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THE
CONDUCTOR,

AND

CONTAINING SPLINTS:

OR A DESCRIPTION OF

Two New Invented INSTRUMENTS,

For the more safe CONVEYANCE

AS WELL AS

The more EASY and PERFECT CURE

OF

FRACTURES OF THE LEG,

Whether SIMPLE OR COMPOUND.

TO WHICH ARE ADDED,

Three Copper-Plates, shewing the Construction
and Application of the CONDUCTOR.

By JONATHAN WATHEN, Surgeon.

Author of a Translation of Boerhaave's Lectures on the Lues
Venerea. Practical Observations on the Cure of the Venereal
Disease by Mercurials. And an Answer to the Letter of J.
Keyfer, Surgeon at Paris.

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PART I.

THE
CONDUCTOR.

FRACTURES of the larger Bones in the human Body, are frequently attended with severe, and sometimes fatal Consequences.

But as the Leg of all other Members is most commonly exposed to, and suffers the greatest Injuries from Accidents of this Kind; so many and various are the Machines and Contrivances which at different Times have been invented and applied in such Cases, with considerable Success.

Those of the ingenious Mr. *Petit*, and of our Countryman Mr. *Gooch* of *Norwich*, are, I believe, the best and most useful of any yet known: They are however greatly deficient in some necessary and capital Points of Utility.

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My present Intention is to supply the Deficiencies of these, and indeed of all others hitherto recommended, or received into Practice.

This Design may be reduced into two Heads. The easy and safe Conveyance of the Patient from the Place wherever the Accident may happen, to his being placed in Bed for the necessary Time of his Cure.

And next the Preservation of the fractured Bones in their natural Position, until that Cure be perfectly accomplished.

In both which I would be understood to mean, not only all simple, but also compound Fractures to a certain Degree.

The first Intention may be accomplished by the CONDUCTOR, so called from its Use and safe Purpose of Conveyance; the second by SPLINTS or SIDE PIECES: In which the fractured Limb may be compleatly received, and lodged till the Cure is performed.

It should be observed, that very few Writers have considered the Necessity of such an Assistant Instrument as the CONDUCTOR; at least they have not produced any one compleatly qualified for the needful and safe Conveyance of the Patient, in that critical Time of Danger.

The Machines which have best succeeded, are destined merely to Setting and Retention, and can be applied only after the Patient is placed in Bed; so that, however judiciously constructed

constructed in those Respects, they cannot prevent many of the Evils attendant on Fractures of the Leg which were already produced, antecedent to their Application: And farther, the Patient is very often unhappily deprived for a considerable Time, of receiving any Service from them †, as will evidently appear by attending to the following Circumstances.

When a Fracture happens to the Leg, so that both Bones are broken, the inferior Part becomes pendulous and liable to Flexions every Way. Nevertheless the Patient must be removed from the Place where the Accident happened to his own Habitation, generally up one or more Stories; or, if destitute and indigent, to the next adjoining Hospital. It is therefore impossible (from any Means yet known) but that in such a Conveyance the Limb will be frequently and variously contorted, and bent; by which the Parts surrounding the Bones are bruised, pricked, and lacerated by the Extremities of the fractured Pieces; whence Pain, Swelling, Inflammation †, Convulsions, Mortifications, arise; and often Death itself, if not prevented by a speedy Amputation of the Limb.

Three melancholy Instances of this Kind (which were lately under my Care) strongly induced me to wish that something could

† † See Note, Page 4.

be invented, which might effectually prevent the Injuries sustained by such a Patient in his Removal from the Place where the Accident was received, to that where he must remain till cured.

The Importance of such a Contrivance will appear most evidently, if we reflect on the State of the Patient when the Hurt is first received; perhaps the Fracture was then merely simple, if so, the Injury is (comparatively speaking) but inconsiderable. Nevertheless, by the usual Methods of conveying him Home, however prudently conducted, Contusion and Swelling* may be produced, if not a compound Fracture.

This last Misfortune frequently succeeds what was at first a simple Fracture only, when, should the Leg be preserved, the Cure will, notwithstanding the greatest Care and Assiduity, be uncertain, imperfect, unsatisfactory to the Patient, and often dishonourable to the blameless Surgeon.

Though these Effects do not always attend every broken Leg, it is owing more to Chance than Design.

If the Fracture be oblique, complicated, or the Bones forced through the Skin, &c. the aforesaid Injuries are proportionably aug-

* When these Symptoms proceed to any considerable Degree, every Surgeon defers the Application of strait Bandage, Splints, &c. or what is called setting of the Limb, till they are removed.

mented, and almost inevitably determine the immediate Loss of the Limb to prevent that of Life *.

Such are the Consequences of Motion to a Patient with a broken Leg. Influenced by these Considerations, which arose from repeated Proofs of what is above advanced, I have contrived a very simple Machine, which may be most easily and expeditiously applied as soon as possible after, or on the Spot where the Accident is received, by which the Limb may be immediately straitened, and the Bones reduced and retained in their proper Place, so strongly and firmly, as to resist any Probability of being displaced by any Conveyance whatever.

Nor has this Assertion of its Utility a Foundation in Theory and Speculation only, but it is supported by the repeated Practice and Experience of several Surgeons of reputation, and greatly approved of by others

* If the Fracture be very oblique, and the subsequent Splints † found incapable of sufficiently counteracting the contractile Force of the Muscles, and preventing the over-
lapping of the Bones, the Conductor may still be kept on the Limb, by which its due Length will be preserved, with very little Inconvenience to the Patient, if the following Cautions be observed. Cut the Stocking off above the Malleoli, leaving the Remainder on the Foot, over which must be wore an easy high quartered Shoe buckled; which will be found sufficient to secure the Heel from that Heat or Soreness, which would otherwise arise from a long continued Pressure of the inferior Part of the Conductor.

† See Part II.

of the first Eminence ; amongst whom I have the Honour and Permission to mention Messrs. *Hawkins* and *Gataker*, Surgeons to St. *George's* Hospital ; Mr. *Baker*, Senior Surgeon to St. *Thomas's*, and Mr. *Warner*, Surgeon to *Guy's*, &c. By the Order of the first of these Gentlemen, this Instrument has been used in St. *George's* for many Months, with entire Satisfaction. To these Testimonials I have the Pleasure to add that of Dr. *Hunter*, who frequently visits the Hospital first mentioned, and who assures me he is thoroughly convinced of its great Importance.

Mr. *Gervais*, House Surgeon to St. *George's*, greatly esteemed for his Industry and Abilities in his Profession, was the Person appointed to make Trial of this Instrument ; who says, the Patients felt so much Ease the Moment it was put on, that they usually expressed it by desiring to walk, declaring they were perfectly free from Pain ; in which State, notwithstanding all subsequent Motions, they continued till the Instrument was taken off, which was after the Patient was placed in his Bed, Bleeding, Glister, &c. administered, and the proper Apparatus got ready for treating the Fracture agreeable to its various Circumstances ; when another important Advantage of this Instrument discovered itself, for as it restored the
Bones

Bones to their proper and natural Position at its first Application, so all further Extension was thereby rendered unnecessary. We must therefore take it off from the fractured Limb with the greatest Caution, so as not to disturb or misplace the Pieces, which are to be retained as exactly as possible in the same State till the Cure is accomplished by other Applications; concerning which I shall just observe, that the Apparatus hitherto made Use of for the Treatment of either simple or compound Fractures of the Leg, is not so complete as could be wished: So that in Fact, a perfect and slight Cure is rather to be imputed to the Skill and Care of the Surgeon, and the favourable Circumstances of the Fracture, than to any Perfection in the Machinery †. I shall only add one Observation more in Proof of the Utility of the Instrument here mentioned, derived from the ill Success of Amputation after Fractures of the Leg, *viz.* That we shall find upon fair Enquiry, that not above one Patient in three survive that Operation. I have now shewn, that the Cause by which Amputation is rendered so frequently necessary, is the Want of an Instrument capable of preventing the Accidents before-mentioned, and what great

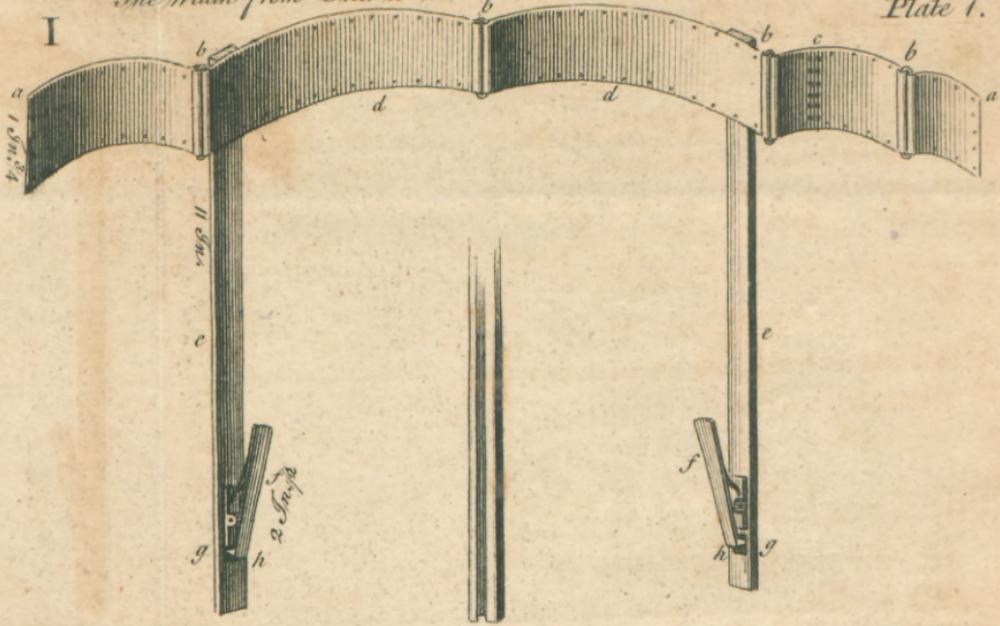
† See Part II.

Advantages may be derived from this which I now offer to the Public, *viz.* The Preservation of the Limb, frequently of Life, and an Exemption from a Variety of other Evils to the Patient.

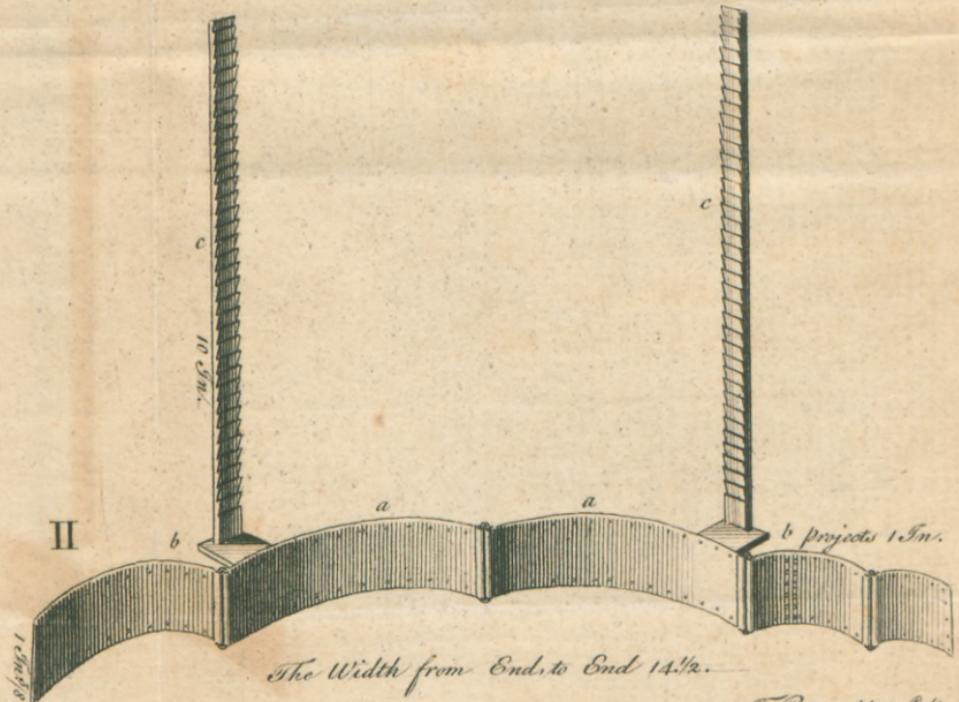
The Width from End to End, in the View as here Drawn, 18 In.

Plate 1.

I

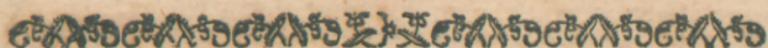


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The Width from End to End 14 1/2.

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P A R T II.

T H E

C O N T A I N I N G S P L I N T S .

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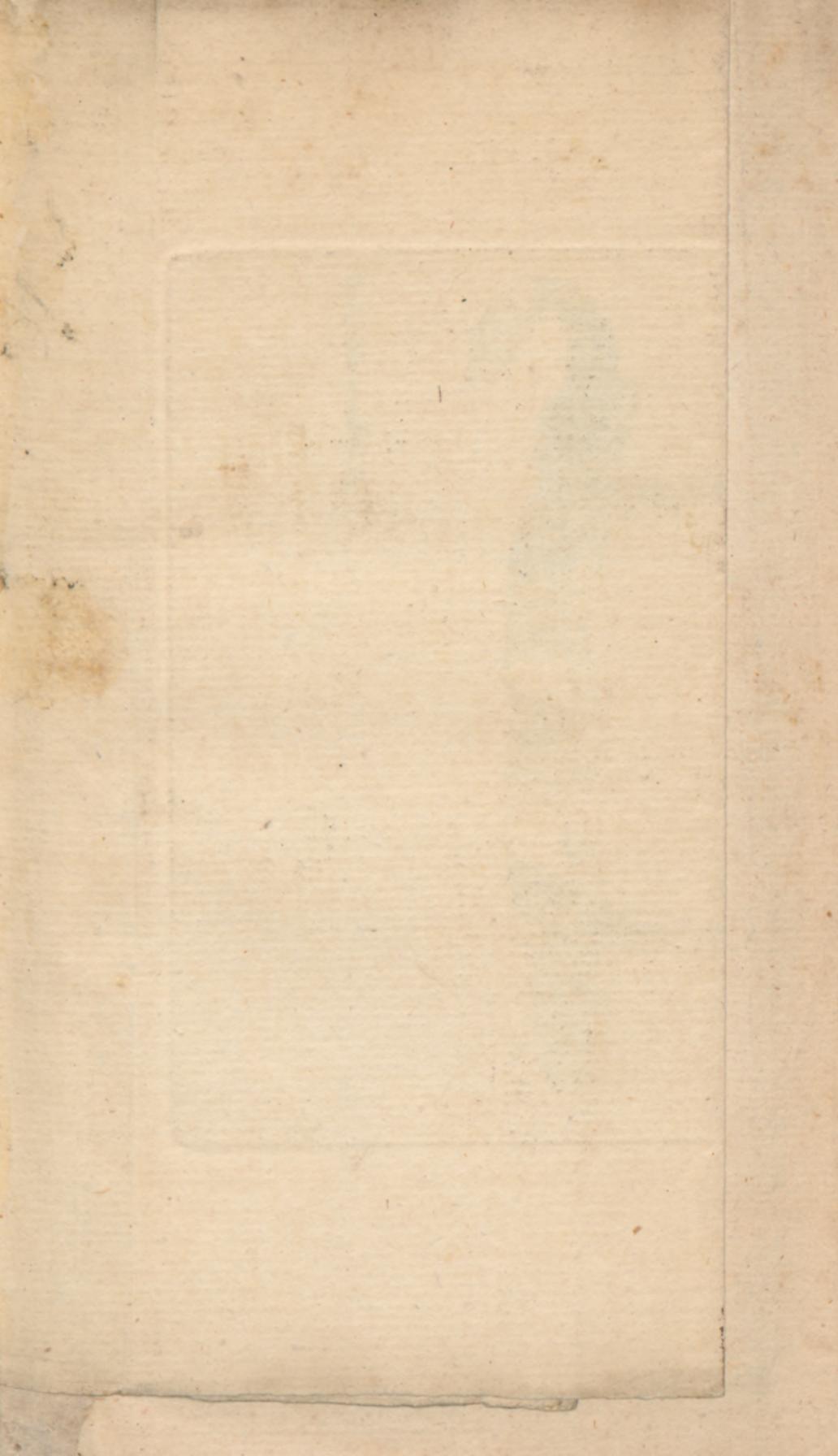
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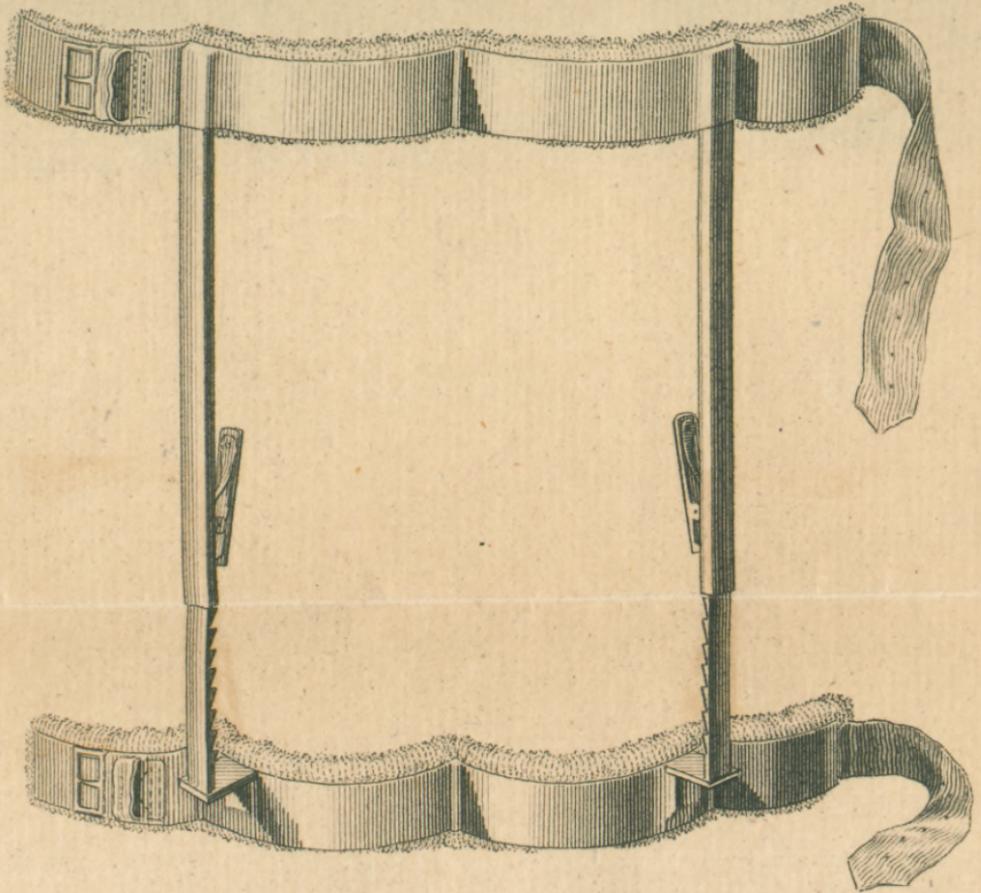
THE

CONTAINING

OF A NEW CONSTITUTION

AND





EXPLANATION

OF THE

PLATES.

PLATE I.

Shewing the Skeleton of the Conductor separated into two Portions.

FIGURE I.

The Knee Band *a* made of Tin a little bent, divided by four Joints *b*, that it may fit any Limb great or small. Holes *c* for fixing the Buckle and Strap. Others *d* round each Margin for sewing on the Padding. Two Tin Canulas *e* grooved on the Outside, and furnished on the Inside with Brass Springs *f* and Catches *g*; small Holes *h*, through which the Catches pass to meet the Serræ of the upright Portions when they are within the Canulæ.

The Figure in the Middle represents the Inside of the Tube with the Groove.

FIGURE II.

The Ankle Band *a* less, but constructed as the former; Shoulders *b*, to support and render the serrated Portions parallel to the grooved Canulas, both of Brass.

By compressing the Springs, the Catches are raised, and admit the whole Length of the upright serrated Portions within the Canulæ,

C

nulæ,

EXPLANATION, &c.

nulæ, reducing the Instrument to near half its Length; from whence by the Disposition of the Catches and Serræ, they are retracted without any Difficulty; but cannot be returned the same Way, unless the Catches are elevated by compressing the Springs; so that when the Conductor is applied to the Leg, whatever Extension be given, is by that Means secured to it with the greatest Certainty, though alterable with the greatest Ease.

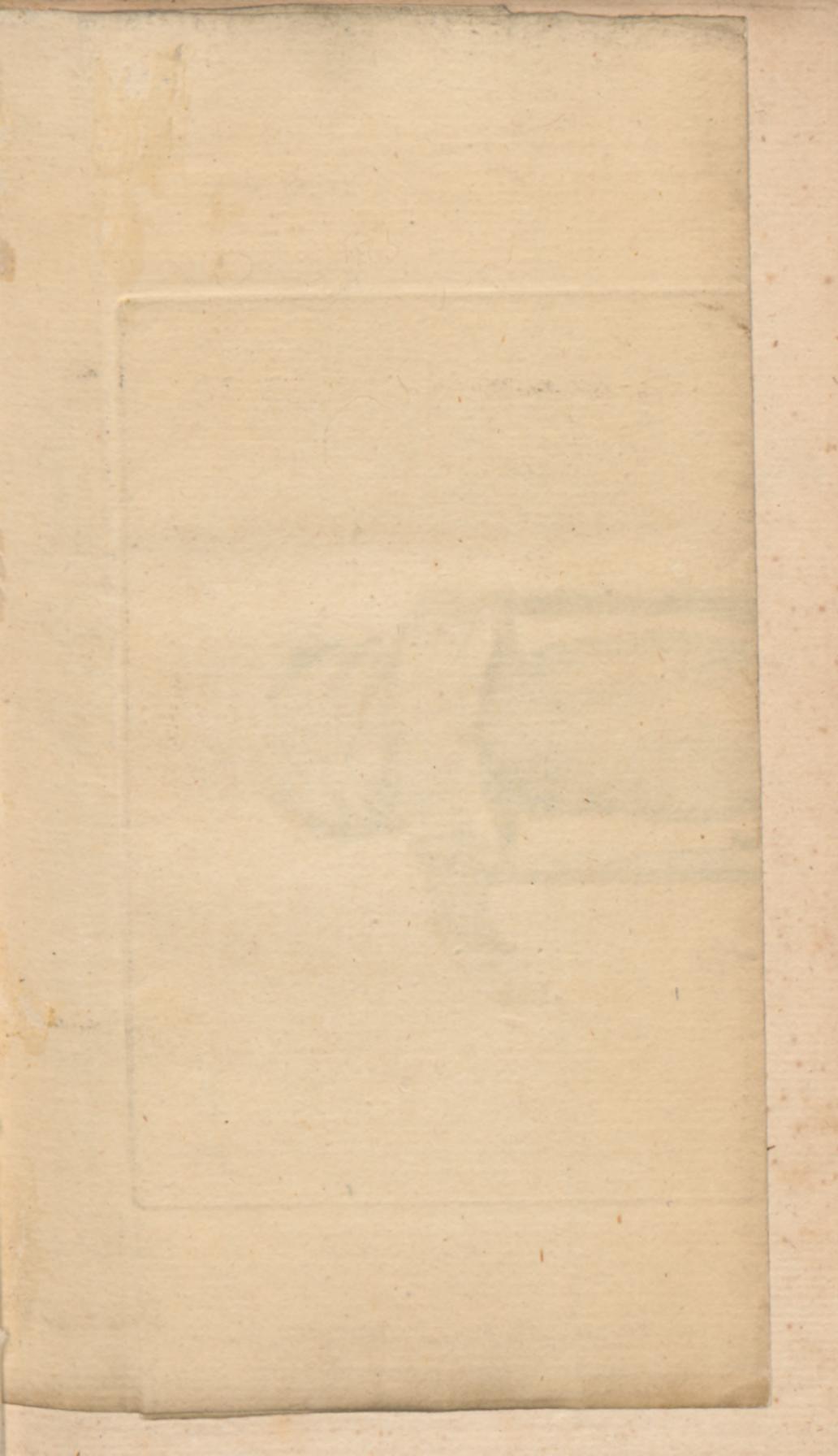
PLATE II.

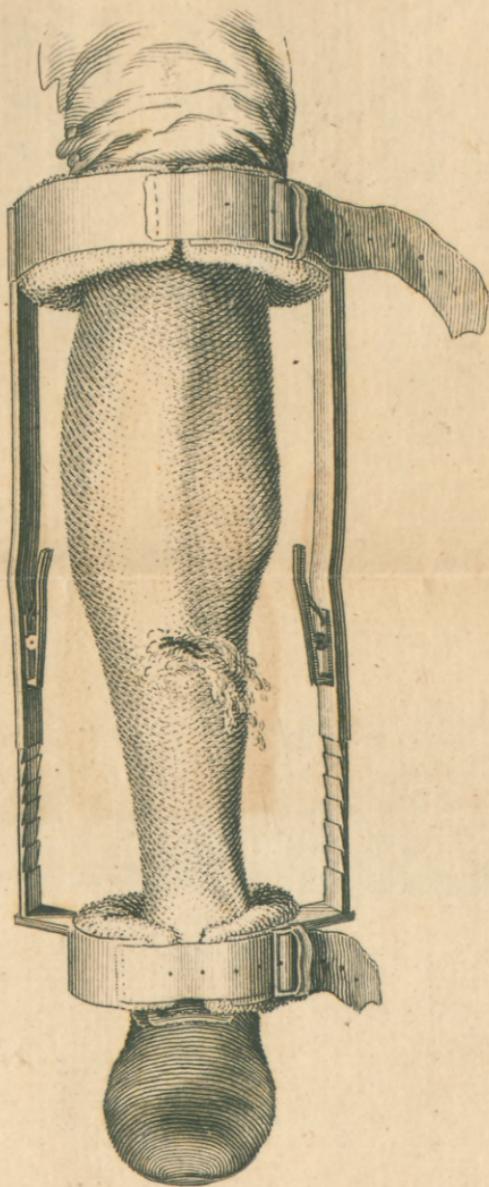
The same Instrument covered with Leather that it may fit easy on the Limb.

PLATE III.

The Conductor applied to a compound fractured Leg, by which the Limb is fitted for Conveyance.

This Instrument is well constructed at a reasonable Price, by Mr. *Masemore, jun.* Tinman, in *Old Bethlem.*





P A R T II.

T H E

CONTAINING SPLINTS.

HAVING taken the Liberty of mentioning some Defects in the present Apparatus for Fractures of the Leg, I would now point out, and endeavour to remedy those Deficiencies, by a new and different Kind of Machinery, which I have not only succeeded happily with myself, but several very eminent Surgeons, who have adopted them into their Practice, confirm my Opinion by their own Experience, and enable me with the strictest Truth to affirm, that they are superior in Efficacy to all others yet known, for curing Fractures of the Leg.

The SPLINTS generally used for this Purpose, are made either of Pasteboard, Banbox Wood, split Deal lined with Leather, or perforated Tin covered on both Sides in the same Manner.

The two first of these are rendered useless by any kind of Humidity, they are for that Reason, in simple, but still more in compound Fractures, almost wholly discarded.

Those

Those of Deal (which are most in Esteem) keep their Stiffness in Length, and are formed to embrace very completely such Parts as are not only long, but at the same Time perfectly round; but since the Shape of the Bones and Muscles of the Leg, render that Limb of a very different Form; so these cannot perfectly support and retain the fractured Pieces with sufficient Stability, unless the unequal Parts be most accurately filled up with Bolsters, &c. and thereby brought to a cylindrical Figure; much Art is therefore necessary to their due Application; and as these Appendages are very apt to change and slip from their proper Situation, a frequent Renewal of them is required; and not only so, but the Side Edges of the SPLINTS, press more on the Limb than any Part of them, causing a Hollowness through their whole Length; whence a partial, unequal, and often hurtful Compression. On which Account I have for some Years preferred those of Tin, as pressing more adequately, though they have the same Inconveniencies and Disadvantages as the former, with Respect to the true Shape of the Limb.

This will, I doubt not, be admitted as a true Representation of the present Machinery for Fractures of the Leg, so far as it relates to the Structure and Use of SPLINTS; whose Deficiencies are too apparent to escape Observation, and too easily account for protuberant

tuberant Calluses, and mishaped Legs, which sometimes take place even after Fractures not of the worst Kind.

I shall now, agreeable to my Promise, attempt to mend the Faults I have observed by a new Species of SPLINTS, made of strong thick Leather, formed in such a Manner as to fit the true Shape of the Leg, receiving it on each Side as in a Mould.

That for the ~~Inside~~ *outside* is longer and broader than the other, with an End Piece to sustain the Foot; longer, because it is needful that the whole Length of the Limb should be furnished with such a Stay and Support as may defend it from those accidental or other Motions of the Muscles, Ankle, &c. which might otherwise happen, and more or less disturb and affect the Fracture; a Circumstance unprovided for in the former Apparatus; nor does the most accurate Bandage afford sufficient Security against this Evil. It is broader, as the muscular Outline is larger than on the Inside of the Leg, and made concave, so as to receive and adapt itself to the Shape of those Muscles from their Origin, almost to their Insertion.

That for the Inside is shorter and narrower; its anterior Portion plain, adapting itself to the Tibia; its posterior Concave to receive the Bellies of the Muscles behind that Bone; diminishing in Breadth as it descends, it shapes itself to the Inside of the
Small

Small of the Leg, and at last ends in a Concavity to receive the Malleolus Internus, with a Margin to press against the Inside of the Foot; Straps with Holes at their Extremities, one below the Knee, the other above the Ankle; a third to the Margin of the Foot-piece. Betwixt the two former, the whole Space is filled with Loops, to pass in Straps (furnished with Buckles) higher or lower at Pleasure.

The smaller or inside SPLINT has two Pins, at correspondent Places and Distances, so as to answer the two first mentioned fixed Straps of the greater or outer; and to which they, (*viz.*) the Straps are fastened, when the strapped Pieces or Splints are applied, excepting only that the Foot-strap or Stirrup is buttoned to the lowermost of the Pins already specified: The whole Space betwixt the Pins is filled with Loops as the former, and for the same Reason; it ought to be observed, that the Straps, whether fixed or moveable, be made of oiled or Bridle Leather, as no other will endure Wet or Moisture of any Kind, without spoiling.

These Splints are (as before-mentioned) constructed of thick and strong Leather, worked into the Shape above described, by hammering and jacking it upon Blocks, so moulded, as to give them that proper and necessary Form.

Three or four Sizes are required to fit different Legs. The Blocks may be had at
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the Carvers, and the Splints may be easily made by any Saddler, Jack Boot-maker, &c. But as they are already executed with the greatest Perfection and Elegance, and at a very reasonable Expence, by Mr. Mellor, Sadler in *Devonshire-street*, it is needless to set others on the same Experiment.

By the Operation of Jacking; they are as Caps, Boots, &c. rendered impenetrable to almost any kind of Humidity, especially if their Insides be japanned or painted; a Quality of the greatest Consequence in compound Fractures of the Leg: On which they may be applied sooner, and in a more early State than any others, even so as to preserve in a great Measure, the true Shape of the Limb, when slackly put on over emmollient or other Topics, where needful.

I would here note another useful and important Advantage, afforded by these Splints in such Cases; where if only one be taken off at a Time in dressing the Wound, and the other carefully held on; the latter will be found an effectual Support to the Limb, and preserve the fractured Pieces steady during the necessary Movements: Nay, in many Cases where the Wound (as frequently happens) is on the anterior Part of the Leg, they need only be slipped a little on one Side for that Purpose.

I have lately seen some Splints made, as I imagine, of Glue and brown Paper, covered
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with Canvas, of the same Shape with the above described; they are perfectly stiff and rigid when cold; soften a little by the Warmth of the Limb, but grow flabby and useless, where the Perspiration is considerable, or when moistened by any common Embrocation; it is therefore apparent enough they cannot be depended on in simple, but still less in compound Fractures of the Leg. Others are made of thin Plate Iron painted, with a Foot-piece to move and fix at Pleasure: Those I saw were very indifferently shaped; but were they executed on the very same Plan as those I now recommend, Leather must certainly be not only more elegant, but more useful in this Case, than it is possible Iron should be, for Reasons too obvious to mention.

These Splints are found capable of preserving the Limb in its true natural Shape, with as much Ease to the Patient, and as little Trouble to the Surgeon, as can reasonably be expected; for though they have sufficient Strength and Stiffness, they are not so rigid as to impress the tender Parts painfully: There is a Kind of Elasticity in Leather thus prepared, capable of yielding, accommodating itself a little to the Parts, and restoring itself again when the Resistance is removed.

They give such a Firmness to the broken Parts, that the Limb may be removed, and suffered

ferred to lie inflected on either Side, or in such a Manner as is most convenient an easy to the Patient; who is thereby exempted from the great Misfortune of being always confined to one particular Posture; a most desirable and happy Release, which the old Apparatus would not admit of with any Degree of Safety.

The Patient may also be removed with great Security, much sooner from one Bed or House to another, than formerly.

It may perhaps be imagined, that these Splints might also serve the same Purposes as the Conductor; be applied as easily, and with as good Effect, as that Instrument, to convey the Patient from the Place of the Accident, as from one House to another afterwards. To obviate such a Supposition, it need only be considered, that a Patient's Cloaths, especially Shoes and Stockings, are then on the fractured Member, and must of Necessity be taken off, before the Splints can be well applied; after which, not only a Surgeon, but proper Assistance is required, rightly to reduce the Fracture, and hold it in that State till these new-constructed Side Pieces are accurately fixed upon the Limb. It is plain, here are too many Things to be done, too many proper Attendants necessary to do them, and too much Time required for their due Application, to an Accident, perhaps in the Street, amidst a Concourse of People; or in the

the Country, where little or no Assistance is to be had; whereas the Conductor is easily and instantly applied, without taking off the Cloaths, Shoes, Stockings, &c. by almost any one that ever saw it, pulling the Limb straight, and fixing it at the same Time so steady, as to fit it for Conveyance in the shortest Time imaginable to his Abode, where it should be taken off, with the Caution already observed, and the Splints applied with the greatest Care and Accuracy.

The Offices then of these two Apparatuses are very properly distinct; yet at the same Time are both of the utmost Importance in Fractures of the Leg.

Although I have confined myself to a fractured Leg in this small Tract, I cannot omit the present Occasion of recommending Splints of the same Kind and Structure, in Fractures of some other Parts, especially where the Patient is muscular, as in the Arm and Fore-arm, &c. for the same Reason as in the Leg. But no Bone requires them more than the Clavicle, whose crooked Shape renders the Cure of it, when fractured, generally very imperfect and inelegant for Want of such a Contrivance.

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