ireland.

Nor do I think it necessary to insist on the superiority of the apparatus which I offer at present to the notice of the profession over the one formerly described by me. Those who are acquainted with the latter will see at once how widely it differs

from the former, and will easily observe the very many advantages of the one when compared with the other. It is, in fact, the produce of more extensive experience and of longer meditation; and although it is natural to expect that time, which renders every thing more perfect, will suggest new improvements, at present I cannot conceive an instrument more perfect for the fulfilment of all its objects. It has been seen and examined by almost all the members of the College of Surgeons, of the College of Physicians, and of the General Board of Health in this city, who have unanimously admitted the superiority of its construction; and although, as yet known only by report and by verbal communication from one member of the profession to another, it has been ordered to the United States of America, to England, to Scotland, and to several parts of this Island.

However, as the former apparatus can be erected at a smaller expense, it is possible that there may be circumstances in which it would be prefered; I shall, therefore, in the present publication, reprint the description and delineation of it for the information of those who are not in possession of my tract on Sulphureous Fumigation.—Moreover, this will afford an opportunity to the reader of comparing the construction of both, and enable him to choose which may be best suited to the objects he may have in view.

The subjects of cutaneous diseases and of rheumatism have, necessarily, in consequence of my connection with the Skin Infirmary, obtained, for several years past, a very considerable portion of my attention; and, as I conceive it is my duty not to allow the opportunities afforded me by that Institution to pass unoccupied for the advantage of the public, it is my present intention to lay before the profession, at no very distant period, such facts as I have remarked respecting the history, and the improvements

which have been suggested to me in the treatment, of these diseases, by the extensive field for observation which the Institution affords. Much of the peculiarity of the modes of treatment adopted by me depending on applications to the skin, I conceived that it would not be injudicious to seize the opportunity, now offered by the publication of the description of my apparatus for the employment of non-respirable vapours or gases, of laying before the profession an account of the apparatuses constructed by my directions, for the application of respirable vapours or gases, and also of fluids. This will, moreover, satisfy the curiosity and wishes of many of the profession, and will be a satisfactory mode of answering enquiries which are daily made, respecting the construction of the apparatuses in use at the Skin Infirmary.*

WILLIAM WALLACE.

3. *Gardiner's Place, Dublin.*
January, 1825.

* The apparatuses described in this publication are of the same construction as those which have been erected for the use of my *private* patients.

CONTENTS.

Dedication iii
Preliminary Observations v

CHAPTER I.

APPARATUS FOR THE ADMINISTRATION OF NON-RESPIRABLE VAPOURS, &c.

General Observations 1
Section 1. Description of the plates which represent its construction 4
Section 2. Mode of using it 16
Section 3. Directions for its erection 23

CHAPTER II.

FUMIGATING APPARATUS FORMERLY USED AT THE SKIN INFIRMARY.

General Observations 27
Section 1. Description of the plate which represents its construction ... ... ibid.
Section 2. Mode of using it 30
Section 3. Mode of erecting it 31

CHAPTER III.

APPARATUS FOR THE ADMINISTRATION OF RESPIRABLE VAPOURS, &c.

General Observations 33
Section 1. Description of the plates which represent its construction 34
Section 2. Mode of using it 36

CHAPTER IV.

APPARATUS FOR THE IMPREGNATION AND APPLICATION OF FLUIDS.

General Observations 39
Section 1. Description of the plate which represents its construction ... ... ibid.
Section 2 Mode of using it 42

ACCOUNT OF THE APPARATUSES,

&c. &c.

CHAPTER I.

APPARATUS FOR FUMIGATION, OR FOR THE PARTIAL AND GENERAL ADMINISTRATION OF NON-RESPIRABLE VAPOURS OR GASES.

THE essential characteristics of fumigation consist in the partial or general exposure of the external surfaces, while in a state of excitement, to the action of medicine, in the form of gas or vapour. It is scarcely necessary to observe that medicines, in this form, are in a state of the most minute division, and consequently in that state in which they are most likely to gain admittance into the pores of the skin. Moreover, the great excitement, which the skin experiences, while under this operation, encreases not only its exhaling but also its inhaling functions, converting the covering of the body into myriads of gaping orifices, which, on one hand, pour out in profusion its natural exhalations, and, on the other, drink in, as it were, the elements with which it may be in contact. Therefore, not to say any thing of the direct and valuable influence which fumigation exercises on the skin itself, it is evident that it affords a powerful means of introducing into the system all such remedies as are capable of being converted into gas or vapour, without the destruction of their medical properties.*

Although the apparatus, which I am about to describe, has been named, from its affording the means of applying to the surface gases or vapours, which cannot be respired, the reader is not to suppose that such only are administered by it. Indeed, it is evident that, if non-res-

* In the " Researches respecting the Medical Properties of Chlorine," I have collected many facts illustrative of the power of influencing the system through the medium of the skin, and have laid down the principles which we should hold in view, in making our applications to the cutaneous surface.

pirable vapours can be applied by such an instrument, so may those which are respirable. In fact, this apparatus is employed as frequently for the latter as for the former purpose, and hence there will be found several vapours, which are respirable, in the following list of those I am in the habit of using, viz.—

Acetous acid vapour.
Aqueous vapour.
Alcohol vapour.
Ammonia.
Arsenic, protoxide of.
Chlorine gas.
Ether vapour.
Hydriodic acid gas.
Hydrocyanic acid vapour.
Iodic acid.
Mercury, various oxides of.
Muriatic acid gas.
Nitric acid vapour.
Nitrous acid vapour.
Sulphureted hydrogen gas.
Sulphurous acid gas.
Sulphuric acid vapour.
Sulphuret of carbon vapour.
Sulphur in vapour.
Tar vapour.

This instrument, therefore, affords the means of employing, as therapeutic agents, with the utmost safety, and with remarkable efficacy, some of the most active substances in nature. Is not the importance of such an instrument strikingly evident? And is it too much to expect that it may unfold to the medical practitioner a vast addition to his means of remedying or alleviating the miseries of his species? Were I to enlarge on these reflections, and to express the confident hopes that I entertain of its being likely to produce a very considerable revolution in therapeutics, I have little doubt but that they would be attributed to natural partiality. I may, however, be permitted to observe that, if the skin is a portal by means of which medicines may be introduced into the system, and if this organ can be used for such purposes with much less injury to the constitution than the stomach, (both of which are facts very generally admitted), a great addition to our practical resources must be afforded by the possession of an instrument, which enables us to employ, in this manner, not only many of those remedies which we are in the habit of administering by the medium of the stomach, but also a numerous class of others, which could never have

been employed in the latter way. To what extent such an instrument may encrease our catalogue of active medicines, and how many resources it may afford for the removal of diseases at present incurable, it will be for future experience, assisted by analogy and well directed induction, to unfold.

It may also be observed that such instruments are, in an economical point of view, of the very first importance to charitable institutions. On this subject I have very fully enlarged in another publication, addressed principally to the medical attendants of hospitals; and I may here remark, that the invention of the present instrument resulted, in a great measure, from exertions undertaken with the view of removing, as far as might be possible, all those difficulties which have been experienced in erecting such apparatuses in provincial hospitals; and with which difficulties I have been made acquainted by correspondence contingent on the above publication.

The saving which would result to public institutions from the practice of fumigation, must appear evident when it is considered, that the expense of the operation is not one tenth of that of an ordinary medicated fluid bath; for if a given quantity of any material be required to impregnate a sufficient quantity of fluid for the general immersion of the body, one tenth of that quantity will be sufficient when applied to the surface in the state of gas or vapour, and the quantity of fuel required to heat the apparatus for ten fumigations will be less than that consumed in heating fluid for one bath. In short, the expense attendant on fumigation is so much less than that attendant on fluid immersion, that it enables us to employ remedies which could not, in an economical point of view, be otherwise had recourse to.

Nor is the utility of these instruments as a means of disinfecting the clothes of patients, who have been seized with contagious disorders, of little importance to charitable institutions. Washing is the process at present very generally adopted for such purposes; but this is an operation which cannot be employed without considerable expense and delay; and to these objections may be added, the risk of infection experienced by those who are engaged in its performance. Moreover,

it is well known that washing is nearly inapplicable to certain articles of dress, such as hats and shoes, and very destructive to such as are woollen. By the operation of fumigation, or the exposure of the infected articles to a high temperature, and to such gases as destroy contagion, the process of disinfecting can be performed at a mere nominal expense, without incovenience to the operator or injury to the articles infected, and, in a time incomparably shorter than that required for washing and drying.

When, in addition to the above reflections, it is considered that these apparatuses not only afford the means of curing many chronic diseases with much more rapidity than any other method as yet employed, but also that by them we can relieve and remove affections upon which medicines internally administered have little if any effect, it must appear evident that there should be no public hospital without them.

It is not my object, in this publication, to direct the attention of the reader to any particular remedy. The tracts, which I have published on Chlorine and Sulphur, afford abundant proofs of the efficacy of the practice of fumigation; and to render these works complete this publication was in part necessary. However, although I do not propose to discuss at present the medical virtues of any vapour or gas, which may be used by this instrument, it is probable that some of them may form the subject of a future publication. The present may, therefore, be considered as an adjunct to those which have gone before, and as the forerunner of others on analogous subjects.

SECTION I.

DESCRIPTION OF THE PLATES WHICH REPRESENT THE CONSTRUCTION OF THE APPARATUS.

PLATE 1.

THIS plate represents the general plan of the apparatus.

A, The furnace, in which such gases or vapours as are employed in

fumigation are produced, and in which the required caloric is evolved.

B, B, The case, in which the surface of the patient is exposed to the operation of fumigation.

C. The box, which is used to heat the patient's clothes to a comfortable temperature.

a, A sheet iron pan, on which the furnace stands for the protection of the floor.

b, The pedestal of the furnace.

c, A drawer in the pedestal for receiving the ashes: it is pulled out a little way to show its construction. It forms, when necessary, a stopper to the opening, which admits air to support the combustion of the fuel contained in the furnace. When this drawer is in its situation, and the grating in its front closed by the slide, with which it is provided for that purpose, the admission of atmospheric air is so effectually cut off from the fire, that combustion may be thereby extinguished. This is one of the means by which we are enabled to regulate the temperature of the apparatus.

d, The body of the furnace. This is grated at the lower part of each of its sides for the admission of air to the evaporating chamber of the furnace; or, in other words, to that part of the interior of the furnace, in which the substances employed in fumigation are converted into gas or vapour: these openings are supplied with slides, by which they can be closed at pleasure.

e, *e*, *e*, *e*, *e*, The flue of the furnace, which comes from its back part, passes through the case in which the patient sits, and afterwards through the clothes-box, and thence into the chimney.

f, The capital of the furnace. The front of this is grated for the occasional admission of air to the evaporating chamber, and supplied with a slide, by means of which its openings can be closed or shut. The cover of the capital, (which is moveable to admit the introduction of fuel into the furnace, or of the substances to be converted into vapour into the evaporating chamber,) is furnished in its centre with a hole and stopper. By this hole, those substances which are to be vola-

tilized can, in general, be introduced without removing the cover. In the stopper a funnel is implanted, for the convenience of passing fluids into the evaporating chamber, which may be done, either quickly or guttatim, by regulating a stop-cock, with which the funnel is supplied.

g, *g*, Tubes, which come from the side of the capital of the furnace, and convey gas, or vapour, or heated air, into the bottom of the case, in which the patient is exposed. These tubes are furnished with a valve, by which the passage of the gas or vapour through them can be interrupted, when it is wished to send it in any other direction. There is also, on the under surface of each, and between the valve and the part of the tube connected with the case, in which the patient is exposed, an opening, about three inches long, and two wide. These openings can be closed by a sliding cover. They admit, when necessary, pure or cold air to pass into the case for the purpose of regulating its temperature, or to clear it of medicated vapour, before its door is opened for the patient to come out.

h, A tube, which comes from the back part of the capital of the furnace. This tube quickly divides into a horizontal and ascending portion. These are both supplied with valves to regulate the passage of gas or vapour through them. The ascending portion, 1, terminates in the interior of the case by a pipe, which is moveable in all directions. By this pipe the patient or attendant can direct a stream of vapour on any particular part. The horizontal portion, 2, is much shorter than the ascending portion, and terminates in the flue of the furnace. It is called the waste pipe of the evaporating chamber of the furnace; and is used to carry into the flue any superabundant gas or vapour, which may be generated, and which would otherwise escape into the apartment.

i, *i*, The ladder, by which the patient ascends into the case.

k, *k*, The door of the case. When the entire of the patient's skin is to be exposed to the operation of fumigation, the door is formed by the six upper panels; but when the operation is to be confined to the lower half of the body, or when it is necessary to use the appara-

tus with young persons, the superior row of panels can be taken away, by lifting the portion of the door, formed by them, off its hinges, and in this manner, the depth of the case may be greatly decreased.

l, *l*, The capital of the case, through which the patient's face is protruded, surrounded by a napkin, which fills those interstices between his face and the opening, that would otherwise allow the vapour to escape.

m, The pedestal of the case, by which the body of it is elevated to the proper height in respect to the furnace. The pedestal is formed into a locker, very useful for containing such parts of the apparatus as may not be employed.

n, A small door, by which such substances as can be evaporated by a low temperature, or by the heat of a lamp, or by a heated iron, may be introduced, when it is not wished to heat the furnace of the apparatus, or when it is desirable to use as little heat with the patient as possible.

o, *o*, *o*, *o*, Panels of the case, which receive the pipes and flue that pass into it from the furnace. They are made of cast-metal.

p, The thermometer, by which the temperature of the case is indicated. The bulb is curved at right angles with the stalk, so that the former passes into the case, while the latter hangs externally.

q, *q*, Two holes, furnished with leathern string-cases. These are to enable the attendant to introduce his hand for the purpose of directing the pipe, used for partial fumigation, on any part necessary. They also enable him to attend the patient with a napkin, or any article of dress, or to apply friction to several parts of the body. The medical attendant may use them to ascertain the state of the patient's circulation, respiration, or perspiration. They are also employed in those cases, where the hands, arms, or fore-arms are to be alone fumigated; and when the operation of fumigation is performed on very young children, they allow the nurse to introduce her arms to grasp the child, and thus assist very much in tranquillizing him.

r, One of two tubes, which form a communication between the flue and the case. These tubes are used to convey into the flue any su-

perabundant vapour, which may be in the case, and which might otherwise escape into the apartment. They are furnished with a valve, by which the passage of vapour through them may be regulated.

s, The pedestal of the clothes-box, which is formed into a locker like that of the case.

t, The body of the clothes-box, which is furnished with a lid.

u, The metal panel of the clothes-box, which receives the flue of the furnace.

Plate 2.

This Plate represents the internal construction of the apparatus.

Fig. 1. A vertical section of the apparatus in a line from A to C. of Plate 1.

a, The pan, on which the furnace stands.

b, The pedestal of the furnace, with the ashes-drawer in its place.

c, The outer case of the body of the furnace. This is supported by the pedestal, and supports the capital.

d, The inner case of the furnace: this contains the fuel. The outer and inner case are separated from each other by a space, which increases towards the top, where it ends in the chamber *e*, *e*. The bottom of the inner case of the furnace is grated. It is upon this that the combustion of the fuel takes place; and the top is supplied with a cover, which is moveable to admit the fuel into it.

e, *e*. The space, in which the substances used in fumigation are converted into vapour: it is called the evaporating chamber.

f, *f*, The grating at the bottom of the outer case of the furnace, which is used to admit air at pleasure into the space between the inner and outer case of the furnace, and thence into the evaporating chamber.

g, A similar grating on the front of the capital of the furnace, which

is also used to allow air to pass into the evaporating chamber; but, as it enters more directly, it is not so much heated; and this means of admitting air is prefered, when we wish to keep down the temperature of the case.

h, The tube, which comes from the back of the capital of the furnace, for conveying vapour from the evaporating chamber. The ascending division of it, 1, terminates in the case by a pipe, which the patient holds in his hand, and by which the vapour can be applied to particular parts: the horizontal portion terminates in the flue of the furnace, and forms the waste pipe of the evaporating chamber.

i, *i*, The flue of the furnace, which may be observed to come from the inner case, and to pass through the outer.

k, The funnel, by which fluids are sometimes passed into the evaporating chamber.

l, The orifice of one of the lateral tubes, for conveying vapour from the evaporating chamber into the lower part of the case, in which the patient is seated. The course of this tube is denoted by the dotted lines.

m, The interior of the case, in which the patient is observed sitting on a screw-chair, placed on a perforated metal plate, through the holes of which the vapour passes up and surrounds his body. By the screw-chair the seat can be raised or lowered, so as to accommodate its height to the size or inclination of the patient; who has it also in his power to change his posture and turn his back, his front, or either of his sides to the tube used for partial fumigation, which he is observed, in the drawing, to hold in his right hand. This tube, by means of a leathern joint, can be moved in any direction. It can also be changed for others of different lengths or forms, and thus the vapour may be directed to almost any part of the body.

n, *n*, A ledge, which surrounds the interior of the case, and which supports the cover of it, when the height of the case is diminished, as in those instances when it is wished to limit the application of the vapour to the lower parts of the body, or to use the apparatus with young persons.

o, The thermometer, placed in this situation, to show the manner in which the bulb projects into the case, while the scale is seen externally.

p, A sheet-iron box, through which the flue runs in a zig zag manner. The box is thus heated, and raises the temperature of the interior of the case.

q, The interior of the pedestal which supports the case.

It may be now clearly understood that the case is formed into three cavities, viz. 1st, the cavity of the pedestal, which is used to contain any portion of the apparatus that may not be in use ;—2dly, the cavity, in which the patient sits ;—and 3dly, the cavity in which the flue box is situated, and in which the tubes for general fumigation, and for conveying the vapour from the case into the flue, terminate. This cavity, called the middle chamber of the case, is separated from the upper chamber, or that one in which the patient sits, by a perforated metal plate, and from that of the pedestal or inferior chamber of the case, by a partition, which is covered on its superior surface by tin, and which supports the sheet-iron box.

r, *r*, The flue, continued from the case through the box for heating the patient's clothes, and from thence into the chimney. The waste pipe of the case, or, in other words, that tube which carries the vapour from the case to the flue terminates in the flue, at the black spot observed in the drawing between the box and case ; and there is a valve in the flue, between the opening of the waste tube and the case, by which the draught of the flue may be regulated.

s. The cavity of the pedestal of the clothes-box.

t, *t*, The cavity of the clothes-box itself. The partition, which separates this from the cavity of the pedestal, is lined on its upper surface with tin ; and a metal plate separates that part of the cavity of the box, which contains the flue, from the part which receives the patient's clothes.

FIG. 2. A horizontal section of the apparatus in a line from A to C, PLATE 1.

a, The tray, on which the furnace stands.

b, The outer case of the furnace.

c, The inner case of the furnace, which is separated from the outer by an interval of about an inch and a half.

d, The cover of the inner case: this forms the bottom of the chamber for evaporation.

e, *e*, *e*, *e*, *e*, *e*, The tubes which convey vapour from the furnace into the middle chamber of the case. These tubes are continued to the opposite side of the case to that at which they enter, for the purpose of diffusing more equally the heat and vapour.

f, The tube, which conveys vapour from the back of the evaporating chamber into the flue, or in other words, the waste tube of the furnace.

g, *g*, *g*, *g*, *g*, The flue of the furnace contained in the sheet-iron box: it makes several turns as it passes through the middle chamber of the case.

h, *h*, *h*, *h*, The sheet-iron box, which contains the flue.

i, *i*, The waste tubes of the case, which are seen commencing in its middle chamber and terminating in the flue. Each of the tubes is observed to be crossed by a line, which denotes the situation of the valve for regulating their respective draughts.

k, *k*, The middle chamber of the case, in which the metal box is seated, and in which the openings of the tubes *e* and *i* are placed.

l, *l*, The bottom of the clothes-box.

Plate 3.

This plate represents the details of the apparatus.

Fig. 1. A front view of the furnace: *a*, the cover of the capital, with the funnel implanted;—*b* the capital, grated in front, and presenting at its sides short or stump pipes, which receive on them the pipes for conveying into the case gas or vapour from the lateral part of the evaporating chamber;—*c*, the body, which is grated at its lower part;—and *d*, the pedestal, presenting the grated front of the ashes-

drawer. These parts are elevated a little above each other, the better to show their boundaries.

FIG. 2. A posterior view of the furnace; the different parts being elevated from each other as in the front view. On the capital, in this view, may be seen, in addition to the lateral stump pipes, the situation of that stump pipe, by which the tube that carries vapour from the back of the evaporating chamber is connected with the furnace; and on the back of the body of the furnace, the hole for the reception of the flue may be observed.

FIG. 3. The different parts of the internal case of the furnace: *a*, the cover;—*b*, the body;—*c*, the grate which forms the bottom. It is the posterior surface of the body which is seen, and on it may be observed the stump pipe, which receives the short pipe, that connects the furnace with the flue.

FIG. 4. The short pipe for connecting the furnace with the flue: one end of it passes on the stump pipe of the inner case of the furnace, and the other end is received into the flue. Between the two ends there is a flange, which is screwed on the outer case of the furnace.

FIG. 5. A metal evaporating dish. It fits on the top of the inner case of the furnace; and has a square opening or hole in its middle part, by means of which the iron retort, FIG. 8, can be introduced into the interior of the furnace, or any substance conveyed into the retort, without removing the evaporating dish. It is used when it is necessary to combine a substance, which requires, for its volatilization or decomposition, a great heat, with vapour obtained by boiling a fluid: the former being evaporated in the retort, and the latter in the dish.

FIG. 6. An iron pan, which fits on the cover of the inner case of the furnace, and holds sand, when a sand-bath is required for slow evaporation or volatilization.

FIG. 7. A dish made of reticulated wire-work, used for the evaporation of animal substances.

FIG. 8. An iron retort, which is employed as above observed. When used, it is passed down, through a hole in the cover, into the interior of the inner case of the furnace, and consequently into the fire. See FIG. 3. *a*. The top of the retort projects, or is formed into a

flange, to prevent its passing entirely through the cover. The hole in the cover, and the neck of the retort, are adopted to each other by being turned and ground. When the retort is not in use, the hole for its reception in the cover is filled with a ground metal stopper.

FIG. 9. A glass tube, which is used, on some occasions, along with the retort. It is of such a size that it can be passed into the retort, and allow a small quantity of sand to surround it in all directions.

FIGS. 10, 11. Small evaporating dishes of Wedgewood's ware or glass, which fit on the sand-bath.

FIGS. 12, 13. Small crucibles, which are sometimes placed on the sand-bath, and sometimes immediately on the cover of the inner case of the furnace.

FIG. 14. A small pair of tongs or pincers, which are useful in moving several parts about the furnace.

FIG. 15. A sheet iron tray, on which the furnace and its appendages stand.

FIG. 16. The metal plates, which form the bottom of that chamber of the case, in which the patient sits.

FIG. 17. The tube, which conveys vapour into the side of the case, for partial fumigation : the end *a* is received on a stump pipe of a metal panel, situated on the side of the case; and the end *b* on the ascending stump pipe *b*, FIG. 21. See also PLATE 1, *h*, 1, and PLATE 2, FIG. 1. *h*, 1.

FIGS. 18, 19. Pipes of different forms for partial fumigation. The ends, *a*, *a*, are received on a stump pipe on the side of the interior of the case; and the opposite ends, *b*, *b*, are directed towards the part, to which it is wished to apply the vapour.

FIGS. 20, 20. The tubes, which convey vapour for general fumigation into the middle chamber of the case. They are connected by their ends *a*, *a*, to the stump pipe on the side of the capital of the furnace, and by their ends *b*, *b*, they terminate in the fumigating case : see PLATE 1, *g*, *g*, and PLATE 2, FIG. 2, *e*, *e*. The under surfaces of these pipes are turned upwards, to show the sliding lid at *c*, *c*, by which

the atmospheric air may be admitted into these pipes, and from them into the case in which the patient sits.

FIG. 21. *a* The end of the pipe, which is connected with the stump pipe, on the back part of the capital of the furnace;—*b*, the stump pipe, which receives the end of the ascending tube, used for partial fumigation;—*c*, the end of the flue, which is connected with the body of the furnace;—*d*, the end of the same, which passes into the case, in which the patient sits.

FIG. 22. A sheet-iron box, which is placed in the middle chamber of the case. Through this box the flue passes. Its under surface is turned upwards to show, at *a*, a slide, which covers an opening, through which the flue may be cleaned when necessary.

FIG. 23. That division of the flue, which extends from the case to the clothes-box;—*a*, receives the stump-pipe on the corresponding end of the sheet-iron box;—*b*, is connected with the part of the flue, which is lodged in the clothes-box;—*c*, *c*, are small stump-pipes, which receive the ends *b*, *b*, of

FIGS. 24, 24. The waste-pipes of the case.

FIG. 25. The portion of the flue, which is lodged in the clothes-box. Its ends, *a* and *b*, are connected respectively with the ends *b* and *a* of FIGS. 23 and 26.

FIGS. 26, 26. The portions of the flue, which extend from the clothes-box to the chimney of the apartment: the end *a* being connected with the end *b* of FIG. 25;—the ends *b*, *b*, with each other;—and the end *c*, passed into the chimney.

FIG. 27. That skeleton cover of the case in which the patient sits, which is used when the case is of its full length;—*a*, *a*, a portion of it, which is immoveable and screwed down;—*b*, *b*, a portion which merely lies on the case, and is hinged to the immoveable portion, so that it can be raised to admit the patient into the case;—*c*, *c*, two small fasteners to retain, in its situation, the central part of the cover, which accurately fits into this skeleton.

FIG. 28. One of the central parts of the cover. This central portion

is used, when the lower half only of the patient's body is to be fumigated: the oval line at *b* marks the opening for the reception of his body. A central part of the same kind as this, (with the exception that the hole is only the size of the circle described by the dotted lines at *a*,) is used, when the entire surface of the patient, from the neck downwards, is to be fumigated.

FIG. 29. The central portion of the cover, which is employed when the entire head, or the head with the exception of the face, is to be fumigated. *a*, *a*, The box, which receives the patient's head;—*b*, a stopper, which fills the opening for the face: this stopper is used when the face is to be enclosed in the box, and then the patient respires through the tube *c*, which he applies to his mouth with one hand, while he compresses his nostrils with the other.

FIG. 30. A skeleton cover for the case, of a smaller size than FIG. 27. It is not divided into two portions, as it is used by being simply let down into its place, after the patient is seated. This skeleton cover is employed when the height of the case is diminished. The central portions, FIG. 28 and 29, fit on this skeleton, as they do on the other, and are retained in their situation by the fasteners *a*, *a*.

FIG. 31, The screw chair, on which the patient sits in the case.

FIG. 32, A view of the apparatus, when all its parts are packed up in the case, for the purpose of being carried from one place to another. *a*, *b*, *c*, are stump pipes of the metal panels, which are connected with the tubes that come from that side of the cover, which corresponds to the clothes-box.

FIG. 33, Part of the apparatus for the application of respirable vapours or gases; and will be described along with it.

PLATE 4.

This plate represents the plan of the apparatus, adapted to two persons.

a, *a*, The ladders by which the patients pass into the cases.

b, One of the doors for the same purpose, with the holes and leathern string-cases used for introducing one or both hands, as formerly described.

c, The door of the pedestal.

d, The furnace.

e, *f*, *g*, *h*, The tubes, which convey the gas or vapour into each case, for partial or general fumigation.

i, The flue of the furnace.

k, The thermometer: the situation of this corresponds to the partition, which separates the one case from the other.

In all other respects the construction of the single and double apparatus resemble each other so accurately, as to render further description unnecessary.

SECTION 2.

MODE OF USING THE APPARATUS.

That the directions, respecting the mode of using the apparatus, may be as clear and precise as possible, I shall arrange them under the following distinct heads:

Mode of heating the apparatus.

Mode of regulating its temperature.

Mode of volatilizing the substances used.

Mode of conveying the vapour, gas or heated air into the case.

Mode of preventing any escape of gas or vapour from the furnace or case into the apartment, during the operation, or at the time of taking the patient out.

Mode of putting the patient in, or taking him out of the case.

Mode of heating the apparatus. Remove the covers of the capital of the furnace, and of the inner case of the furnace;—place the fuel,*

* Any kind of coal will answer for fuel. At the Skin Infirmary gas-coke is used in these apparatusses. It burns extremely well in them, and has the advantage of being very clean, and of keeping up a regular heat. Wood or shavings are placed under it.

with some easily lighted materials underneath it, on the grating of the inner case of the furnace ;—replace the covers ;—open the valves of the flue of the furnace and of the tubes which convey the gas, vapour, or heated air from the furnace into the case ;—shut the valves of the waste pipes of the furnace and of the case ;—remove the ashes-drawer, and by the assistance of a candle, passed under the grate of the furnace, set fire to the inflammable materials, which have been placed on it ;—open the gratings in front of the capital of the furnace, and round the base of the body of the furnace. In the course of twenty minutes or half an hour, on a medium calculation, the thermometer will indicate that the temperature of the apparatus is sufficiently raised. However, the time required for this purpose must vary, according to the heat that may be necessary, and according to the draught of the chimney, into which the flue of the furnace passes.

2. *Mode of regulating the temperature of the apparatus.*—If it be necessary, at any time, to lower the temperature of the apparatus, while the patient is in it, attention to the following directions will be sufficient.—Close the grated openings in the front of the ashes-drawer ;—close the valve of the flue of the furnace ;—close the valves of the tubes, which convey vapour, or gas, or heated air from the furnace into the case ;—close the grated openings, which are at the base of the body of the furnace ;—open the grated apertures in the front of the capital of the furnace ;—open the apertures on the under surface of the tubes, which convey vapour from the furnace into the middle chamber of the case ;—open the waste pipes of the case and furnace. When the temperature of the apparatus is to be increased, an opposite arrangement of the tubes and apertures, to that just mentioned, will produce the effect. In case it be necessary to cause a great heat in the furnace, and at the same time to preserve the temperature of the case as low as possible, permit all the tubes and apertures (with the exception of those of the ashes-drawer and flue, which must be left open) to remain as directed for the purpose of lowering the temperature of the apparatus, and increase the quantity of fuel in the furnace. It may be useful to mention, that the temperature of the case may be immediately raised,

(in relation to the patient's feelings), when either heated air or any dry vapour is employed, by simply allowing a few drops of a fluid to be converted into vapour and carried into the case along with the heated air.—For, the vapour being a better conductor of caloric than the heated air, the patient feels much warmer in a given temperature of the former than of the latter. Moreover, when the patient is immersed in a dry vapour, his perspiration is greater, and consequently also his means of preserving a low temperature. Any person acquainted with the mechanism of the apparatus, by attention to the foregoing directions, will be able to adjust its temperature with the greatest accuracy.

3. *Mode of volatilizing the substances used.*—This must vary according as the substances employed are fluid or solid, or according as they may require a low or elevated temperature for their volatilization.

Fluids may be evaporated in one of two ways, viz.—by being put into the funnel of the capital of the furnace, and allowed to drop guttatim on the plate, which forms the floor of the evaporating chamber, and thence on the sides of the inner case of the furnace, both of which, being hot, cause its immediate ebullition and evaporation;—or, 2dly, by being put into an evaporating dish, placed either directly on the top of the inner case of the furnace, or on a sand-bath situated on it. Such a fluid as tar can be used only by being placed in an evaporating dish, but most fluids may be employed by means of the funnel.

Some solids require a very high temperature for their volatilization. Such are introduced into the iron retort, which may be brought to a white heat when necessary. This retort is sometimes used with, and sometimes without the glass lining tube. Other solids may be evaporated by simply throwing them on the heated cover of the inner case of the furnace, or on an evaporating dish. Sulphurous acid is produced by burning sulphur in a crucible, by the assistance of a cotton wick, which is placed in the middle of the sulphur. When castor, musk, or such substances as contain a volatile oil are employed, they are introduced into the wire dish, and a current of aqueous vapour or heated air being passed through them, their volatile parts are carried off into the case.

When it is required to combine the vapour or gas, derived from a fluid, with that obtained from a solid, both are sometimes introduced together into an evaporating dish, and occasionally they are evaporated separately, in a manner peculiar to each, and their vapours allowed to coalesce as soon as formed.

After what has been said the operator can easily adapt his arrangements to the exigencies of each case, and evaporate any substance which he may wish to employ, whether it require a greater or a lesser degree of heat, whether it be used alone or with others, whether it be fluid or solid, or whether it may, or may not, be heated in contact with metals.

4. *Mode of conveying the vapour, gas, or heated air into the case.*—It is supposed that the vapour or gas is ready formed, and remains in the evaporating chamber of the furnace. If the vapour is to be applied to the general surface of the patient, close the tube *h*, 1, PLATE 1, and open the tubes *g*, *g*, PLATE 1; but if the application is to be made to a particular part, shut the tubes *g*, *g*, and open the tube *h*, 1. The tubes which convey the vapour into the case being prepared for its reception, and the gratings open, which are at the bottom of the outer case of the furnace, the atmospheric air immediately enters, is heated, passes up between the inner and outer case of the furnace, reaches the evaporating chamber, and, meeting with the vapour, carries it into the case. Should the temperature of the case be too high, the atmospheric air should be allowed to enter by the grating in the front of the capital of the furnace: those at the base of the outer case of the furnace being closed. While the patient continues in the case, it is necessary to preserve a constant supply of pure or fresh vapour from the furnace; therefore, as soon as the case has been filled with vapour, which may be ascertained by its having a tendency to escape at some of the joints, the waste tube of the case should be opened, and a quantity allowed to pass into the flue equal to that which may be conveyed from the furnace into the case; by this means, there will be a constant supply of fresh vapour, and neither the case nor the furnace will overflow.

5. *Mode of preventing any escape of gas or vapour from the furnace or case into the apartment, during the operation, or at the time of taking the*

patient out.—These are among the most important of the objects which should attract the particular attention of the operator. If the case or furnace become too full of gas or vapour, an escape of some portion of it will, almost inevitably, occur. The attendant should, therefore, watch, and if he observes such an occurrence, he should immediately open, as much as may be necessary, the waste pipes of the furnace and of the case : see *h*, 2, and *r*, PLATE 1 ; and PLATE 2, FIG. 2, *f*, *i*, *i*. These pipes immediately carry off all superabundant vapour, and effectually preventing any escape of it into the room, they may be said to serve the purpose of luting the furnace and case. Before the patient comes out of the case, it is necessary that it should be entirely cleared of any noxious vapour, which may be in it; otherwise it would escape into the room, as soon as the door of the case was opened. To accomplish this object, open the grating on the front of the capital of the furnace and the waste pipes of both the case and furnace ;—shut the tubes which convey vapour into the case, and also the grating in the front of the ashes-drawer ;—lastly, open the apertures on the under surface of those tubes, which convey the gas into the middle chamber of the case. By means of the waste tubes, the draught of the flue, which has been increased by the closure of the grating of the ashes-drawer, exhausts the evaporating chamber of the furnace, and the entire of the case, of their contents ; and by the aperture on the under surface of the supply tubes, and in the grating on the front of the capital of the furnace, pure atmospheric air is admitted to supply their place.

6. *Mode of putting the patient in the case*, &c. &c.—When the temperature of the case has been raised to the required height, the patient should be placed in the apparatus ; and the mode of accomplishing this must vary according to the parts to which it may be necessary to apply the vapour. If one or both of the superior extremities are to be fumigated, this may be effected by the patient introducing the members into the holes in the side of the box, which are furnished with leathern string-cases ; but if the entire body, or any portion of it, the lower limbs inclusive, is to be submitted to the operation, the patient must sit in the case on the screw-chair, in some of the following ways :—1st, If it

be required to fumigate the face, having raised the moveable half of the skeleton cover to allow the patient to pass in, place him on the screw-chair arranged at such a height, that his head shall pass up into the box, Fig. 29, Plate 3 ;—and let the stopper *a*, *a*, be placed in this box and furnished with the breathing tube *c*. The patient's head being enclosed in the box, he should with the fingers of one hand compress his nostrils, having his eyes closed, and with the other direct the breathing tube to his mouth, and respire through it, so long as he may be in the case. 2dly, When it is not necessary to include the face in the box, the stopper of the box should be taken out, the patient should then protrude his face into the opening from which the stopper had been removed : his face being previously surrounded by a napkin, to prevent the escape of any vapour through the intestices, which would otherwise exist between the edge of the opening and his face. 3dly, When the application of the vapour is to be limited to the surface from the neck down, the box, Fig. 29, Plate 3, is to be removed, and the central portion of the cover with the round hole *a*, Fig. 28, Plate 3, is to be put in its place. This hole receives the neck of the patient, round which a napkin or sheet should be rolled to prevent any vapour escaping, between it and the edge of the opening. 4thly, When we wish to limit the application of the vapour to the lower half of the body, the height of the case should be diminished by removing the upper division of the door, and the smaller skeleton cover, Fig. 28, Plate 3, being placed on the ledges, *n*, *n*, Fig. 1, Plate 2, the central cover, Fig. 28, Plate 3, should be let down on it. The oval hole in this central portion accommodates the body of the patient, round which it is necessary to roll a sheet to prevent the escape of any vapour. 5thly, When the apparatus is to be used by young persons, its height should be diminished as above, and either the box, Fig. 29, or the central parts with the round or oval holes, may be used accordingly as required. 6thly, When it is wished to apply the vapour to a particular part, the attendant should introduce his hand into one of those holes, which are furnished with leathern string-cases, and grasping the tube for partial fumigation should direct it on the part required. On many occasions

this part of the operation may be performed by the patient himself, as may be seen in PLATE 2, FIG. 1. The form of the tube for partial fumigation must be varied, according to the part to which the vapour should be applied, and according as the application is to be made to a point or surface.

After the patient has remained in the apparatus a sufficient time, the attendant should prepare for his coming out, by heating those articles of dress which are to be put round him, and by emptying the case and furnace of any gas which may be in them. The heating of the clothes is accomplished by introducing them into the clothes-box, which is itself heated by the flue of the furnace passing through it; and the case and furnace should be emptied as above directed. When the case is sufficiently emptied, which may in general be accomplished in about five minutes, the patient should be taken out in the inverse manner to that in which he was put in.

The room in which the operation is performed is, in general, rendered so warm by the heat thrown off from the metallic portions of the apparatus, that the patient does not feel any unpleasant transition of temperature on coming out. This is also further prevented by his linen being warmed in the box used for that purpose. After the operation he should, in general, recline for a short time on a bed or sofa, either in the room in which the operation was performed, or in an adjoining room, the temperature of which had been previously raised to a sufficient height. At the Skin Infirmary, there is a contrivance in those rooms into which the patients retire after the operation of fumigation, which enables the attendant to raise the temperature nearly as high as that of the apparatus in which the patient was placed, and, by imperceptible degrees, to lower it to that of the surrounding atmosphere. This contrivance is often of much importance, as well in regard to the comfort as the safety of the patient.

SECTION III.

DIRECTIONS FOR PLACING THE DIFFERENT PARTS OF THE APPARATUS IN THEIR RESPECTIVE SITUATIONS.

For greater precision it will be necessary to arrange these directions under distinct heads.*

1st. *Mode of connecting with each other the different parts of the case, in which the patient sits.*—Screw together the sides of the pedestal of the case, A, B, C, D, and also to each other the three sides of the body of the case, E, F, G;—screw the bottom of the body of the case, H, on the lower edge of the three sides of the case, E, F, G, and the cover of the case, I, (see Fig. 27, PLATE 3,) on the upper edge of the three sides of the case, E, F, G;—place the side of the case, K, in its situation, between the sides E, G, and screw the lower division of it to the same sides and to the bottom H;—hinge the upper division of the side K, which is that for the formation of the door, to the side G. The body of the case may be now seated on the pedestal. Place the ladder L, (see PLATE 1, *i*, *i*,) in front of the pedestal, and below the door of the case;—open the door of the case, and place the sheet-iron box (see FIG. 22, PLATE 3,) on the bottom of the body of the case, in such a manner that its surface *a* shall be upwards, and the end *b* correspond to the side E of the case, with the openings in each end of the box opposed to the corresponding holes in the middle one of the three metal panels;—place the perforated metal plates (see PLATE 3, FIG. 16,) M, M, M, in the bottom of the case, on the metal supports adapted to this purpose;—place the screw-chair, (see PLATE 3, FIG. 31,) on the metal plates;—place the thermometer in any of the sides of the body of the case, which may be most exposed to the light, having previously made a hole in the side, in which it may be intended to place it,

* The letters and numbers used in the following directions refer to those which are on the Apparatus, when sent from the Infirmary, if not otherwise specified.

for the reception of the guard, which surrounds the bulb, see FIG. 1, *o*, PLATE 2.

2. *Mode of connecting with each other the different parts of the box for heating the patient's clothes.*—Screw to each other the sides of the pedestal of the clothes-box, N, O, P, Q, and also to each other the sides of the body of the same, R, S, T, U ;—screw the bottom of the body of the clothes-box, V, in its situation, as also the lid of the clothes-box, W ;—place the body of the clothes-box, (see *t*, PLATE 1,) on the pedestal, (see *s*, PLATE 1,);—open the lid of the clothes-box, and place on the bottom of it the pipe X, (see FIG. 25, PLATE 3,) in such a manner that its end *a* shall correspond to the opening in the metal panel *a*, and the end *b* to the opening in the metal panels *b* ;—place the perforated sheet-iron plate Y on the supports for that purpose, situated on the inside of the body of the clothes-box, above the pipe X.

3. *Mode of connecting with each other the different parts of the furnace.*—The various parts of the furnace are packed together in their relative position, and may be so taken out of the packing-case and placed on the sheet-iron tray, (see FIG. 15, PLATE 3.)—It is, therefore, unnecessary to add, in this place, any thing to that which has been already said respecting the construction and details of the furnace.

4. *Mode of placing the pipes and flues, which pass from the furnace to the case, in their proper situations.*—Having placed the furnace and case in that situation, in respect to each other, which is represented in PLATE 1, and PLATE 2, FIG. 1, place the end *a* of the tube 1 on the stump pipe *a* of the capital of the furnace, and the end *a* of the pipe 2 on the stump pipe *b* of the capital of the furnace, in such a manner that the surfaces on which the letters are placed shall be upwards : see FIGS. 20, 20, PLATE 3 ;—place the end *a* of tube 3 on the stump pipe *c* of the back of the body of the furnace, and the end *b* on the stump pipe *d* on the back of the capital of the furnace : see FIG. 21, PLATE 3 ;—place the end *a* of the tube 4 on the stump pipe *e* of the pipe 3 : see FIG. 17, PLATE 3.

The furnace and case should be now caused to approach each other in such a manner that the ends *b*, *b*, of the tubes 1, 2, shall correspond

respectively to the metal panels 1 and 2 of the side E of the case, (see PLATE 1, *g*, *g*, and PLATE 2, FIG. 2, *e*, *e*,) and the end *d* of the pipe 3 to the panel 3, and consequently to the hole in the sheet-iron box which corresponds to it, (see FIG. 21, PLATE 3, and PLATE 1, *e*, *e*,) and the end *b* of the tube 4 to the metal panel 4, (see FIG. 17, PLATE 3, and PLATE 1. *h*. 1.) When the corresponding parts are properly adjusted, the furnace and case should be pushed as close to each other as possible, and thus square and tighten the pipes in their situation.

5. *Mode of placing in their proper situation the pipes and flues, which pass between the case and the clothes-box, and between the latter and the chimney of the apartment.*—The case and the clothes-box having been placed in such a situation in regard to each other, that the side G of the case shall correspond to the end R of the clothes-box, and the end T of the clothes-box to the chimney of the apartment, pass the ends *a*, *b*, *c*, of the tube 5, into the corresponding metal panels *a*, *b*, *c*, of the side G of the case, and in such a manner that the tube *b* shall pass on the stump pipe of the corresponding end of the sheet-iron box, which had been previously placed on the bottom of the body of the case, underneath the perforated metal plates, (see FIGS. 23, 24, 24, PLATE 3, and PLATE 2, FIG. 2, *i*, *i*, *g*.) The clothes-box should now be made to approach the case in such a manner, that the end *d* of the tube 5 shall pass into the panel *a* of the end R of the clothes-box, and corresponding end of the tube X placed in it. The pipe 6, which forms the communication between the tube X, lodged in the clothes-box, and the chimney of the room, may be now placed in its situation by causing its end *a* to pass on the end of the pipe inclosed in the box, and the end *b* to pass into the chimney, (see FIGS. 25, 26, 26, PLATE 3.)

The various parts of the apparatus, when in their proper situation, are so accurately adapted to each other, that in general neither smoke nor vapour can escape at what may be called the immoveable joints; but, if from any cause this accident should occur, the joint at which the escape takes place should be luted, and for this purpose a mixture of powdered quick lime and ox-blood are used at the Skin Infirmary. The moveable joints of the apparatus are all effectually secured by the

parts screwing into each other, by their being adapted to one another by grinding, or by one side of the joint forming a groove, which lodges a quantity of fine sand, into which the other side is received.

The wooden parts of the apparatus will require to be painted, at short intervals, for several months, in consequence of the shrinking which occurs from the exposure to heat; and the metallic portions should be preserved of a cleanly appearance, by the employment of black lead, used as is done with cast-metal articles in general.

CHAP. II.

FUMIGATING APPARATUS FORMERLY USED AT THE DUBLIN SKIN INFIRMARY.

It has been already stated, that by this apparatus many of the objects of fumigation may be accomplished; but, the reader will observe, upon examining its construction, that, 1st.—It does not afford the means of applying the gas or vapour, in a concentrated state, to particular parts of the general surface;—2dly.—It is with difficulty, that its temperature can be accurately regulated, in consequence of the furnace being placed directly under the patient;—3dly.—Substances which require a very high temperature for their volatilization, cannot be used in it, as there is no means of applying a separate heat to the case in which the patient sits, from that used for the evaporation of the medicine employed;—4thly.—Gases very deleterious to respiration cannot be administered by it, without much care and inconvenience, because, if the patient wished to come out of the apparatus, or if it was necessary to terminate the operation, before the substance was exhausted, from which the gas was obtained, there is no means of removing the former from the furnace, and the latter must consequently escape into the apartment;—5thly and lastly, in consequence of the brick-work which surrounds it, it must be stationary, and consequently cannot be moved from place to place.

SECTION I.

DESCRIPTION OF THE PLATES, WHICH REPRESENT THE CONSTRUCTION OF THE APPARATUS.

a, *a*, *a*, The fumigating case, in which the patient is seated on a screw-chair.

b, The screw-chair, by means of which the patient can be raised or lowered, so as to be adapted to the height of the apparatus.

c, The door of the fumigating case: in the panels of which there are two openings, destined to receive the upper limbs, or one of either, in case of partial fumigation being required. They also serve the purpose of permitting the medical attendant to pass in his hand, and ascertain the progress of the production of perspiration, and the state of the patient's respiration and circulation. Moreover when infants or children are fumigated, they are used to admit the hands and arms of the nurse, who is, in this way, enabled to support and tranquillize the little patient. Each opening is furnished with a leathern bag, nailed by one end round the circumference of the opening in the door of the case, and formed at the other into a string-case, which, when the holes are empty, can be drawn perfectly close, and thus prevent the escape of any of the vapour contained in the case; or if there be a limb, or limbs, in the hole or holes, the strings can be drawn tight round them, so as to have the same effect.

d, The cover of the case, perforated by a large round hole, to the circumference of which the cap or box, that receives the head of the patient, is attached.

e, The leathern cap, having one end nailed to the circumference of the opening of the lid, and the other supplied with a string-case, for the purpose of being drawn tight round the face and forehead of the patient.

f, The floor of the apparatus, made of stone and perforated by holes, through which the materials, that have been converted into vapour or gas, pass up into the case, and surround the patient.

g, A metal plate, having two holes filled with metal stoppers, and one of these perforated in its centre, so as to receive the end of a funnel.

h, A thermometer, the bulb of which passes into the case, the scale being visible externally.

i, *i*, *i*, The brick-work, upon which the fumigating case is placed,

and which contains the apparatus required for evaporating the medicines used.

k, The door of the fire-place.

l, The ash-pit.

m, The door of the ash-pit, which gives much assistance to the attendant in regulating the draught of the apparatus.

n, The stopper of an opening, which leads into a chamber of the apparatus, above the furnace and its flue, and below the stone bottom *f* of the box and the iron plate *g*. The opening is used to introduce a drawer or tray, sometimes used in fumigation.

o, A funnel, by means of which fluids are conveyed into the chamber over the furnace.

p, The line of direction, in which the hot hearth, or metal plate runs, which is placed over the fire place *k*, and over the flue which leads to the tube *q*, and serves to separate both from the chamber of the apparatus already described.

q, A tube, which communicates by its lower end with the flue of the fire place *k*. This flue runs under the hot hearth placed in the direction of the line *p*, and is separated from the floor of the room by two courses of bricks. The upper end of the tube *q* is bent at an obtuse angle, to enable it to pass into the funnel of the chimney of the room, in which the apparatus may be placed.

r, One of the tubes (the other not being seen,) which serves to convey the vapour or gas from the case, in which it opens, into the tube *q*, and thence into the chimney of the apartment.

s, The handle of the valve of the tube *q*, by means of which this tube may be shut or opened, entirely or in part, and thus diminish or encrease the draught of the fire place.

t, The handle of the valve of the tube *r*, by means of which the draught from the case, by the tube *r*, into the tube *q*, is regulated.

u, The ladder by which the patient ascends into the apparatus.

SECTION II.

MODE OF USING THE APPARATUS.

It is supposed that the apparatus is cold, and that we wish to administer a fumigation of sulphurous acid saturated with watery vapour.

We commence by closing the valves *t* of the tubes *r*; we open the valve *s* of the tube *q*, and kindle the fuel on the grate of the fire-place *k*. When the interior of the case is heated to a proper temperature, which will be denoted by the thermometer *h*, we introduce the patient into it by the ladder *u*. Having regulated the height of the stool *b* by means of its screw, so that when the patient is sitting, the top of his shoulder shall be about half an inch below the level of the upper edge of the case, we shut the door of the apparatus, and then let down the cover *d*, so that the head of the patient shall pass into the cap *c*, and his face appear through its opening; which is now to be drawn tight, by means of its string case, round the forehead, cheeks, and chin, previously surrounded by a towel, which enables the string-case to be drawn much closer. We then open the valves *t* of the tubes *r* to such an extent, that the vacuum, caused in the case by their draught, shall attract only a little of the external air, but nevertheless sufficient to prevent the sulphurous acid gas from escaping through the joints of the case; which are, by this means, as it were, luted. We then introduce, by the door *n*, into the chamber of the apparatus, situated above the hot hearth, and upon the hot hearth itself, a small crucible, containing the sulphur kindled by means of a piece of cotton wick, which is placed in the crucible, and surrounded by the sulphur. The door *n* being then closed, the sulphurous acid, produced by the combustion of the sulphur, diffuses itself within the apparatus, and passing along the chamber, which is situated over the hot hearth, and through the holes of the stone bottom *f*, it surrounds the body of the patient, and afterwards escapes through the tubes *t*, by which it is conducted into the tube *q*, and thence into the chimney, along with the smoke, &c. of the fire place *k*.

If we wish to combine aqueous vapour with the sulphurous acid, it is necessary to fill with water the funnel *o*, and having sufficiently opened the cock, with which it is furnished, we permit the water to fall, drop by drop, on the hot hearth that is over the fire place, and, being thus converted into vapour, passes into the apparatus, is mixed and combined with the sulphurous acid, and produces on the patient the effect required.

When the operation of fumigation is terminated, or when the patient feels himself fatigued, and wishes to come out of the apparatus, it is necessary, for the purpose of preventing the escape of the sulphurous acid into the room, to extinguish the combustion of the sulphur a few minutes before, (if it be not already burned out,) by putting a cover on the crucible that contains it, which may be done through the opening in the plate *g*, that receives the stopper not provided with a funnel; also to open the two holes of the plate *g*, which are filled during the fumigation by the two stoppers; to shut the valve *s* of the tube *q*; and, on the contrary, to open entirely the valves *t* of the tubes *r*. The tube *q* having thus its communication with the fire-place *k* cut off, requires much air, and obliges the atmosphere of the room to enter into the apparatus by the two holes of the plate *g*, and by all the chinks of the box. This air mixes itself with the sulphurous acid contained in the apparatus. The whole is then carried outwards by the tubes *r*, and the box thus filled with pure air, may be opened without danger of diffusing any injurious or disagreeable odour through the room in which the apparatus may be placed.

SECTION III.

MODE OF PLACING THE DIFFERENT PARTS OF THE APPARATUS IN THEIR PROPER SITUATION.

As there is a quantity of brick-work employed in setting this apparatus, it has been found more convenient to accompany it, when

forwarded from the Infirmary, by a model, than to attempt any written description of the mode of placing its various parts in their proper situation. The letters and numbers on the model, refer to letters and numbers on corresponding parts of the apparatus itself, and such parts of the latter, as are formed of brick, are coloured red in the model.

CHAPTER III.

APPARATUS FOR THE GENERAL OR PARTIAL ADMINISTRATION OF RESPIRABLE VAROURS OR GASES.

The apartment, in which the apparatus for the administration of respirable vapours or gases is contained, measures, in length 26 feet, and in breadth 8 feet. It is equally divided by two transverse partitions into three compartments, which, however, communicate by doors with each other. The middle, which is the operating compartment, and which is that seen in Plate VI. measures in height 7 feet, and it is in it that the vapours are administered. On each side of this compartment, there is a door, leading into the adjoining compartments, which are much loftier. Of the two latter compartments, one is fitted up with a shower-bath, and with means of ventilation so constructed that its temperature can be lowered as much as may be required. The other compartment is furnished with a couch for the patient to recline on, and with the means of having its temperature considerably elevated. It has also such means of ventilation that its temperature can be gradually lowered to the same degree as that of the external air.

The middle, or operating compartment, serves, as has been stated, for the administration of all respirable vapours applied in every possible manner. After the patient has undergone, in this compartment, such operations as may have been directed, he passes into either of the others, according to the transition required. If it be wished to apply cold, either generally or partially, on coming out of the operating compartment, this can be accomplished in the compartment in which the shower-bath is placed; but if it be adviseable that the transition from the heat of the operating compartment to that of the external atmosphere should be very gradual, he passes into the other compartment,

the temperature of which may be gradually lowered from that of the operating compartment to that of the external atmosphere. The order of using the compartments is sometimes the reverse of that just stated. That is, the patient is sometimes exposed to a sudden elevation of temperature, by passing from the compartment in which the shower-bath is placed into the operating compartment, and sometimes to a gradual one by remaining, for some time before he enters into the operating compartment, in that compartment which possesses the means of having its temperature *gradually* lowered or elevated.

The apartment, in which the apparatus for the administration of respirable vapours is placed, leads into an enclosed garden, in which the patients may exercise for some time in the open air, before they leave the Institution to go to their own residences.

SECTION I.

DESCRIPTION OF THE PLATES WHICH REPRESENT THE CONSTRUCTION OF THE APPARATUS.

PLATE 6.

A, The urn, from which the vapour issues.

B, The attendant in the act of applying a stream of vapour to the left knee of a patient.

C, The patient, reclining on a couch, (the bottom of which is made of cane-work, to allow the vapour to diffuse itself about him,) and holding a rope, suspended from the ceiling, which enables him to change his position with ease, or to exercise his upper limbs when necessary.

a, The tube which conveys vapour from a steam boiler into the urn A.

b, A cock, by which the condensed water is drawn off from the urn.

c, The tube, by which the vapour is discharged in an impregnated state from the urn.

d, A thermometer, suspended from the ceiling, to indicate the temperature of the compartment.

e, *e*, The windows of the compartment, by which the vapour may be allowed to escape when necessary.

f, A section of an instrument, by which the vapour may be applied to any of the outlets of the mucous surfaces. The small end is passed into the outlet, and the pipe by which the vapour escapes from the urn is directed on the large end. The vapour passes through the perforated partition, which may be observed to cross the narrow portion, and having been conveyed to the part, upon which it is to be applied, it returns by the curved tube; and in this way a current is kept up. The size of this instrument must vary, according to the outlet to which it is wished to apply it.

g, *h*, Two small guards made of wood, used to protect the surrounding parts, when it is wished to apply the vapour in a very concentrated state on a particular point, as when it is necessary to form an eschar, or produce vesication.

i, The door, which leads into one of the compartments above alluded to.

Plate 3.

Fig. 33. A section of the urn for the impregnation of the vapour used; and also of the tubes, which convey the vapours to and from the urn.

a, The pedestal, by which the urn is raised to a convenient height.

b, *b*, *b*, The bottom and sides of the urn, made of stone.

c, The tube, which conveys vapour into the bottom of the interior of the urn.

d, The interior of the urn, which is divided by a transverse perforated partition into two portions. The lower portion receives the vapour from the tube. The vapour then passes through the perforated partition, and being impregnated by traversing such substances as may have been introduced on the perforated partition, it escapes at the upper part of the urn in a medicated state.

e, The cock, which conveys the condensed water from the bottom of the urn.

f, The tube, which is connected with the top of the urn, when the vapour, which escapes from it, is to be directed on a particular part.

g, A perforated capital, which fits like the tube *f* on the top of the urn, and is used when it is wished to allow the vapour to escape in a diffused manner into the apartment.

h, *h*, A tube which may be connected with the tube *f*, when it is necessary to convey the vapour under the couch on which the patient reclines, before it be allowed to escape into the apartment. The perforated capital *g*, fits on the end of this tube as well as on the top of the urn.

i, A vessel connected with the tube *h*, *h*, which receives the condensed water.

SECTION II.

MODE OF USING THE APPARATUS.

The directions respecting the use of this apparatus relate to:

The mode of producing the vapour.

The mode of applying it to the general surface.

The mode of applying to a particular part.

1. *Mode of producing the vapour.*—This consists in causing a current of steam to act on those substances, from which the vapour or gas may be obtained. To accomplish this, screw off the top of the urn A, PLATE 6, and, by the opening thus produced, introduce the substance on the perforated partition in the interior of the urn;—screw on the top again, and by opening the stop cock of the tube *c*, PLATE 3, FIG. 33, or *a*, PLATE 6, the steam will rush in, and becoming impregnated by passing through the substances used, whatever they may be, it will escape from the top of the urn in a medicated state.

2d. *Mode of applying the vapour to the general surface.*—When the vapour is to be applied to the general surface, the perforated capital *g*, PLATE 3, FIG. 33, should be placed either on the top of the urn, or on the top of the tube *h*, *h*, and the steam being permitted to enter the urn, will escape through the numerous holes in the capital, and diffuse itself equally through the compartment. The patient having placed himself naked, or with a light covering on him, in whatever position, on the couch, he may find most comfortable, the compartment becomes immediately filled with vapour, and surrounds him in all directions. It is clear, as the patient must necessarily respire the vapour, which is discharged into the compartment, none can be used which would injure or obstruct respiration. However, it may be here observed, that there are many vapours or gases, which will not produce any very unpleasant effect when combined with aqueous vapour, although they would cause the most deletereous consequences were they respired in a pure state, or diluted with atmospheric air in a dry state. Such are, for example, sulphureted hydrogen gas, chlorine gas, many of the acid vapours, &c. &c. After the patient has remained for some time enveloped in the vapour, the attendant commences the operations of friction, percussion, and all those actions which favour, in a remarkable manner, the circulation in the vessels of the surface, and at the same time excite the energy of the cutaneous organ. The patient also, with the assistance of the rope, which he holds in his hand, PLATE 6, performs many exercises, which materially contribute to the restoration of such parts as are in a more or less rigid state. After this operation, which lasts nearly half an hour, is terminated, the patient is removed into one or other of the adjoining compartments, according to the nature of the temperature, into which it is wished to bring him; and as soon as he leaves the compartment, in which the operation was performed, the windows are thrown open, and it is quickly freed from the vapour, and rendered clear.

2d. *The mode of applying the vapour to a particular part.*—This operation, if judiciously employed, affords one of the most powerful auxiliaries we possess, in the treatment of local diseases. It may be

performed on almost all parts of the surface and on all the outlets, and so modified as to produce very different effects. There are not perhaps any means, with which we are acquainted, so well adapted to produce all the various degrees of cutaneous excitement, from a slight and transitory blush, to vesication and complete disorganization. When the application of the vapour is to be confined to a particular part of the cutaneous surface, the operator takes in his left hand a guard, similar to those delineated in PLATE 6, *h*, *g*, and applying it to the part, in such a manner that the portion of skin to which the vapour is to be applied, shall correspond to the hole in the middle of the guard, he directs, with his right hand, the tube, which is connected with the top of the urn, in such a manner that the vapour is discharged on the part required. The form and the size of the hole in the guard must vary according to the part on which the vapour is to be applied, and the operator must keep the pipe directed to the part for a longer or shorter time according to the effects which he may wish to produce. On those occasions where it is not wished to cause a disorganization of the part, or any very great degree of excitement, it will not be necessary to use the guards. When the application is to be made to one of the outlets, the instrument, a section of which is shewn in PLATE 6, *f*, is to be used in the manner already described.

CHAPTER IV.

APPARATUS FOR THE IMPREGNATION AND APPLICATION OF FLUIDS.

Fluid applications to the skin may be varied in their temperature, in their mode of application, and according to the substances or agents with which they are impregnated. By the apparatus, which has been constructed at the Infirmary, for the impregnation and application of fluids, they may be raised to any temperature necessary, impregnated by any substances, whether the substance gives its virtue to the fluid by solution, decoction, or by distillization; and they may be applied in all possible manners, as by immersing, aspersing, pumping, showering, &c. &c. with or without friction, percussion, &c. &c. It is altogether unnecessary to enlarge on the powerful auxiliary which such an apparatus must afford in the treatment of those diseases for the relief of which the Institution has been established.

SECTION I.

DESCRIPTION OF THE PLATE, WHICH REPRESENTS THE CONSTRUCTION OF THE APPARATUS.

Plate 1.

The apartment in which this apparatus is placed measures in width 17 feet, in length 20 feet, in height 16 feet.

A. A pump, by which the apartment is supplied, from a reservoir in a distant situation, with any quantity of water required. It also serves

to propel, with the necessary force, such fluids, whether impregnated or simple, as are used in the operations of aspersion, showering, pumping, &c. &c.

B. A reservoir, generally full of cold water.

C. A reservoir, generally full of warm or medicated water.

D. The boiler and furnace, by which the fluids are heated and impregnated.

E. The bath, in which the patient immerses himself, and which also serves as a waste reservoir to the part of the apparatus for aspersing, showering, or pumping; which part, however, being placed over the bath, cannot be seen in the drawing.

F. The couch, in which the patient reclines for a longer or shorter time after the operation.

G. The door, which leads into the retiring apartment, the air of which can be heated to any temperature necessary for the patient to remain in, on coming out of the bath. The apparatus for heating this apartment consists simply of a metallic urn, which is fed by a steam pipe from the boiler, furnished with a stop-cock to regulate the quantity of vapour admitted, and consequently the quantity of caloric which will be given off by the urn. There is also a power of gradually lowering the temperature of this apartment to that of the external atmosphere, by which means the patient is enabled to avoid any unpleasant feelings, which might be produced by the sudden transition from one temperature to another.

a, The tube, which feeds the pump with pure water.

b, The tube, which supplies the pump with medicated fluids.

c, The pipe, which conveys into the reservoir B the pure water, which has been lifted by the pump.

d, A branch of the tube *c*, which runs round the cornice of the room, and supplies with fluid the apparatus for aspersion, showering, pumping, &c. &c.

e, The handle, by which the pump is worked.

f, A tube, by which the boiler is supplied with water from the reservoir B.

g, *g*. A tube, which forms a communication between the reservoir B, and the reservoir C. By this B supplies C with water, which had been conveyed into it by the pump A.

h, *h*. A cock in each reservoir, by means of which a small quantity of their contents may be taken out, to ascertain their temperature or degree of impregnation, before they are drawn off for use.

i, *i*. The balance weights of floats, which lie on the surface of the fluids contained in each reservoir. The float, rising or falling, according as the contents of the reservoir rise or fall, causes the balance weight, which is connected with it by a cord that passes over two pulleys, to rise or fall, and thereby denotes the quantity of water contained in each reservoir.

k, The furnace, by which the boiler is heated.

l, *l*, The boiler, made of copper, capable of containing about thirty gallons, and furnished with all the appendages of a steam-engine boiler, with the exception, that it is supplied with water by hand—a mode that has been found most convenient in a boiler of so small a size.

m, A tube, which conveys vapour from the boiler into the reservoir C. This tube, having entered the side of the reservoir, ascends, and forming an arch above the level of the top of the reservoir, descends until it reaches the bottom, where it ends in an expanded mouth-piece.

n. A tube, which conveys vapour, from the boiler into other apartments, for various purposes.

o, The balance weight and cord of a valve, which opens into the boiler, to allow the atmospheric air to enter it and the tubes, when a vacuum is formed by the condensation of the vapour.

p, An alarm pipe.—It descends into the interior of the boiler, to the level at which, when the water boils down so far, it should be resupplied with water, and the attendant is called for this purpose by the noise which the vapour then makes in passing out of the upper end of the alarm tube, which is of the form of an organ pipe.

q, The valve which opens into the boiler.

r. The tube, which conveys fluids from the boiler either into the bath E, or into the tube *b*, by which the pump is occasionally supplied.

s. The tube which conveys the contents of the reservoirs B, C, into the bath, or into the tube *b*, which supplies the pump.

The various tubes are supplied with stop-cocks in different situations, so as to enable them to perform the offices for which they are intended; and they are all connected by screw coupling-joints, so that any of them may be taken down, to be repaired when necessary, without disturbing the remainder of the apparatus.

SECTION II.

MODE OF USING THE APPARATUS.

The directions on this subject may be arranged as follows:—

To give a simple warm bath.

To give a bath of a fluid impregnated by decoction.

To give a bath of a fluid impregnated by the products of distillation.

To give a bath of a fluid impregnated by solution.

To perform the operation of pumping, &c. &c.

To give a simple warm bath.—Fill the reservoir B by means of the pump A, and afterwards the reservoir C by opening the stop-cocks of the pipe *g g*, which connects the latter with the former. It having been ascertained that the reservoirs are full, by the balance weights *i i* having descended to the bottom of the reservoirs;—fill the boiler *l l* about two-thirds full, by opening the stop cock of the tube *f*;—kindle the fire in the furnace *k*;—and stop the communication between the reservoirs B C by closing the stop cock of the tube *g g*. In about twenty minutes the escape of vapour from the boiler, by its safety valve, will denote that the water is boiling. It will then be necessary to open the stop-cock of the tube *m*, to permit the vapour or steam to pass

into the reservoir C; and in the course of a short time it will be found that the temperature of the water contained in the reservoir C, when drawn off by the cock *k*, is sufficiently elevated for the purposes of a bath. It may then be drawn off into the bath E by the tube *s*. In case it be too warm, some of the contents of the reservoir B may be conveyed into the bath by opening the stop-cock of the tube *g*, which separates this reservoir from the tube *s*, and closing the stop-cock which separates the reservoir C from the same tube. After the operation the contents of the bath are to be drawn off by its waste pipe.

To give a bath of a fluid, which has been impregnated by decoction.—Having nearly filled the boiler *l l* with water from the reservoir B by the tube *f*, introduce into it by the man-hole such substances as it may be wished to submit to decoction. The fire should be now kindled in the furnace *k*, and the water in the boiler having been sufficiently impregnated by decoction, shut the stops of the tubes *s* and *b*;—open the stop of the tube *r*, and allowing the contents of the boiler to pass off into the bath E, admit at the same time a similar quantity of fluid to be conveyed into the boiler from the reservoir D by the tube *f*, to prevent the boiler being injured by the fire when its impregnated contents have been removed. The fluid contained in the boiler having been in this way conveyed into the bath, it may be diluted, as required, by fluids from the reservoirs C or B.

To give a bath of a fluid impregnated by the products of distillation.—Introduce by the man-hole of the boiler, previously filled with water, as above directed, the substances from which the volatile elements are to be obtained; and conduct the remainder of the process, as in the case of a simple warm bath. In fact the contents of the reservoir C, are in this instance impregnated with the volatile elements of the substances submitted to distillation, exactly in the same way as that in which their contents are heated by the steam obtained from the boiler.

To give a bath of a fluid impregnated by solution.—The solution of the substance used may be made either in the bath E, or in the boiler *l l*, and afterwards conveyed into the bath by the tube *r*. The former

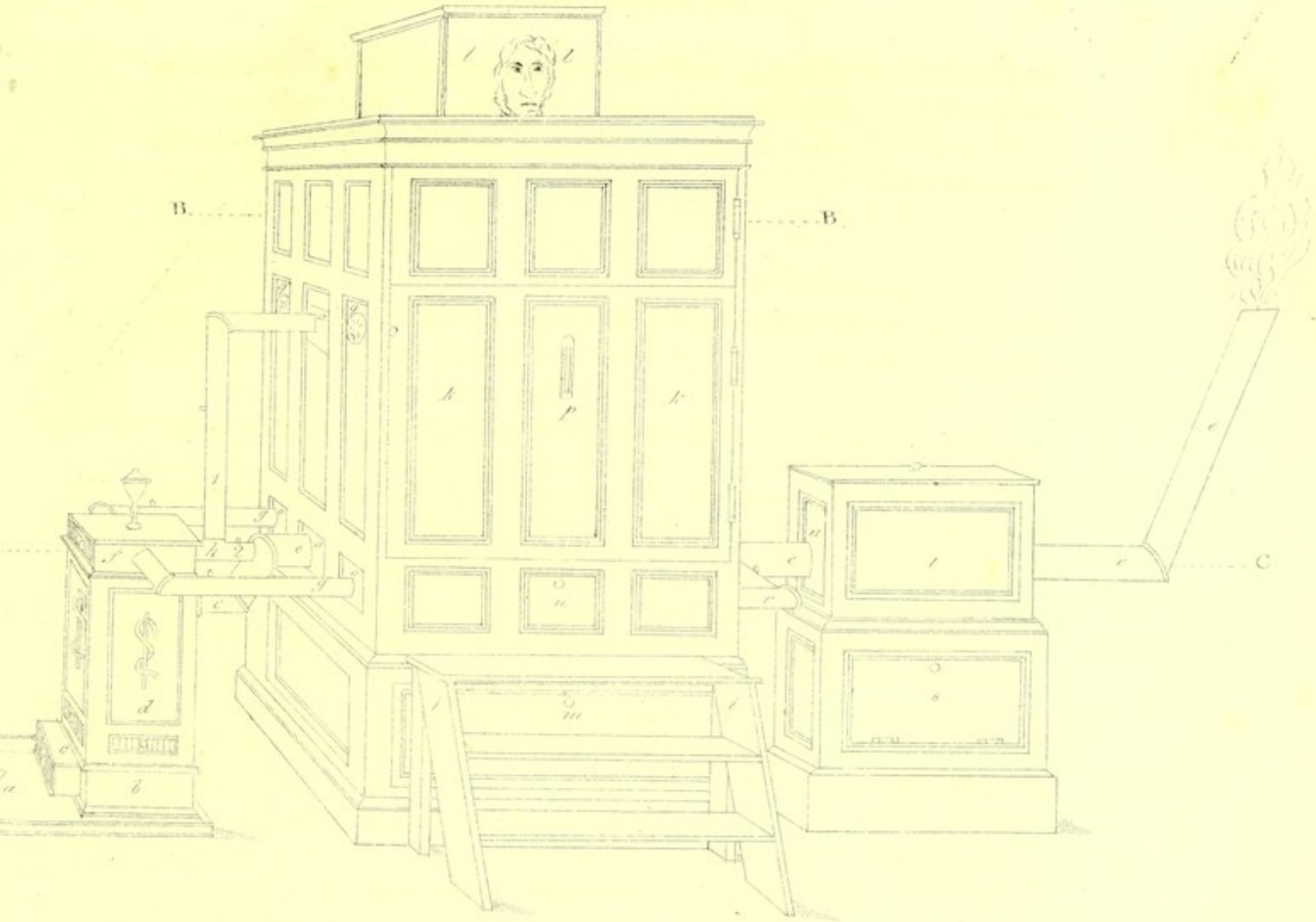
mode will be prefered when a high temperature is necessary for causing the solution of the substances used.

To perform the operation of pumping, &c. &c.—Open such stop-cocks as will enable the pump to be fed with the fluid, with which it is wished to perform the operation;—convey the fluid by means of the pump either into the reservoir placed over the bath E, (and thence allow it to be discharged on the patient, in whatever manner it may be desired,) or else at once propel it by the pump on the part, and in the manner wished.*

* All the drawings in this publication have been made, whenever perspective permitted measurement, on a scale of three-fourths of an inch to a foot.

For the information of surgeons of county infirmaries, of governors and medical attendants of hospitals, and other charitable institutions, of inspectors of prisons, and of all medical men residing in the country, I take this opportunity of mentioning that fumigating apparatuses similar to those above described have been constructed, and are sold by the Register of the Skin Infirmary, *for the benefit of the charity*. All communications, on this subject, are to be directed, *post paid*, to the REGISTER of the SKIN INFIRMARY, 20, MOORE-STREET, DUBLIN.

THE END.



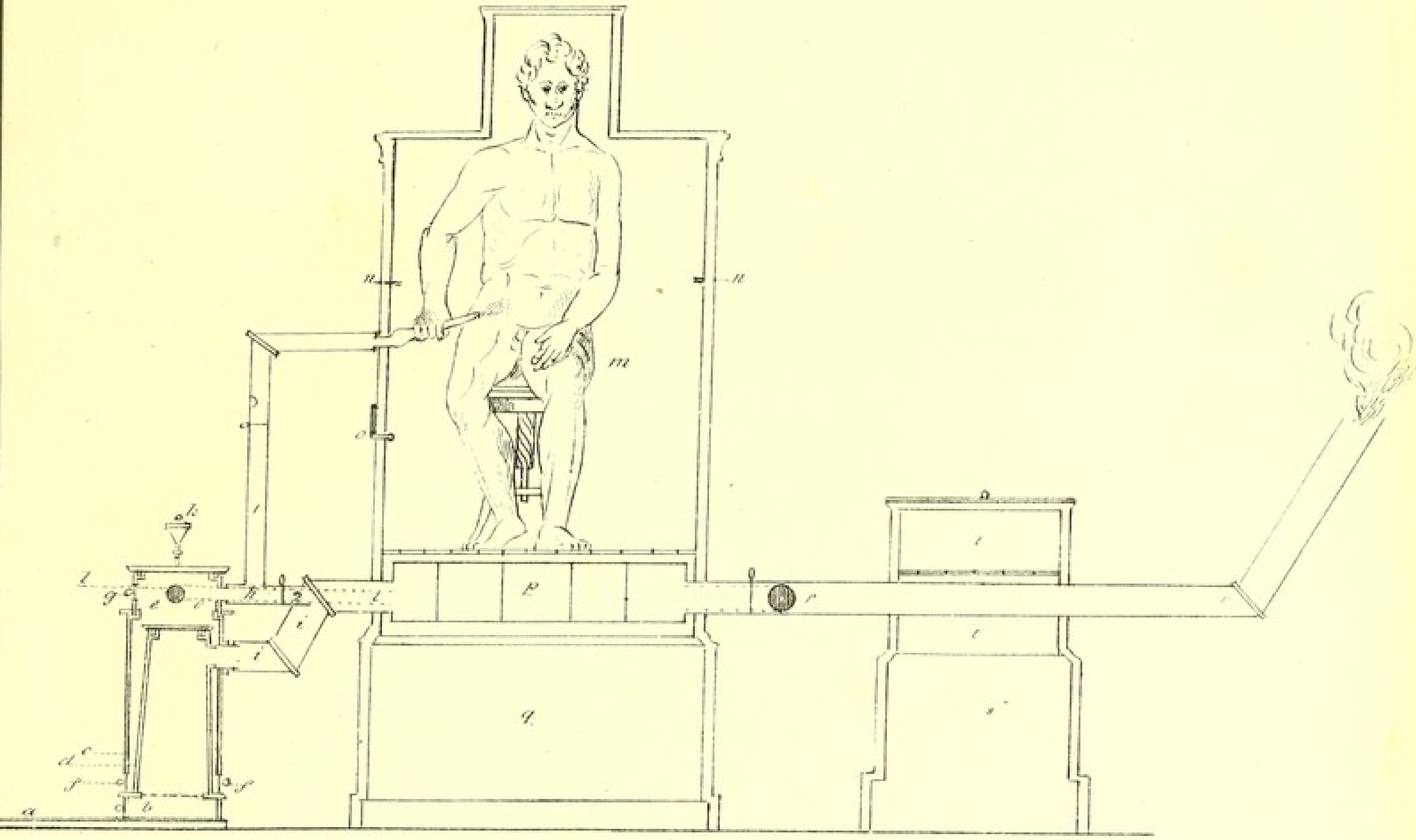
of the Apparatus for the general or partial administration of non-inspirable Vapours or Gases.

J. Connolly Del.

Forrester & Morrison Lithog. Dublin

Plate II

FIG. I.



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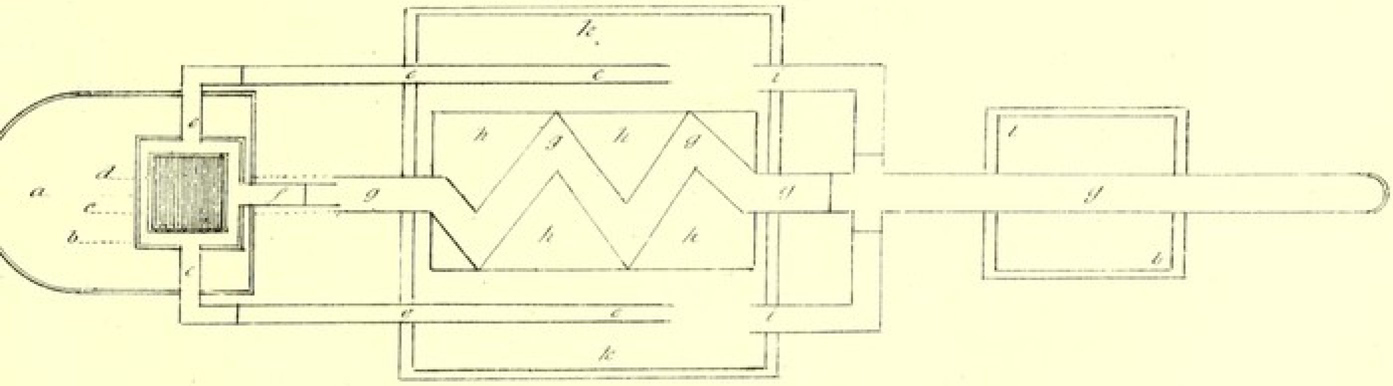
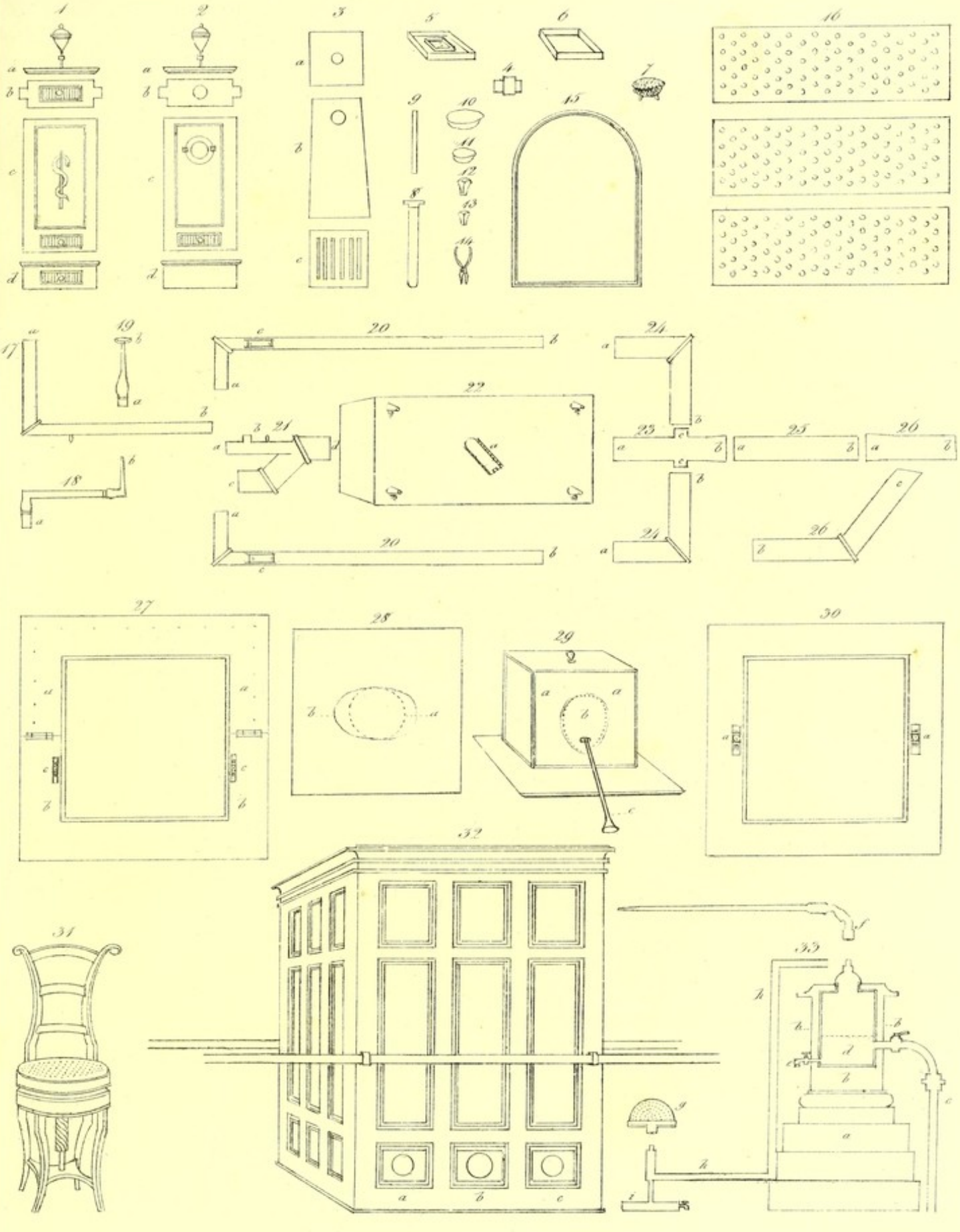


...ions of the Apparatus for the partial & general administration of non-respirable Vapours or Gases.

Del.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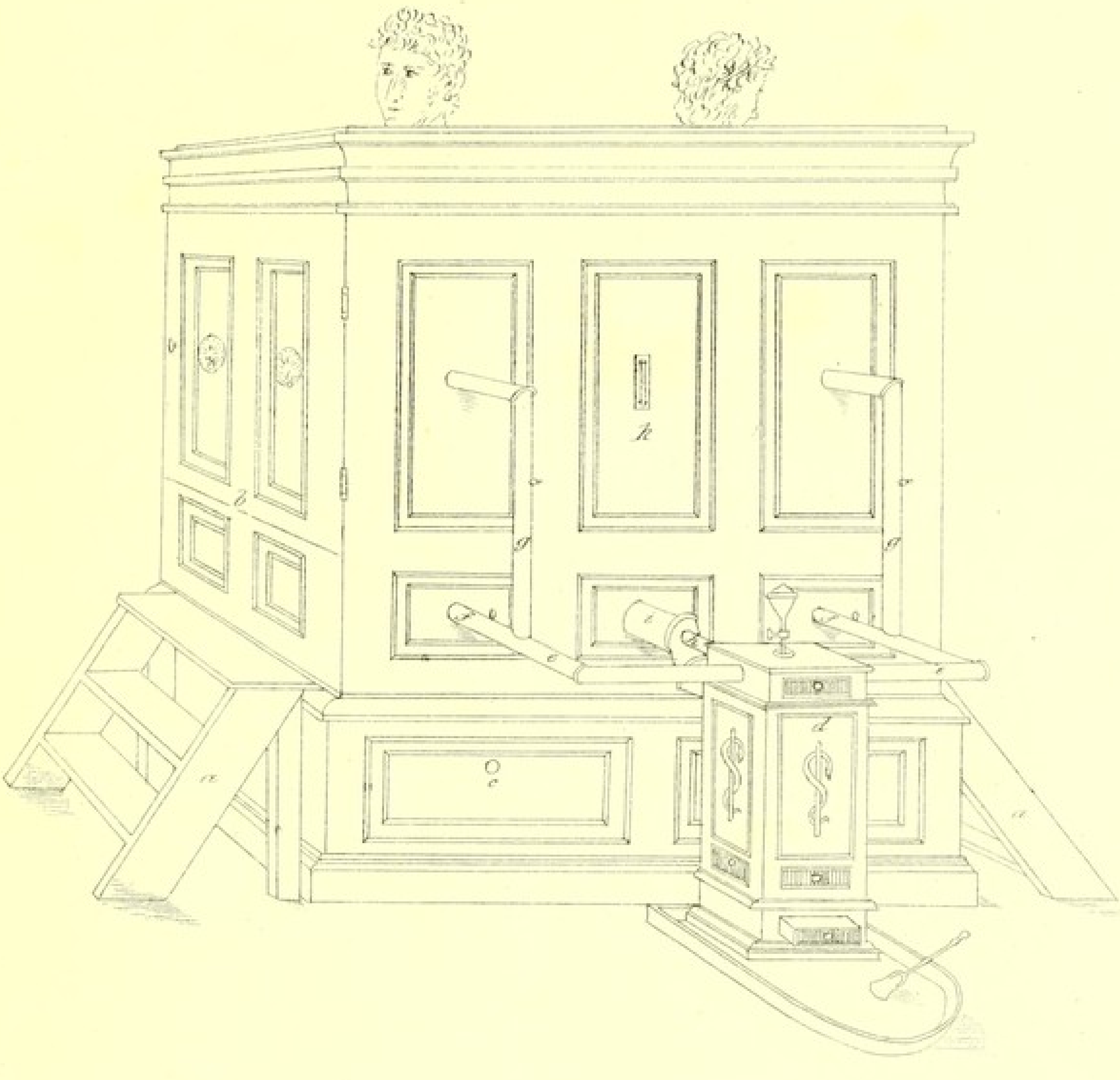
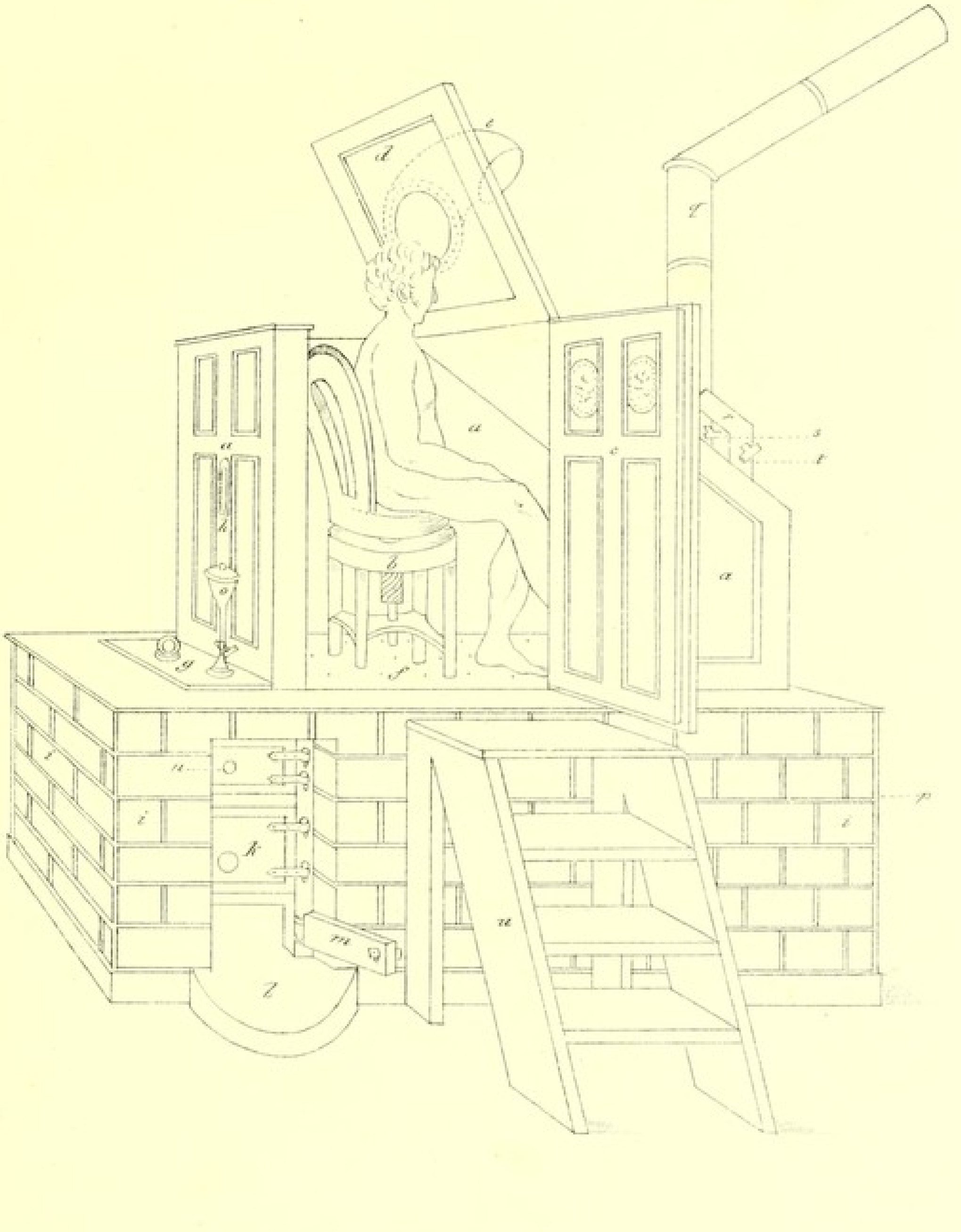


Plan of the Apparatus for the general or partial administration of non-respirable Vapours or Gases, adapted to two persons.

J. Connolly Delt

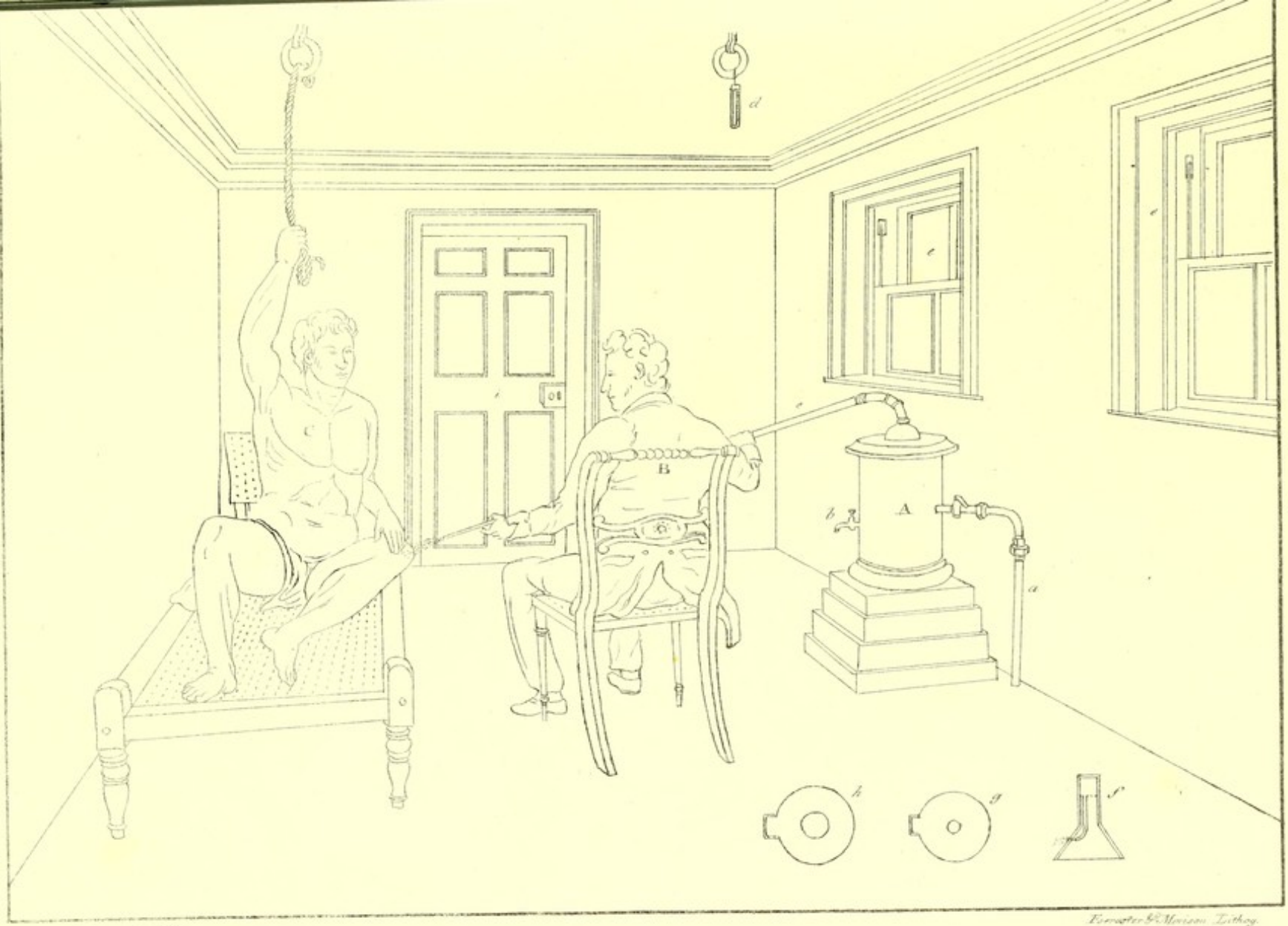
Forrester & Nicolson Lithog. Dublin



Fumigating Apparatus formerly used at the Dublin Skin Infirmary

J. Connolly Delt.

Forster & K. Morison Lithog.



J. Connelly Del.

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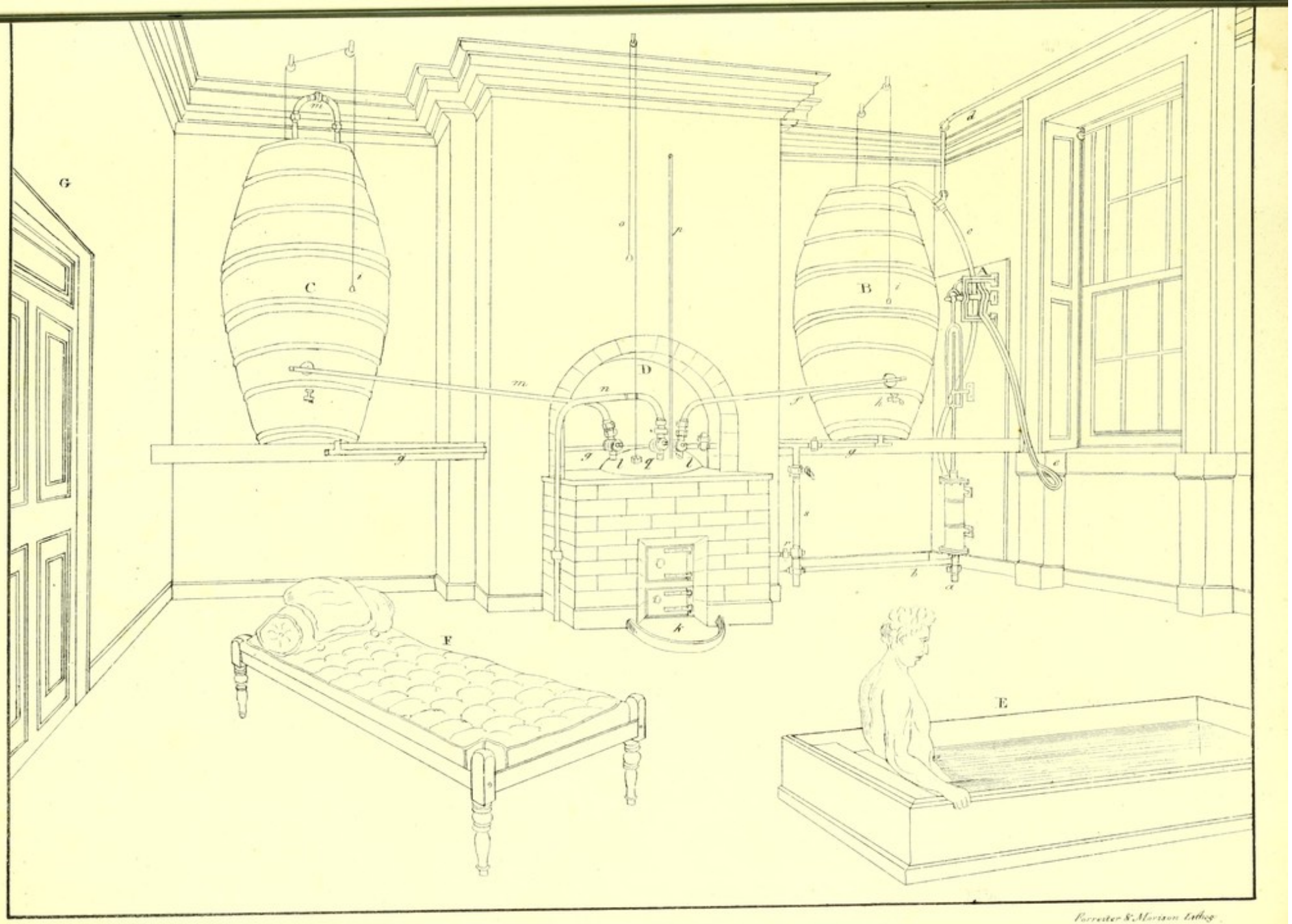
Apparatus for the general or partial administration of respirable Vapours or Gases.

Apparatus for the Impregnation and Application of Fluids.



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Apparatus for the Impregnation and Application of Fluids.