A memoir upon the method of securely closing moist anatomical preparations, preserved in spirit / by John Green Crosse.


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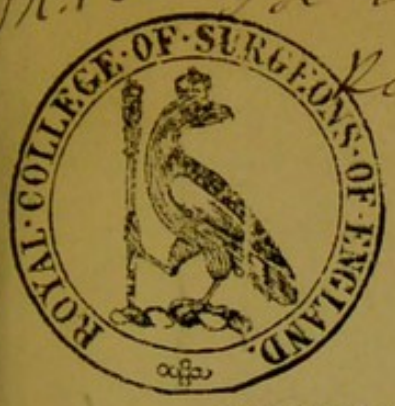

A MEMOIR

UPON THE

METHOD OF SECURELY CLOSING

MOIST

ANATOMICAL PREPARATIONS,

PRESERVED IN SPIRIT.

BY JOHN GREEN CROSSE, ESQ.

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WITH PLATES.

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MEMOIR, &c.

One sure way of being tedious is, to endeavour to say everything upon a subject that admits of being said, leaving the reader to find out nothing for himself, and giving him no credit for possessing common understanding. At the risk of being tedious, however, I shall proceed to describe, minutely, what I consider the best and securest method of closing moist anatomical preparations, conceiving this to be an art of great value to the teacher of minute anatomy, and to the zealous cultivator of pathology. Indeed, I regard this art to be next in importance,

for the advancement and stability of pathological anatomy, to the inspecting of human bodies *post mortem*, and believe it to have contributed greatly to heighten the character of some of our present most renowned professors in this country, where museums have multiplied in number and increased in extent, and are still increasing and multiplying, to the credit of our profession, and to the certain diffusion of useful and incontrovertible knowledge.

If an engraved representation of a morbid part be valuable, how much more so must be the original specimen from which the drawing was made? The inspecting of a well-managed preparation is to be considered the best substitute for not having witnessed the morbid dissection; and I could readily adduce examples in proof of the position, that a teacher cannot convey a distinct knowledge of certain parts of minute anatomy, most requisite to be generally understood, without a series of preparations kept in spirit. The works of Ruysch, Albinus, the Hunters, and Baillie, are still authenticated by specimens prepared respectively by their own hands, and preserved in spirits, not only for the present, but a future age. To dispute the value of such an employment, would be equal to denying that a good map can assist us in gaining knowledge of a country, or that making ocular inspection of an object conveys a better idea than reading a description of it.

Initiated in the art of closing moist anatomical preparations by my early and venerated preceptor, Sir Charles Bell, whilst I resided in his house as a pupil, and further instructed by Professor Macartney,

of Dublin, whilst engaged as demonstrator of anatomy in the University, which his zeal and talents have so greatly heightened as a medical school; I necessarily owe much to those gentlemen, which I embrace the present opportunity of inadequately acknowledging; and having since added the experience of nearly twenty years in making a *collection* of my own, chiefly comprising specimens of pathological anatomy, with the history of the cases prefixed, I am not like a young adventurer, sitting down to write upon a subject which he has just begun to cultivate. In stating what I know from experience in this matter, I shall, however, require indulgence, on account of writing hastily, without premeditation or revision.

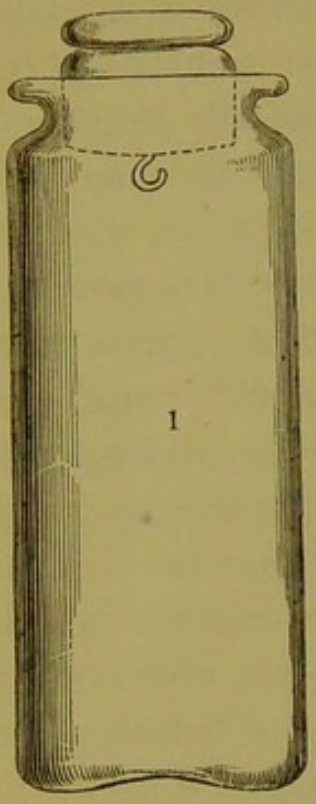
In general, the parts, whether natural or morbid, which the anatomist intends to preserve in spirit, are of small size; and the first attention required is to dissect away all extraneous portions, such as do not strictly belong to, or are not calculated to assist in explaining, the subject to be illustrated. As to shape, size, connexion, and relative position, a moist preparation well made may be considered sufficiently exact; the colour, though often desirable, can seldom be preserved. Sometimes we attempt to preserve the colour, by at once immersing the specimen in pure spirit or alcohol, or by pouring over it dilute nitric acid. In a few cases, you may preserve the colour, and shew vascularity, by drying the surface of the specimen before immersing it in spirit; the colour and vascularity of the pia mater of the brain, and of some other membranes, may be

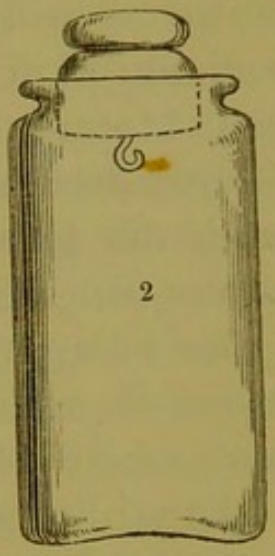
thus preserved ; but most commonly we relinquish all attempts to preserve the colour, and wash the specimen in abundance of cold water, by immersion and by *douche,* as soon as it is obtained. The cleanliness, distinctness and beauty of some specimens, depend very much upon such ablution being practised every few hours during the time we are dissecting and preparing them : this process of ablution should seldom be prolonged above three or four days. There are occasions, however, where the dissection takes a much longer time, even several weeks, and then the parts should be kept in pure spirit, or in proof spirit (prepared by mixing equal parts of alcohol and distilled water) and the dissection renewed and completed when convenient.

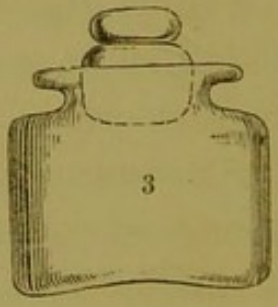
The dissection being completed, or as much of it done as is required in this stage, it is often desirable to harden the specimen, and to fix it in a certain shape for display ; and both these ends are obtained by immersing it for twenty-four or forty-eight hours in a strong saturated solution of nitrate of potass and alum, in equal proportions, distending the cavities of the specimen to the right degree by horse-hair, or carded cotton, or by such other mechanical aid as the ingenuity of the anatomist may suggest. In many instances, this hardening process is of great value ; and I possess numerous specimens which prove it to be so. (See *plate* 1, and description.)

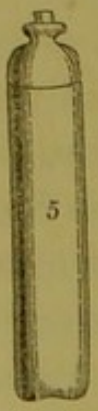
When the specimen is taken out of the hardening solution, it requires to be well washed with water, to dissolve and remove the salts which adhere to it, before it is placed in proof spirit. The plan I have long practised, and found most advantageous, is, to

Plate 2.









have large wide-mouthed glass vessels (see *plate* 2, *figs.* 1, 2, 3,) with ground-glass stoppers, containing proof spirit, in which I place each specimen, prepared as directed, until the convenient or proper season arrives for putting it up in a separate jar for exhibition. Such large jars, with ground stoppers, are indispensable for every curator of a museum of morbid anatomy; and the plan is not very expensive, after the first purchase of the jars, because the spirit kept in them does not evaporate; and when it becomes foul, which it inevitably will do, it can be distilled by a very simple apparatus, and thus fresh pure spirit be obtained. From the moment the anatomist obtains a morbid specimen, his attention must be daily directed to it in washing, dissecting, hardening, and again washing it; but as soon as it is lodged in a jar of the above description, (and one jar may contain several specimens) no more care is required until the period arrives for securing each specimen in a separate jar, for permanent exhibition.

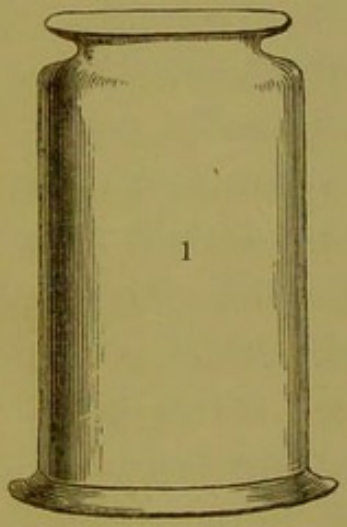
The preceding remarks are very brief in regard to the subject to which they refer, and are stated in a preliminary way, as being intimately connected with the point I purpose entering upon minutely, the permanently and securely closing moist anatomical preparations, which is found of such great difficulty, that we rarely enter a museum in which we do not find great part of the spirit evaporated from each jar, disheartening the curator by an incessant return of his labours, endangering the specimens intended to be preserved, and incurring a degree of expense which can only be borne by

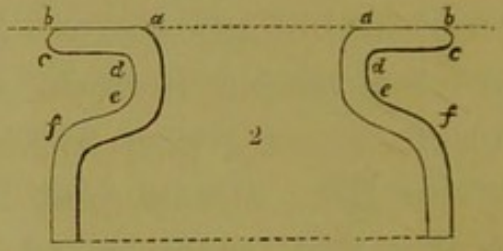
wealthy corporate bodies. When recently in London, I was assured, by the curator of one of the largest museums, where the greatest experience is necessarily afforded, that in six or seven years so much evaporation usually took place as to require the spirit to be renewed: according to this calculation, all the moist preparations in a collection would require, about every seven years, to be renewed with spirit and covered over afresh. By adhering to the rules I am about to lay down, this evil may be greatly diminished, and preparations secured for twenty, thirty, or even fifty years. I have endeavoured rather to adopt a secure process, than to study economy in the first expenditure, believing that plan to be most economical in the end, which most effectually answers the purpose and prevents a repetition of labour.

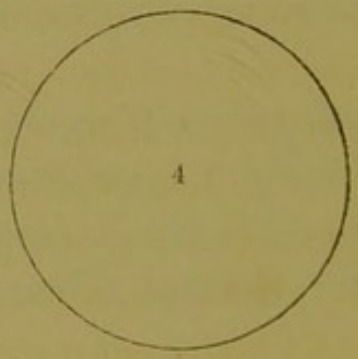
The anatomist having given the first attentions required, and lodged his specimens in glass stopper jars, as I have advised, may keep them for weeks or months, and select his time for the final arrangement of them.

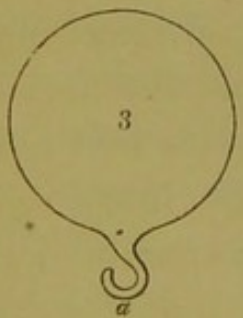
I consider it injudicious to attempt to close moist preparations in winter; the warmth of the succeeding summer will irresistibly expand the contained fluid, loosen and disturb the cover, and give rise to evaporation. The best, and at the same time most convenient, season for attending to this business, is during the warm and long days of summer; and where there is an option, the curator should make this choice. All the processes of closing a moist preparation are best conducted in warm weather; indeed, they can scarcely be accomplished quickly

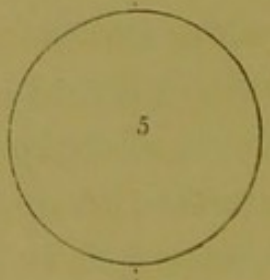
Plate 3.











enough in the winter season. The jar being closed in warm weather, when the contained fluid has its greatest dimensions, is afterwards submitted to lower degrees of temperature only, which contract the fluid and do not, therefore, tend to displace the covering of the jar.

If we are too studious in avoiding expense, we cannot close moist preparations perfectly and successfully. The jars should be invariably made of the clearest flint glass, and should be from 1-10th to 1-8th, or even 1-6th of an inch thick. If the edge of a jar be not made sufficiently thick, it will break under the requisite force employed in closing the jar and adapting the lead to it. Oval jars seem to be required for some preparations, but should in general be rejected, on account of their being liable to crack in cold weather at the part where the curvature is greatest. Round glasses should be selected, shaped like *fig.* 1, *plate* 3; and it will be found very advantageous to have the jar high in proportion to its diameter, because, although some spirit should in the course of years evaporate, the morbid specimen may still remain covered with spirit, and the necessity of replenishing and re-covering the jar be obviated. There is also another advantage in a high jar, that it allows the upper part of the specimen to be distinctly seen. The lip of the jar needs to be very accurately formed; if the glass-blower have not performed his duty, leaving the lip of the jar irregular, or chipped, or not shaped exactly as I shall describe, no anatomist, in my opinion, can ever successfully close the jar. Suppose *fig.* 2, *plate* 3, to represent the perpendicular section of a jar, the

top or rim should be exactly flat in the direction of the line *(a. b.)*, the lip *(b. c.)* should be rounded, and the rest of the surface of the glass should take the direction of the line (*c. d. e.*) If the rim be not well shaped, but irregular, and brought too near to (*e.*), it will not be possible to apply the lead accurately, as will be subsequently described. Continually we find in use, jars with the rim bent irregularly, so that its inferior surface (*c. d.*) is found inaccessible when you are about to adjust the lead; and with such defects the jar can never be effectually closed.

Certain specimens, whether natural or morbid, as of the brain and spinal marrow, are usually preserved in pure alcohol. Some specimens, being previously dried, are put into spirit of turpentine, which is now less used than formerly, and is found to increase so much in bulk in hot weather as to break up the covering of the jar. The use of pyroligneous acid, or solutions of certain salts, is only recommended by cheapness, but will not be found to answer well for permanently preserving morbid specimens. In general, the fluid employed for moist preparations, is composed of equal parts of spirits of wine and distilled water; and as these fluids do not at once mix completely together, the plan I advise, and have long practised, is, to put them together, and keep them for weeks or even months in narrow-mouthed glass stopper bottles, which are very high in proportion to their width (see *plate* 2, *fig.* 4); thus you get a perfectly clear and uniform fluid, which can be poured off as you require it, leaving the sediment at the bottom. If the water and spirits of wine be mixed and immediately used, the mixture

has globules of air in it, as well as *impurities;* but *these* by long standing, in tall slender bottles such as I describe, will settle to the bottom, whilst the globules of air will soon rise to the top, leaving the proof spirit in the best state for being employed by the anatomist.

Having selected a jar suited to the size and shape of the specimen, you fill it nearly full with proof spirit, in which you immerse the specimen, transferring it direct from the glass-stopper jar, if no more dissecting be required.

The method of suspending a preparation must be left greatly to the ingenuity of the operator. Where a thread is employed, it should be very fine as well as strong; what is called dentist's silk answers well, a smaller or a larger filament being employed, according to the weight to be supported. For very large specimens, Dr. Macartney, when I was with him in Dublin, employed a cat-gut thread, such as is used by anglers to fasten the hook to the line; it is only specimens of great magnitude that require this. The thread being attached to the preparation, its two ends are carried in opposite directions over the rim of the jar; a fine thread is put circularly upon the neck of the jar; then the former two threads, held down by the circular one, are brought back over the rim of the jar and meeting in the centre of its mouth, tied there. Description alone will hardly render this clear, but the *fig.* 1 of *plate* 5 will enable any one to comprehend so simple a process. In many instances a suspending thread may be dispensed with; where the specimen has been properly hardened and prepared, and the jar just

fits it, you need only press it down to the situation you wish, and it will be retained there, compressed by the sides of the jar. Some specimens, particularly small ones, can be fixed upon talc, which rests at the bottom of the jar, and thus a suspending thread be avoided. Glass globes filled with air, as represented in *fig. 3, plate 3,* have been used, a thread attached to the specimen being hung upon the hook (*a*): this method of suspending the preparation, by a floating glass globe, I have not found convenient; the preparation is unsteady, and sinks lower in the jar as the spirit evaporates.

The specimen should invariably be placed near to the bottom of the jar; often it may touch the bottom of the jar; and the upper third of the jar, or a considerable portion of it, should remain occupied only by the clear spirit; placing the specimen in this relative position to the top and bottom of the jar, not only brings the advantage already stated of allowing for the evaporation of spirit during many years, before the specimen will be exposed, and a necessity for renewal of the spirit arise, but admits light to come to the upper part of the specimen, enabling you to get a clear view of it, which is precluded when a preparation fills the jar near to the top, because the covering of the mouth of the jar is opaque. The *figure* in *plate* 6, representing hydatids in the placenta, exhibits the proper relative position of such a shaped specimen. Nothing can be more injudicious, or more unsightly to the eye of the experienced conservator, than a preparation placed, as one has often seen, nearer to the top than to the bottom of the jar.

The preparation being suspended, or supported, or somehow fixed in the right relative position in the jar, you must proceed to fill the jar most accurately to the brim with proof spirit, which should be poured out of a small tall and narrow vial (*fig.* 5, *plate* 2); for this filling to the brim cannot be done with accuracy, if you pour the proof spirit out of a large bottle, nor unless you make the brim of the jar exactly horizontal.

You next proceed to close the top of the jar, and bladder is the first covering you put over it. A common bullock's bladder, inflated and dried as we commonly purchase it, is the best material; and you must immerse it in water, and keep it macerating in this fluid, until it is pulpy, or until one coat passes over the other readily when a portion of the bladder is rubbed between the finger and thumb. A week or ten days will be required for macerating a bladder well, even in the warmest weather; and in the cold season, two or three weeks. In an emergency you may expedite the process by using tepid water; it can scarcely be macerated too much, though nearly putrefying, provided it continues sufficiently firm not to tear under the force requisite in applying it. The bladder thus macerated should be well washed with water to render it quite clean, and wiped with a towel to remove moisture from its surfaces. Having also wiped the rim of the jar dry, you proceed to apply the bladder, by placing the inner or mucous surface next the spirit, laying it over the top of the jar and in contact with the spirit, so that no air is left; you bring the edge of the bladder round the rim of the jar (*b. c. d. fig.* 2, *plate* 3)

and maintain it in this position by several turns of twine round the neck of the jar. Cut off the bladder close to the twine all round the neck of the jar, and press the edge of the bladder firmly upon the neck of the jar, by wiping it from above downwards with a towel, that on drying it may adhere to the jar firmly, and by a thin edge.

Experience has suggested to me a plan of drying the bladder, which is of great utility: that part only should be dried which is in contact with the rim and neck of the jar, and not the central portion which is over the mouth of the jar and in contact with the spirit. If no precaution be taken, whilst you are allowing the first bladder to dry, much spirit will evaporate through the portion of the bladder covering the mouth of the jar. I therefore cover all the bladder which is over the mouth of the jar and in contact with the spirit with a circular flat piece of lead, of such size as answers to the mouth of the jar. Graduated sizes of these circular pieces of lead should be kept (as *figs.* 4, 5, 6, *plate* 3), which may be an eighth of an inch or more in thickness; the weight of the lead brings some advantage; this lead should be allowed to remain on until the bladder is perfectly dried upon, and firmly adherent to, the rim of the jar. The bladder being perfectly dry upon the rim and neck of the jar, you remove the circular lead from the top, and also the twine placed round the neck of the jar; then pare off any irregularities of the edge of the adherent bladder at the neck of the jar, by cutting obliquely from above downwards.

The drying of this first bladder will, in warm

weather, occupy at least twenty-four hours, and sometimes it will not be accomplished in less than two or three days: you should expedite it, by placing the jar where there is a free circulation of air. If the circular piece of lead be not laid upon the bladder over the mouth of the jar, as I suggest, a considerable quantity of spirit will have evaporated, and air be contained in the jar, before you proceed to the next step: even when the circular lead is employed, some evaporation of the spirit takes place, though not more than serves a useful purpose (provided no air has entered the jar), as it renders the upper surface of the bladder a little concave, which is a desirable shape for it to assume.

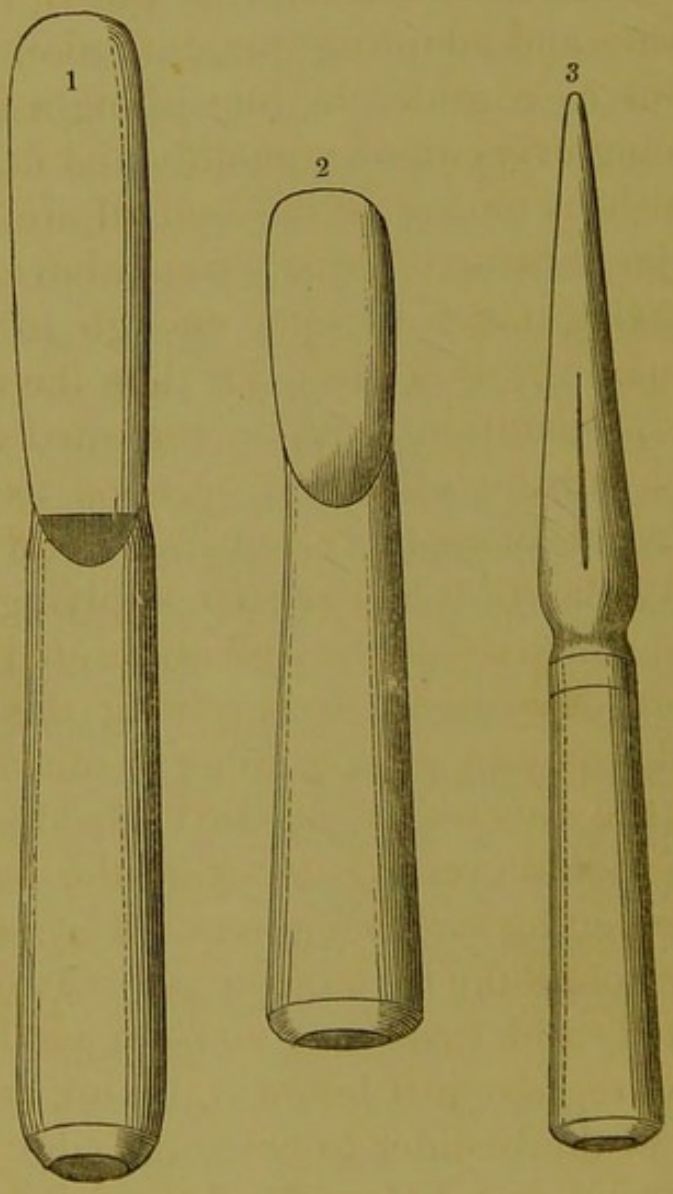
The next step in closing a jar, is to apply a thin sheet of lead over it; I consider the first bladder to be of no further use, than to enable the anatomist to adjust the lead conveniently and effectually to the contained spirit and to the rim of the jar. The lead is impermeable to fluid, and is the material on which we must principally, indeed, almost exclusively, rely, for preventing evaporation of the spirit. Need I, then, dilate on the importance of every practical direction for applying the covering of lead to the jar?

Any glazier can hammer out lead to the degree of thinness required, but it is preferable to obtain it by passing pieces of lead through two metallic cylinders, such as are employed to flatten out sheet-tin. You can, by such a machine, get the lead rolled out to any degree of thinness you please. A small jar requires to be covered with thinner lead than a large jar, and experience only can conduct

us to the due adjustment of the one to the other. If the lead be too thick, it cannot be moulded to the shape of the rim of the jar; and if too thin, it will not firmly remain after being adjusted to it. For small jars, an inch or two in diameter, the lead should, as near as I can calculate, be 1-100th of an inch in thickness; and for the largest jar, 1-40th of an inch, or about the thickness of a common wafer.

You cut out a piece of the prepared lead, as much larger than the rim of the jar as is required to lap over to the extent I shall describe, and having rendered this lead perfectly smooth and regular, you lay it upon the top of the jar, and with the fingers, aided by instruments of wood or ivory, such as are represented in *plate* 4, *figs.* 1, 2, 3, you put the lead in contact with the first bladder, and by forcible pressure with one or other of these instruments, you mould the lead exactly to the shape of the rim and neck of the jar, after the manner that a shoemaker uses similar instruments in pressing down and smoothing the edge of the sole of a shoe. The object is to have the lead correspond to as much of the rim of the jar as is possible, (the bladder, of course, always intervening) and with this view, you make the portion of the lead, answering to the mouth of the jar, a little concave, taking the same shape as the bladder has assumed in drying; you adjust the lead first to the inner edge of the rim (at a *fig.* 2 of *plate* 3), then to all the upper flat surface of the rim (*a. b.*), then round its outer edge (*b. c.*), to the under surface of the rim (*c. d.*), and downwards upon the neck of the jar to (*e*). The leading of a jar, after this fashion, is necessarily a

Plate 4.



slow process; but as every thing mainly depends upon it, no trouble should be spared. When you have gotten the lead tolerably applied, being everywhere in contact with the first bladder, you must, by pressure and hard rubbing, with one of the wooden or ivory instruments (*plate 4, figs.* 1, 2, 3), put it firmer down upon the bladder and rim of the jar, using about as much force as the rim of the glass will bear, and adopting the same motion of the instrument as a gilder in burnishing a frame. The lead being everywhere smoothly and firmly applied, you finish by paring off the lead all around the neck of the jar, cutting obliquely from above downwards, and leaving the lead long enough to pass a little lower upon the neck of the jar than the first bladder.

The preparation may be regarded as tolerably secure against evaporation, as soon as the lead is thus accurately applied; but in general we proceed without delay to the next step, applying the second bladder, which should be well macerated and washed as before described. In applying this bladder to the lead, you may put the inner or mucous coat outwards (the reverse of the first bladder), and the bladder should everywhere touch the lead, without any intervening air, being secured by several turns of twine round the neck of the jar. After the twine is applied, and tied firm, you cut off the bladder even and regular just below it, taking care to leave enough of the bladder to cover the edge of the lead and descend just below it. In order to make the edge of the bladder stick well to the neck of the jar, you must press it down firmly with a rough towel, or with the handle of a knife; if the bladder have

been well macerated, it will stick very close in drying, but a half-macerated bladder will turn up at the edge and not adhere. Having finished the second covering of bladder, you leave it to dry for twenty-four or forty-eight hours, and when dry, you make its edge perfectly regular upon the neck of the jar, paring off all irregularities with a sharp knife, in the same direction as in paring the lead or first bladder.

When the second bladder is perfectly dry, you paint it over with common black paint, which is made not only to cover every part of the bladder, but to extend a little beyond it upon the neck of the jar; and when this coat of paint is dry, you give, to a similar extent, a coat of coach-maker's black varnish—which finishes the process of closing the jar. Once in a few years a fresh coat of the black varnish will be required; but where a preparation has been secured with strict attention to all the rules I have laid down, the spirit will evaporate so little, that at the end of thirty, or even fifty years, the specimen will be in as perfect preservation as at first, and will require no further attention in the interval, than receiving occasionally a fresh coat of the black varnish.

Although I have endeavoured to be very minute in my description, I feel that I have been able only very imperfectly to explain a mechanical process, which would be more easily learnt by a practical demonstration. I hope, however, to assist the preceding description, by a detailed account of the sketches or outlines given in the following plates.

Plate 1, is a representation of a diseased heart,

from extreme contraction of the left auriculo-ventricular opening. The left auricle, and the right auricle and ventricle, are very capacious, on account of the obstruction offered by the stricture to the course of the blood; the pulmonary artery is also very large. But the left ventricle is not enlarged, and the aorta is of even smaller size than in a healthy subject. *a.* Is the aorta; *b.* the pulmonary artery; *c.* the descending vena cava; *d. d.* the cavity of the right ventricle laid open; *e. e.* the septum of the ventricles; *f. f.* the cavity of the left auricle laid open; *g.* the contracted auriculo-ventricular opening, nearly circular, and about 3-8ths of an inch in diameter; *h. h.* are placed on the cut surfaces of the left ventricle, shewing the thickness of its walls; *i. i. i.* refer to the cavity of the left ventricle, two of these letters being placed upon columnæ carneæ, some of which are of great size: a probe is passed from the left auricle through the opening (*g.*) into the left ventricle. The preparation, seen in perfectly clear proof spirit, enables you to study deliberately the effects of the disease, in the enlargement of all those three cavities of the heart which are situated *behind it*, in reference to the course of the circulation; to examine and compare the relative size of all the cavities of the heart, and of the great vessels proceeding from it; also the thickness of the walls. It is a permanent book, in which you may study all these matters; but without the hardening process the specimen could never have been maintained in this shape,—such a study could not be afforded; neither would it have been possible to make such a drawing as is here afforded, for in the hands of the

dissector the parts remained collapsed, until prepared for being placed in the hardening solution.

PLATE 2.—*Fig.* 1 represents a ground-glass stopper jar, of large size, for temporarily keeping specimens in, until a convenient season for putting each specimen into a separate jar; this *figure* represents a jar, 24 inches in height and 8 inches in diameter.

Fig. 2 is a middle-sized jar of the same description, 12 inches high and 6 inches in diameter.

Fig. 3 is a small bottle of the same description, convenient for holding a single preparation; it is 6 inches high, and $5\frac{1}{2}$ in diameter.

Fig. 4. Outline of a tall slender bottle, with narrow neck, for keeping proof spirit in.

Fig. 5. A small slender vial, for holding proof spirit, convenient for filling a jar to the brim before applying the first bladder.

PLATE 3.—*Fig.* 1. Outline of a common round preparation jar, of the most approved shape.

Fig. 2. Plan of a perpendicular section of the upper part of such a jar, to shew more precisely the shape of the rim (*a.b.c.d.*), neck (*d.e.*), and shoulder (*e.f.*) The upper part of the rim (*a. b.*) is horizontal; the edge of the rim (*b. c.*) is rounded; the inferior surface (*c. d.*) is horizontal; the neck (*d. e.*) is of sufficient length to allow of a clear interspace between the inferior surface of the rim and the shoulder of the jar (*e. f.*)

Fig. 3. A glass globe filled with air, and with a hook *(a)*, such as has been often used for suspending preparations by floating.

Figs. 4. 5, 6. Three different sizes of circular

Fig. 1.

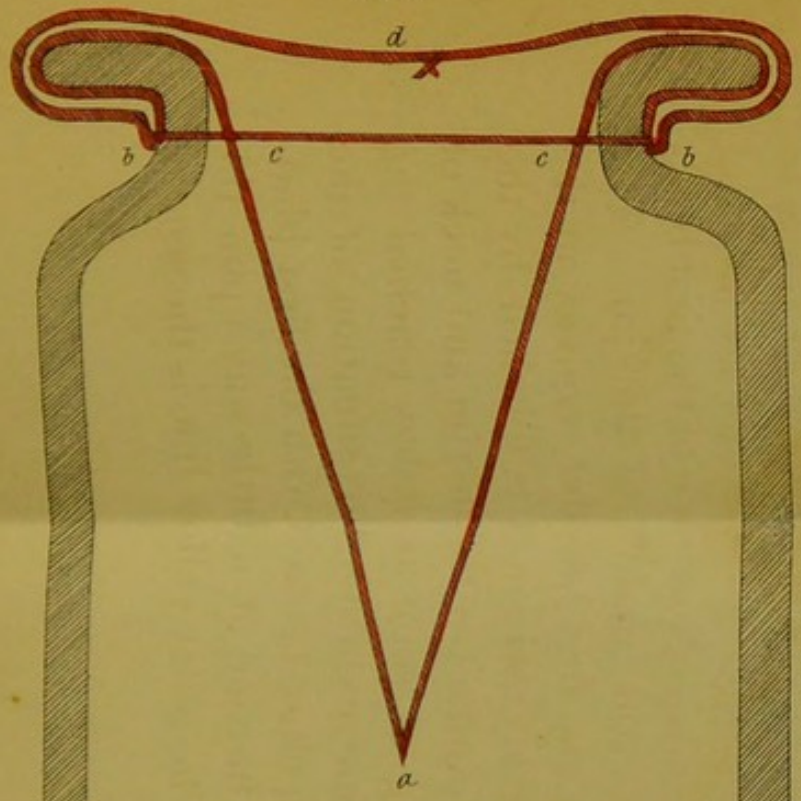
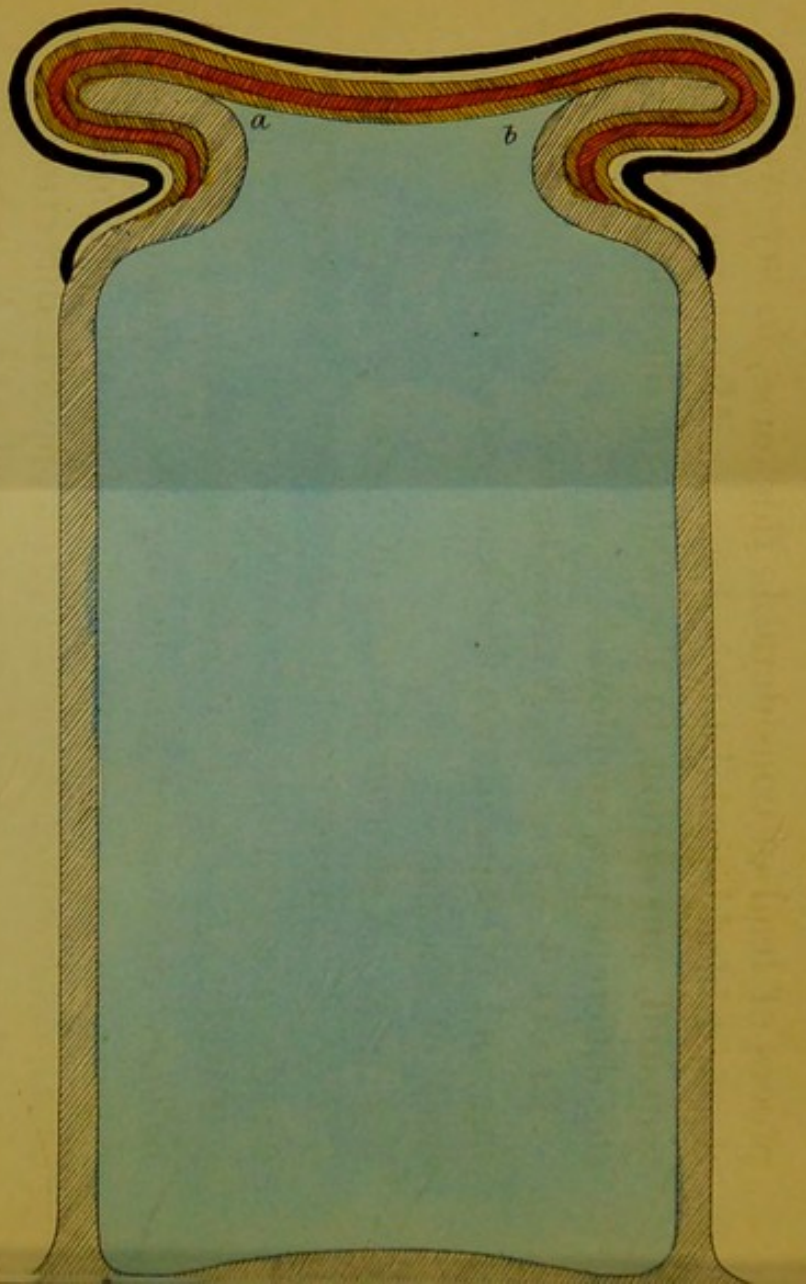


Fig. 2.



pieces of lead of considerable thickness, to lay over the first bladder whilst it is drying. Many sizes are required, answering to the width of the mouth of the different jars employed.

PLATE 4.—*Fig.* 1. A wooden spatula for moulding and pressing down the lead upon the rim and neck of the jar.

Fig. 2. A shorter spatula of the same sort.

Fig. 3. An ivory or bone instrument, in a wooden handle, used for the same purpose.

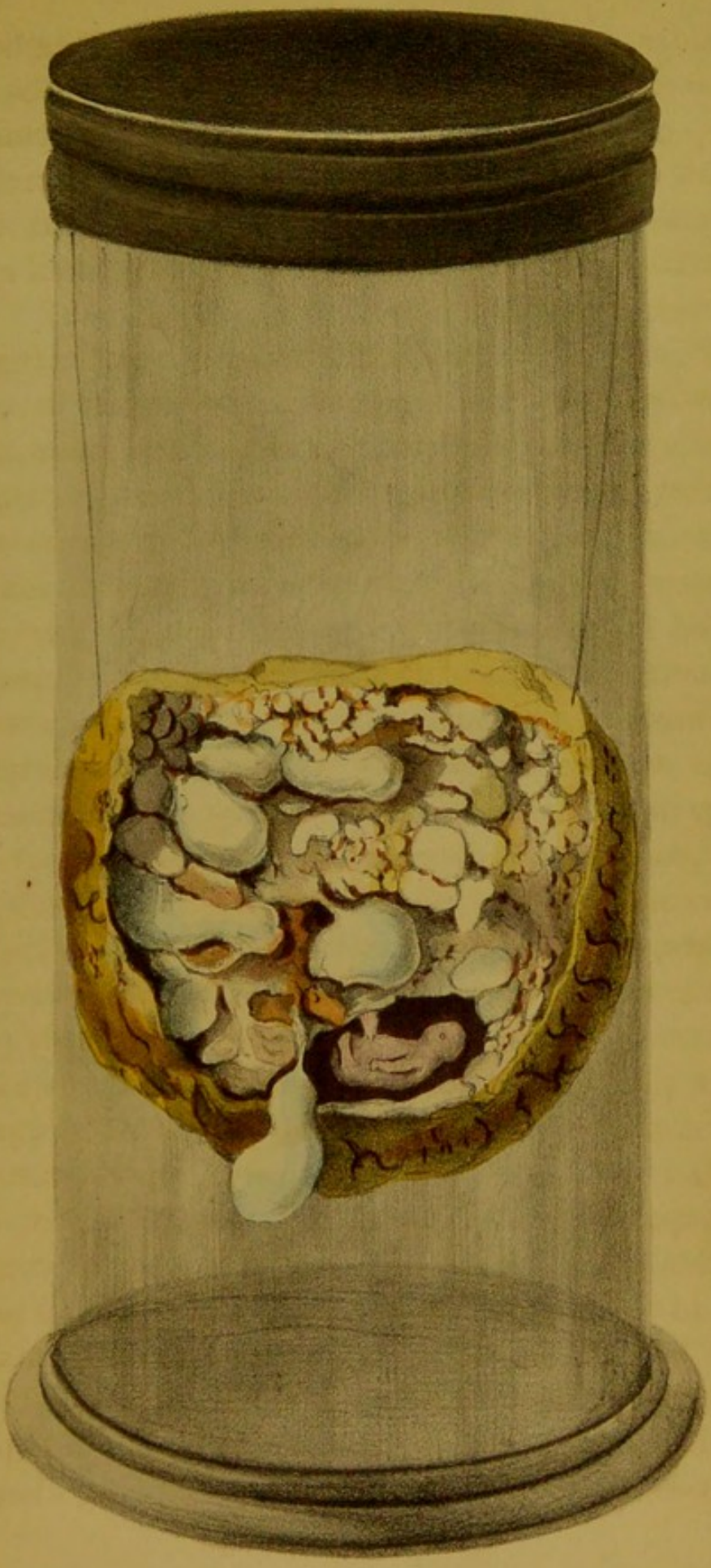
PLATE 5.—*Fig.* 1. Perpendicular section of a jar, to shew the way of suspending the specimen by a minute thread, which, proceeding from the specimen at *a.* is carried, each thread in an opposite direction, over the rim of the glass to its neck at *b. b.*, where it is bound down by a circular thread (*c. c.*) and brought again over the rim of the glass, meeting its fellow, and being tied at the centre of the mouth of the jar (*d.*)

Fig. 2 represents a perpendicular section of a jar, to explain the different coverings of bladder, lead, and paint, in closing it. The blue colour refers to the proof spirit, which everywhere fills the jar, and is in contact with the under surface of the first bladder, where it closes the mouth of the jar. The inner yellow line is the first bladder, convex at the mouth of the jar (*a. b.*), where it is touched by the spirit, and in close contact with the rim and neck of the jar, terminating as soon as it has reached the latter. The red line exhibits the situation of the lead, everywhere in close contact with the first bladder, and pressing beyond it a little way upon the neck of the jar. The outer yellow line is the second

bladder, in contact with the lead, and passing beyond it, so as to reach the shoulder of the jar. The white line, next to the yellow, represents the coating of black paint; and the black line, the covering of coach-makers' varnish; while both extend to the shoulder of the jar, lower than the terminating edge of the second bladder.

Plate 6, is introduced to point out the right relative position of a preparation, in regard to the top and bottom of the jar. It shews the placenta occupied by numerous hydatidous tumours, and the fœtus in its proper membranes and cavity at the inferior part. The ovum was expelled entire at about six weeks after impregnation; a part of the placental mass is of course cut away, to expose the hydatidous tumours which occupy its substance. The minute threads by which the preparation is suspended, are just visible. Was not the disease of the placenta the predisposing cause to abortion in this case? Often we meet with great masses, even quarts, of these hydatidous tumours, filling the uterus where there is no fœtus; and I conceive that, in every such case, the fœtus died at an early period after pregnancy, leaving the diseased placenta to go on increasing until the full period of gestation.

Plate 7, is a tolerably correct representation of a preparation of the nerves within the orbit, made so clear and distinct that every teacher of anatomy would find it valuable in demonstrating those nerves, and he can scarcely do it well without such a dissection: it is prepared from the fœtal head, injected minutely with size and vermilion at the full period of gestation, and kept in spirit before being dissected.



The outer bony part of the orbit is removed, all the fatty substance is dissected away, and there are seen the following parts, all, except otherwise specified, in their relative situation. *Figs.* 3 and 4 are outlines for affixing the references, and *fig.* 2 is placed above them to facilitate the comparison: all these figures being adapted as an explanation of *fig.* 1.

Fig. 3, *a. a.* refers to the superior and inferior eye-lid, stretched aside to show the globe of the eye, *b.*; at *c.* a part of the sclerotic coat is removed, exposing the choroid; *d.* the optic nerve; *e.* external rectus muscle, detached from the globe of the eye and hanging dependant; *f.* the inferior rectus muscle; *g.* the internal rectus muscle, principally concealed by the optic nerve, but visible above and below it; *h.* the superior rectus drawn upwards; *i.* the obliquus superior; *j.* the obliquus inferior; *k.* the levator palpebræ superioris; *l.* lachrymal gland, drawn upwards, with the outer angle of the superior eye-lid.

Fig. 4 contains the references to the nerves: 1. the sixth, distributed in diverging filaments to the external rectus muscle; 2. the third pair of nerves, giving off (besides branches to the internal, upper and inferior rectus) a branch passing forward, 3, to the inferior oblique muscle, and a short branch, 4, upwards to communicate with the lenticular ganglion; 5. is an orbitar branch of the first division of the fifth, which dividing into several branches that are immediately distributed, is continued in the nasal branch, 7, which is seen in a beautiful manner in the preparation, crossing over the orbit, obliquely forwards and inwards, above the optic nerve and

internal rectus, and below the internal oblique, to reach the internal anterior orbitar foramen—it is this nasal branch which, at its commencement, sends a short branch (6) to communicate with the lenticular ganglion (10); 8. 8. is the fourth pair of nerves, entering the internal oblique muscle; 9. is another branch of the superior or ophthalmic division of the fifth, taking its course at the upper and inner part of the orbit, and subdividing into two branches, the smaller to the lachrymal sac, the larger to pass through the superior orbitar foramen; 10. is the lenticular ganglion, sending off a lash of ciliary nerves, which are seen upon the choroid coat at 11., where the sclerotic coat has been removed; 12. the branch of the superior division of the fifth which supplies the lachrymal gland.

Fig. 1.

Fig 2.

Fig 3.

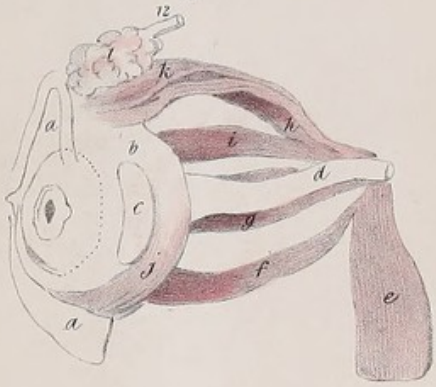


Fig 4.