

Amputations and artificial limbs / by William Robert Grossmith.

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Publication/Creation

London : Longman, 1857.

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Fig. 2



Fig. 3



Fig. 4



Fig. 5



CROSSSMITH'S PATENT ARTIFICIAL LIMBS.



PRIZE MEDALS
GREAT EXHIBITION
LONDON,
1851.
EXPOSITION UNIVERSELLE
PARIS,
1855.



MANUFACTORY 175, FLEET ST LONDON.



Fig. 6

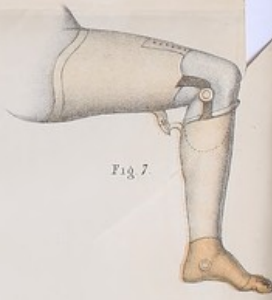


Fig. 7

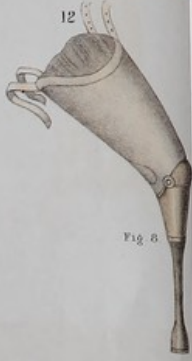


Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12

AMPUTATIONS

AND

ARTIFICIAL LIMBS,

BY

WILLIAM ROBERT GROSSMITH,

INVENTOR, PATENTEE, AND MANUFACTURER

OF

ARTIFICIAL LEGS, ARMS, HANDS, EYES, ETC.,

175, FLEET STREET, LONDON.



With upwards of Two Hundred Descriptive Cases, and
Illustrations in Chromo-Lithography.

DEDICATED (BY PERMISSION) TO

WILLIAM LAWRENCE, ESQ., F.R.S.,

PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS, ETC.

LONDON:

LONGMAN & Co., PATERNOSTER ROW.

DUBLIN:

FANNIN AND CO., GRAFTON STREET.

1857.

ARTIFICIAL LIMBS.

WILLIAM ROBERT GROSSMITH,

SYSTEM PATENTEE AND MANUFACTURER

OF

METALLIC LEGS, ARMS, HANDS, ETC.

IN GREAT BRITAIN.

SOLE AGENTS OF THE UNITED KINGDOM AND
IRELAND, JOHN WILKINSON & SONS, LTD.,
LONDON AND MANCHESTER.

WILLIAM LAWRENCE, ESQ., F.R.S.

RESIDENT OF THE GREAT OFFICE OF PATENTS, ETC.

LONDON.

THE PATENT OFFICE, PARLIAMENT STREET.

1857.

WILKINSON AND SONS, LTD.

1857.

WILLIAM LAWRENCE, Esq., F.R.S.,

PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS;

SURGEON EXTRAORDINARY TO THE QUEEN;

SURGEON AND LECTURER ON SURGERY TO BARTHOLOMEW'S HOSPITAL;

SURGEON TO BETHLEHEM HOSPITAL;

CONSULTING SURGEON TO THE ROYAL FEVER HOSPITAL;

ETC., ETC.

Sir,

The many years you have favored my house, by entrusting numbers of your patients to my care, and by generously awarding your praise to my efforts, at times, when the expression of your approval was most valuable to me, induced me to solicit your permission to dedicate this Pamphlet to you.

Had no such personal consideration existed, I should have sought the sanction of your name, as being one of those amongst the highest ranks of the Profession the most esteemed and honored; the most willing, at all times to promote the advancement of the Industrial Arts.

Gratefully acknowledging the kindness with which you readily acceded to my request; and sincerely wishing you a continuance of health, long to pursue your unexampled professional career.

I have the honor to subscribe myself,

Your obliged and obedient Servant,

WILLIAM ROBERT GROSSMITH.

WILLIAM LAWRENCE Esq. F.R.S.

Secretary of the Royal College of Surgeons

Whitehall

Dear Sir

I have the honor to acknowledge

the receipt of your letter of the 10th inst.

and in reply

To inform you that the number of your papers to be
sent me by your old servant your paper to my
office at 10, St. James's Street, the request of your approval
was most valuable to me in that it enabled me to submit your
papers to the Committee of the College.

I am very sensible of the value of your papers and I should
be glad to see the collection of your papers as being one of
the most valuable the British Museum of the Institution the
most valuable and honest; the most willing at all
times to receive the advancement of the Institution.

I have the honor to acknowledge the papers with which you
kindly assisted me in my report and sincerely wishing
you a continuance of health long to pursue your un-
interrupted professional career.

I have the honor to subscribe myself

Your obliged and obedient servant

WILLIAM ROBERT GROSSMITH

11, St. James's Street, London
May 2nd 1857

Amputations and Artificial Limbs.

IT is not presumed that the following pages will prove interesting to the general reader; and had I consulted my own inclination, they would have been printed *only* for private circulation. I am, however, so repeatedly called on by old patrons of my house,—(those who have worn and are still wearing artificial limbs, made by my predecessors many years since,) to describe the improvements which have recently been introduced by me; and by newly-amputated patients, with the view to assist them in forming an estimate of the comparative merits of the productions of different makers; independently of a request by Dr. DEBOUT, of the *Bulletin Therapeutique*, Paris, to forward such information as I could give, upon the subject of lost limbs, and artificial substitutes, likely to assist him in the compilation of his new and important work on amputations, that I have determined, at once, to submit the results of my experience to the public, as *briefly*, and I hope as intelligibly as can be expected, from one who rests his claims to favour, entirely on the merits of the article he manufactures, and not on his method of describing it.

It is not unusual for inventors—carried away by a belief in the infallibility of their own productions, to *ignore* all competitors, and endeavour, if possible, to convey the impression that *they alone* have obtained the

desideratum of perfection. I trust, that while describing the successes of my house, I shall not be considered as falling into this error,—unjust as it is ungenerous. I have taken part in the Great International Exhibitions of the last four years, and have become thoroughly convinced that no narrow minded policy, or egotism, will avail anything against the onward progress of industrial arts, now being so rapidly developed in our nation; and that he who would successfully compete with the age, must be prepared to have his productions judged by comparison with the works of others—not by his own estimate of their value. With these few introductory remarks I at once proceed to my first subject.

Amputations.

IT is an undeniable fact that the number of amputations performed in this and other countries, has been greatly augmented of late years, attributable no doubt to the numerous accidents occasioned by the increasing use of Machinery and Steam power in all departments. This circumstance, in conjunction with the casualties of the late war, have caused the subject to be brought prominently before the notice of the medical profession. The Surgical Society of Paris is collecting facts, and have entrusted to Dr. DEBOUT, the duty of arranging and reporting them. M. ARNAL has already published a pamphlet upon amputation just above the ankle, showing from a description of 97 cases how small is the amount of mortality after this operation, when compared with that of a few inches below the knee; and, from this and similar papers, I doubt not a mass of information will be obtained, highly advantageous to those whose misfortune it may be hereafter to have to submit to the knife of the operator.

I can but feel honoured at having been selected by Dr. DEBOUT to assist in so philanthropic an endeavour, and shall be much gratified if the information I have been able to collect, prove of any value.

The course I have adopted is this: I have selected from my books the names of about two hundred patients in my "practice" (if I may be allowed to use this medical phrase) all of whom are wearing Artificial Limbs of my construction and manufacture; amongst them will be found a proportionate number of each of the various methods of amputation. I have given in most cases a short statement of the causes and period of the operation—place selected—method of performing it—and subsequent health; also a description of the kind of Artificial Limb I have supplied to each, and the time it has been in use.

From those of my patrons to whom I presumed to make my intentions known, I have received the most willing assistance and kindness; and in such instances I have generally used their *own expressions*. I have not stopped to arrange the cases in a tabular form (according to the dates and amputations), as by so doing I should have been much delayed in sending my pamphlet to the printer; but I have marked the place of amputation distinctly at the head of each case, and by this means those who are desirous of information only, upon one class of cases, will find little difficulty in selecting the patients of that class.

As I must necessarily allude to each particular method of amputation when describing the artificial substitutes most desirable, I shall at once proceed to notice the various kinds of limbs which have been introduced by different makers, reserving any suggestions I may consider it advantageous to make upon the preferable modes of operation till the concluding portions of my pamphlet, when they will be better understood.

Artificial Legs.

THOSE who are amputated in this country will derive consolation from the fact that London has obtained, and still maintains, a greater celebrity for the construction of Artificial Limbs, upon a light and durable principle, than any other city in the world. I cannot even *except* our Parisian neighbours, although they are usually so famous for their works of art and ingenuity. In all other countries with which I have become acquainted, either by professionally visiting them or by correspondence, I find that *leather and steel* are the chief *materials* employed in the making of these articles. To our nation alone belongs the credit of the introduction of "Cork Legs" as they are called; but this term is an anomaly, as the framework of the English legs has always been constructed in wood, cork being merely used for the external shaping. Many of my patrons express their astonishment on being informed that such an article as a *Cork Leg* never yet was made, but any person possessing the smallest mechanical idea will perceive that an acting joint made of cork would crumble to pieces with the slightest weight.

The substitution of wooden sockets fitted to the stump, and a very light frame of wood covered with cork for the lower part of the limb, (in lieu of the heavy steel uprights and coverings of thick leather used in other nations,) constituted the great feature of improvement in the English legs, and caused them soon to become popular; as they still are in all parts of the world. In proof of this I may mention that I have patients wearing them in France, Belgium, Spain, Africa, India, Australia, America, Austria, Prussia, Hungary, and many other British and foreign possessions, to whom I shall be happy to refer the inhabitants of those

nations who may be so unfortunate as to require similar assistance.

It may not be out of place to notice, while on this subject, the productions of the exhibitors of Artificial Limbs at the recent Universal Exhibition at Paris, in 1855. There were from France 7 exhibitors, Belgium 3, Tuscany 2, Prussia 1, Hesse 1, Austria 1, Great Britain 3, and one or two others I have now forgotten.

With but *two exceptions* all the artificial legs exhibited by foreign Artists, at Paris, were constructed, as I have described, of metal and leather; of the *two exceptions*, one was an exact copy of a leg patented by my house some years since, the other also a copy without alteration of the original Tendon leg, the invention of another English house.

From my inspection of the various limbs exhibited I felt so satisfied of the superiority of my own productions, in the three essential principles of lightness, durability, and simplicity of action, that I proposed to the surgical jury, that each exhibitor should bring before them, at Paris, on an appointed day, one of his own patients wearing a leg of the construction he was desirous to recommend. That the Jury, having noticed the ease and facility with which each patient could walk, run, sit, &c., the legs should be taken off, and the construction of each examined; the principles of their action (as to correctness of motion) explained; the weight of each taken; the price at which they could be sold by their maker stated; and their probable durability and strength noticed. That the Jury, having consulted on these particulars, should award to the one which had the greatest share of merit a high class Medal, adding to it a condition, in order to cause a general improvement to be made in their construction, that each competing exhibitor should be at liberty to take plans and designs of the *medal leg*; and should

have the right, if he pleased, to avail himself of it, to make legs upon the *same principles* in his own nation; but not to delegate that right to others. This proposition was made public by circulars and by notices in the principal Paris journals; but the Jurors and exhibitors considered it scarcely practicable or in accordance with the general rules of the Exhibition, and it was not carried out—a result of which *individually* I cannot complain, as I had the honor of being awarded the medal (the only one given exclusively for Limbs) without having to comply with the condition of rendering up the right of using my principles of construction to other makers, which would certainly not have been to my interest in a pecuniary point of view,

In making the foregoing remarks upon what I consider the great faults of construction in the limbs of other nations, I trust I shall not be thought as speaking in any way against the *workmanship*, either mechanical or artistic, of those limbs. In the specimens exhibited by Messrs. CHARRIERE and one or two other makers, there was a perfectness of finish in the metal work surpassing any thing we are able to produce in England; but this avails nothing against the opinion I hold that a steel instrument maker is not the proper workman to make these articles; an artist in wood carving or the finest cabinet work will be more likely to succeed. I doubt not, that before many years have elapsed, all the other nations will adopt the English principle. The American makers have already done so, and one of them (not a bad American joke by the bye) actually brought back the English principle to England, announced it as a *new invention*, and succeeded in making a portion of the English press believe in its genuineness, a circumstance of which I do not complain if the article is well made and really effective; although the proceeding may be considered, to

use an American expression, as "rather taking advantage of us."

Simple as the manufacture of a leg on the English principle may seem to be from its appearance, by those who are accustomed to see the beautiful specimens of art displayed in our saloons and drawing rooms, it is not by any means an easy task to accomplish. A more difficult piece of mechanism to produce, when made effective, and to *answer its purpose well*, cannot be imagined; and unless a maker has been engaged *constantly* at the work for YEARS he will not succeed: he will, perhaps, in form and exterior appearance, make a very fair looking limb; but on trial it will be found to have a totally different gait from the living partner, to take a *wrong bearing*, or to have an untrue motion, and the leg will consequently be useless; it must either be *re-made* by a workman accustomed to it, or thrown away. An instance of this kind I will mention. In December, 1853, a lady from Bristol applied to me, having had a leg made by a workman in that city; a clever mechanic who had *copied* a well made limb to all appearance with unusual accuracy; and had tried every manœuvre to make it succeed, but all to no purpose. A friend in London brought her to my house, and as she was unable to go to the expense of having a second one made, I consented (against the rules of my business) to see if I could have the fault rectified. A new socket properly shaped to her stump was fitted to the leg, the action was corrected, she walked with perfect ease in a week, and has worn it every day till this time. It is very possible a strange workman *might* succeed in some cases by copying a well made leg, but when he did so it would certainly be by *accident*. A reference to the list of cases at the end will show how many have been doomed to years of disappointment and vexation through trusting to the efforts of unpracticed or unskilled

artizans, and have put away the limbs with a determination never to try them again, till, having chanced to meet with some one who was enjoying the comfort of a leg made by a proper artist, they have been induced to make another trial.

In proof of the difficulties which exist in accurately fitting and adjusting them, I can state that I have never yet met with two persons out of the many hundreds I have had under my care during the last 14 years, who could wear each other's artificial limb. I am not unfrequently asked by my patients if I have a leg in my workshop I could lend them for a few hours while their own was undergoing repair—a request wholly impossible to comply with.

Again, when the difficulties of the fitting and locomotion are accomplished, there are yet many others in view. Extreme *lightness in weight* must be obtained, combined with *perfect durability* to withstand the constant wear and tear of almost perpetual motion; and hence the objection I make to the *steel joints* and steel frame work. A metal joint, however well made, will become loose with the constant action in less than six months, and the metal frame work if made light in substance will certainly break or bend; added to this the mechanism must work in *every part* without noise, the slightest squeak or creak rendering the whole apparatus a failure; and by the wearer will be thought a greater evil than all the other faults I have enumerated put together. I believe that in the English limbs, the chief if not all of these apparently insurmountable difficulties have been got over; and the share my house has taken in achieving this result I will briefly state. My predecessor (and relative of my family) Mr. SLEATH, at the time he established this business, now a century since, was with one exception, the only artificial limb-maker of any celebrity in England. The two houses

(for an honorable and friendly rivalry existed between them) brought out the original cork legs, such as I have before described, and introduced the hollow axle bolts, working on leather "bushings" used to this day by all English makers.

Mr. SLEATH was the inventor of the kneeling artificial leg, (see fig. 9,) for patients whose knee joint had become *contracted* after amputation by the use of the common wooden leg. He also introduced the valuable "*Locking Joint*" to the common Pin Leg, (see fig. 8,) which has been found to answer so exceedingly well, and is still considered the best and most desirable for every case where a stiff joint is necessary.

Mr. SLEATH'S productions were worn by many of the nobles at the court of George III, and by some of the heroes of that time whose names have become immortal in British history. At his death he was followed by Mr. WILLIAMSON, who had obtained his knowledge of the art from his predecessor Mr. SLEATH, and continued, like him, to make various improvements, working out the principle of producing a light and durable leg. Contemporaneously with Mr. WILLIAMSON, a maker in Yorkshire made some very valuable efforts (at that time, at least they were considered so) in the same direction, introducing a leg in which all the motive power was obtained by ingeniously inserted *spiral springs*; and having a leather strap shaped to the form of the patella or knee-cap, to cover the cavity occasioned by the meeting of the stops of the knee joint; also worked by *spiral springs* so as to *propel the foot forward*.

Mr. WILLIAMSON perceived faults in the Yorkshire leg although it was on the whole an *improvement*, and deservedly successful. The springs were liable to snap, and the leather knee cap, besides creaking, was continually breaking on the wearer sitting down, the springs which were attached to one end of it being then

at the greatest extension. It was necessary also to maintain a pressure on the foot during the whole of the time it was bent in the sitting position, otherwise it would strike out perhaps against an unlucky neighbour at the opposite side of the table, to the no small discomfiture of the proprietor of the cork leg; another grievous fault. He, therefore, determined on patenting a leg upon a totally different construction from any hitherto introduced, which I will now describe. The exterior form was entirely worked out of willow, which he found was equally light in weight, and far more lasting than a mixture of cork and wood; it was also much easier to be shaped with anatomical exactness to the model of the living limb it had to represent. For the motive power he used springs similar to those of a clock, ingeniously inserted round the axle bolts. Then to get rid of the clumsy sliding patella strap, (previously used to cover the hollow at the knee,) he reversed the action of the joint, and by making a circular chamber in the anterior part of it, and passing a steel pin through the posterior, he was enabled to make a *perfect stop* admitting of easy regulation for the setting the joints to the lines of the living one, and taking a bearing on a portion of the wood, least likely to split with the pressure.

Thus, all the mechanism of the leg was out of sight, and the limbs presented an unbroken surface throughout; a point far more desirable to obtain at that period than now, for it was the age when tight pantaloons and hessian boots, silk stockings and buckle shoes were in vogue with gentlemen; and a *finely formed ankle* (with liberty to display it) was thought the chief characteristic of a lady. This limb was decidedly successful; all who could afford to purchase one did so; and I cannot add any facts of greater value in proof of its merits than these. It brought a golden harvest to Mr.

WILLIAMSON, who in a few years was enabled to relinquish the cares of business, having amassed ample wealth with which to enjoy the *otium cum dignitate* of private life; and at the expiration of the term of the patent all the other English makers of any celebrity availed themselves of the opportunity of using the whole or some of the principles of the invention.

Mr. WILLIAMSON was succeeded by Mr. SLEATH (son of the founder of our business) who continued manufacturing on the same principle, with a few immaterial alterations, for some years afterwards; and I beg to refer the readers to cases 4, 17, 18, 20, 31, and others at the end of my pamphlet, by which they will see that many of the limbs supplied by my house at that period were worn from 20 to 30 years, giving most perfect satisfaction throughout the whole of that time; and were even then only laid aside for the purpose of trying one upon my new construction.

I must, however, go back in my narrative to notice an ingenious and valuable improvement brought out by another inventor during the period of Mr. WILLIAMSON'S patent. It consisted of the introduction of artificial *tendons* connecting the actions of the knee and ankle, whereby the lever power of the foot was made to control the action of the knee, prevent or at least materially check its liability to throw forward, and give a feeling of greater security to the wearer. It also in appearance produced an easier walk, because the knee having no spring to restrain its action, worked with perfect freedom as soon as relieved from the strain of the tendon by the weight of the body being withdrawn from the foot. The tendons were formed of strong *gut* bands, and were placed to correspond with the action of the *tendo achillis* in the living limbs.

The inventor had himself been amputated and was an extremely clever workman, so that any deficiencies there

were to be found in the invention were fully compensated for by the excellence of the workmanship.

This is by no means a common case, for generally the "amputated" who invent limbs, (and numbers of them are announced every year and as speedily disappear) lack the mechanical knowledge which would make their ideas practicable, added to which they have no experience whatever of the manner of treatment required for any other class of amputation than their own.

The inventor of the tendon principle did not make any material alteration in the general construction of the limbs; he adopted the light exterior form of *willow*, (used in Mr. WILLIAMSON'S patent); he returned to the old *patella knee strap* of the Yorkshire leg, to cover the knee cavity, without attaching the spiral springs to it; he worked his joints with the hollow axle bolts and leather bushings, Mr. SLEATH'S invention; in short the only alteration in form was the reversal of the ankle joint action, the better to accommodate the fixing of the *tendons*. I should mention also that a small spiral spring with gut attached was inserted in the foot to assist in raising it to clear the ground, the only steel spring used in the limb.

The Tendon Leg obtained a well-merited success, not perhaps to the extent of Mr. WILLIAMSON'S patent in a *pecuniary* point of view, but it soon became known and appreciated.

It was not protected by patent, still my predecessor, the younger Mr. SLEATH, with a feeling of honor which ought to characterise all competitors, did not adopt or in any way take advantage of the improvement, but left its inventor to the full enjoyment of the benefits which accrued to him from its introduction. After Mr. SLEATH'S death the business came into my hands (now 14 years since) and I continued to make artificial legs upon the system introduced by my predecessors, and never in *any*

single instance found them fail to give perfect satisfaction. I was, however, not so satisfied myself that all was yet done that could be done; and after six or seven years of practical experience in the workshop and the fitting room, I felt convinced that if a simple propelling power could be added to the knee joint (to take off the dead weight of the boot) easily controllable, so that it might be increased or decreased at pleasure; and revolving with the action of the joint so as not to subject the wearer on sitting down to the annoyance of the old Yorkshire patella strap; it would be of the greatest possible advantage, and give a feeling of security and confidence which had never yet been attained. Many years too having elapsed since the death of the inventor of the *tendon leg*; and that principle having been adopted by several other houses, I felt no hesitation in using what appeared to me the *advantages* of that system; not, indeed, as *necessary* to the completion of my own design; for many of my patrons were much prejudiced against the tendon leg from the peculiar awkward gait which some of its wearers made with it; but as an auxiliary, to be applied in cases where the pursuits of the patient were more of an in-door than out-door character.

I therefore, about six years since, introduced a limb upon an entirely new system of action, with the view to effect the objects I have above enumerated (a specification of which will be found amongst the records of the *patent office* of that time); and I am proud to add that its success has exceeded my anticipation; having effected all the objects I had desired to attain. I supplied them at first to patients who had worn artificial legs for years, and were the best able to judge of the merits of the new system, all expressed themselves in the highest terms of commendation (see cases 10, 15, 27, 34, 91); and some who had never succeeded in wearing an

artificial leg before, were enabled at once to put aside their crutches or their wooden legs.

About this time the American leg, to which I have before alluded, obtained considerable notice ; but neither from my examination of the leg, nor from the inventor's, descriptive pamphlet, could I discover any thing new or that could be claimed as an "invention." The exterior form was made of wood, the bearings for the stump the same as in the English ; and the action was on the tendon principle. In the limbs for amputation at or above the knee there was a novelty in the method of forming the joints. They were cut as a hollow ball, similar to those which had been used for some time by London makers in cases where amputation having taken place, *at or close to* the knee articulation ; the length of stump interfered with the mechanism of the usual "rule" joint ; and a joint of this description was the only one available. The proprietor of these limbs had himself, I believe, been amputated at the knee, and was able to bear pressure on the end of the stump. This kind of joint was, therefore, suitable to his *case* ; and hence, no doubt, arose his predilections in its favour and his belief in its general applicability.

Whether it is superior to the mortise or rule joint for all thigh amputations it is difficult to decide,—both have been used by my house for years, and at present, I must say, I prefer the latter from its greater durability.

The fault of the hollow joint is this ; the axle bolt which passes through the knee has steel bands at each end which are rivetted to the willow form of the calf. A sudden strain by a fall, or the jerk of alighting from a horse, will sometimes cause the willow to crack in the *line of the rivets*, an accident which seldom occurs with the rule joint, even when made very light. It has an advantage, however, which should be named—the "bearing" is taken at each end of the axle bolt, and

this perhaps makes it less liable to *lateral motion* than the mortise joint, if the latter is not thoroughly well made.*

The exterior of the American limbs was improved by being enamelled, although it added to their weight.

The introduction of Vulcanised India Rubber bands for the motive power, in lieu of steel springs, has since been tried by a London house, but found to be totally ineffective; and the maker who used them states that "Their elasticity diminishes by frequent use, or they break so frequently as to be a continual plague to the patient and profit to the maker," an opinion in which I perfectly concur. I have made experiments with India Rubber and Gutta Percha in the construction of artificial hands, arms, noses, &c., all of which have proved valueless from the perishable nature of the material, its tendency to lose its form with the action of heat and light, and its constantly offensive odour.

THE NEW PATENT ACTION JOINTS.

Having given, I believe truthfully, an outline of every effort worthy of notice which has been made by my own and other houses during the last century, I will briefly describe on my own behalf the advantages which I feel confident my new system of action in the knee and ankle joints will be found to possess, and the consequent ease, comfort and security it gives to the patient.

In the exterior form of the knee I adhere to the principle of my predecessor's original patent, getting rid of the leather knee strap and its endless annoyances, and producing in its stead a perfectly smooth and clear surface. I reverse the action of the joint, the better to arrange my motive power, which consists of spiral springs inserted in the calf of the limb; and which are

* I was amused lately by reading an announcement of a *New Leg* in a provincial paper, in which the inventor takes credit to himself for having discovered a method of producing *lateral motion* in the joints; a discovery which would condemn any experienced limb maker.

compressed by the movement of the joint, exerting a corresponding influence on the action of the ankle.

I do not, of course, take credit to myself for the introduction of spiral springs, for they are in use in almost every article of scientific mechanism, but it is for the entirely new method in which they are applied that I claim the *exclusive privileges* of invention. They are made to work in revolving tubes, and on sliding pins; by which means a perfectly *noiseless* action is obtained; and are so arranged that the power on the knee or ankle actions can be increased or decreased to any amount of pressure in a few moments. I know that many old wearers of artificial limbs will assert that springs of any kind are apt to snap; they will have painful reminiscences of the instep springs of the "Yorkshire leg," the circular spring of "WILLIAMSON'S patent," and the foot spring of the "tendon leg;" but I can with confidence affirm that on the system I have patented, and on which I now apply them, no such liability exists, in proof of which I beg to refer the reader to the extracts from correspondence, annexed to the cases at the end of the pamphlet. It will be seen that all who have used the *new action* speak of its merits as I describe it, and of its thorough durability. In the working out of my ideas, I had at first some difficulties to contend with, on the point of weight. Any improvement in action, if ever so ingenious, is rendered valueless, if it increases the weight of the limb, to any noticeable extent.

I have succeeded, by recent modifications, fully in surmounting this obstacle. The whole of the "knee action," springs, slides, tubes, &c., does not weigh more than three ounces; and in the ease it gives to the wearer, seems to relieve him of at least a pound in weight; added to which, the jerk, which the limb sustained at each step, when the foot was entirely thrown forward by the stump, being now got rid of, the frame-work of the

limb can safely be made much lighter, thereby saving more than three times the weight of the new action.

I am enabled, by these means, to make a full-length leg, for thigh amputation, (see illustrations fig. 1, and fig. 6,) for a person of moderate size, which I can guarantee to withstand the wear and tear of years, to weigh not more than 4 lbs. ; and if for a lady, or anyone who does not require it for hard usage $2\frac{1}{2}$ lbs. or 3 lbs. In those cases, where a patient has been accustomed to use the Tendon system,—or where I consider the application of it (as an adjunct to my own) advantageous, I have endeavoured to remedy its defects, by giving more spring to the Tendons, (preventing their liability to snap,) and by substituting for the foot-spring one upon my own principle, which will not break.

For the information of those who may have recently been amputated, and who have no knowledge whatever of the mechanism of “Cork Legs,” I will now describe the kind of substitute applicable to each class of amputation.

For Amputation above or at the Knee.

(See Illustrations, Fig. 1 and Fig. 6.)

This limb takes its bearing on the upper part of the stump, within about an inch of the perinæum or fork, on the *inside*, and close up to the ischium, at the back. The socket for the stump, is of *prepared willow*, finely polished, and shaped in its interior by machinery, to the exact form of the stump. The stump must not be allowed to touch at its extremity, or to fit *too tightly* in the lower part of the socket, otherwise it will not be comfortable. For a Lady, the best attachments are Elastic Straps, fastened to a *waist belt* ; and in some cases a steel hip-piece, with joint, carrying a circular strap, is necessary. For a Gentleman, a pair of strong

buck-leather braces, passing over each shoulder, fastened with regulating-buckles to the straps attached to the leg. The interior mechanism of the limb, action of the knee and ankle, &c., I have before described. In the sitting-position, (as in fig. 6,) it is perfectly comfortable,—the stump resting in the socket, and the spring exercising no controul over the limb, till the patient again rises from his seat, when it immediately resumes its motive-power.

For those whose means are too limited to admit of the purchase of an Artificial Limb, with foot, ankle-joint, &c., the Improved Pin Leg, with knee-joint, (fig. 8,) will be found admirably suited, and vastly superior in comfort to the common pin leg. The joint fastens itself, when the patient rises from his seat; and the wearer walks with it *straightened*, but it is instantly unlocked by touching a strap, whenever he requires it. It has, of course, all the disadvantages of the *Pin Leg*, in walking, as it is liable, in wet weather, to slip on the smooth pavements in town, or to sink deep into the mud in country-walks; still, for those who cannot, from their cost, enjoy the luxury of the Artificial Limb, it will be found a great comfort; and it is thoroughly durable.

FOR

Amputations between the Knee & Ankle.

(See Figs. 5, 7, 9, and 10.)

When amputation has taken place immediately under the knee, or the length of stump does not exceed six inches from the centre of the patella, it is necessary to have a thigh-socket, so that the weight may be taken partly on the thigh, and partly round the stump, just under the knee-cap bone, (See fig. 5.) The thigh-socket is supported by light *steel joints*, on each side of the knee, which work in accordance with the action of the natural joint. Fig. 7 shews this limb in the sitting-position. If the stump exceeds six inches in length,

and is pretty sound, and free from excoriation, the "Half-Leg," fig. 10, is sufficient. In this case, the whole of the weight is taken round the stump, just under the knee, (the point being left quite clear of pressure,) and the limb is kept on by straps fastened to a belt laced on the thigh. By referring to the Cases, at the end, it will be seen that about the same number wear the Half-Leg, (fig. 10,) as the one with joints and thigh-socket; (fig. 5) and it must entirely depend on the length and state of the stump, as to which will be the most desirable for any patient.

When the stump, either from the amputation or the using of a common wooden leg, or any other cause has become *contracted*, so that the natural joint cannot be worked freely, the patient will be unable to wear either of the above limbs, but must use the one marked *fig. 9.* in the illustrated sheet. On this limb he kneels, and there is an artificial joint close under the knee-bearing, which, I sometimes make to lock upon the old principle, but more generally loose, and to work with my *patent action* so that the wearer bends the joint at each step.

An acting joint to this description of limb was never successfully applied till the introduction of my patent principle. I do not in all cases recommend the action, but it is of the greatest advantage to Ladies, or to those persons whose avocations are not laborious. When the patient sits with this limb, the locking-joint requires to be unfastened, (accomplished by pulling a strap), the acting joint bends freely by the weight of the patient only. In either case the limb will be found satisfactory (see *Contraction Cases*), and although they are not so neat in appearance as the limbs *fig. 5.* and *10.*, they afford every comfort.

Amputations at the Ankle Joint or Foot.

FOR Syme's Ankle joint operation, the apparatus *fig.* 11, is the most effective yet introduced. I think it best, for reasons I have stated fully in my remarks on the various Amputations, to construct the apparatus for all cases of Syme's Ankle joint operation, so as to take a bearing under the knee, as well as at the end of the stump. By these means, even if the patient is able, after a time to bear his whole weight on the stump, he will still have it in his power to relieve it from the pressure, should over-walking, hot weather, excoriation, or any other cause, render it painful.

For "Chopart's operation," where the heel is left sound, and only a portion of the foot removed, there is no difficulty in constructing the proper substitute. A similar apparatus to *fig.* 11, but without the knee bearing, is all that is required. Care must be taken to protect the front of the stump from pressing against the mechanism of the Artificial portion of foot, and to prevent the heel from rolling with a lateral motion on the cushion; with these minor points attended to, the patient will make an excellent walk immediately.

Amputations of the Arm and Hand.

It is not necessary to give any lengthened description of the construction of the Artificial Arms and Hands. All the limb-makers of celebrity,—London and Parisian, are united in their opinion upon this subject; admitting that the "Hand," beautifully carved, in light-colored lime-tree, (similar to the specimens of carved groups of flowers, game, &c., which are now exciting such universal admiration at the Manchester Art Treasures' Exhibition,)—far surpasses all other contrivances yet thought of, to represent the natural form; and is also the most useful appliance with which to replace the lost member:

It has the whole of the finger, thumb, and wrist-joints; and when the instruments, such as the knife, fork, pen holder, &c., are fixed to the small steel box, inserted in the palm, and the fingers bent over, as if grasping the instrument, the deception is complete. For the Arm stump-socket, when the place of amputation is more than five inches below the elbow, I prefer the usual case made of blocked-leather; but when nearer to, or above the elbow, the light hollow form of willow-wood,—the same as used in the construction of the Legs, is much the best, being not more than half the weight of the leather, and less likely to bend or yield with the pressure applied to it by the use of the hand.

Many efforts have been made, both by amateurs and professed limb-makers, to obtain a grasp with the artificial thumb and fingers by mechanism, worked either by the movement of the stump in the socket, or by the bending of the elbow-joint. All endeavours of this kind,—as intended for purposes of general use, have proved to be signal failures; for while the wearer of one of these complicated machines was making fruitless attempts to pick up a fork which had most perversely been placed the wrong side upwards on the table, his fellow-sufferer, whose artificial hand was made with the steel socket in the palm, would be found to have adjusted his fork, and probably to have half finished the contents of his plate.

Of these attempts, I think the instrument invented by SIR GEORGE CAYLEY, about ten years since, (and fully described in the 'Mechanics' Magazine' at that time,) the most worthy of notice. The grasp was made *constant*, by means of a strong spiral spring inserted in the end of the "stump case." When it was required to open the finger and thumb, (for the purpose of receiving any object,) it was necessary to touch a lever with the other hand, or to press it against the body; and while the pressure was so retained the hand remained open.

In this, however, consisted the great difficulty, which neither professed makers or amateurs have yet been able to surmount. The taking away of the sound hand from its occupation, for the purpose of touching the lever at the wrist, excited far more attention than the fixing of an instrument in the palm socket; and the turning of the arm, so as to get the grasp in a position to take hold of the article was most ludicrous. The other method was equally, if not still more objectionable. When the elbow had to be pressed to the body, in order to touch the lever which released the grasp, the whole of the body had to be moved, to get the finger and thumb in a position to clasp the instrument, because, while the elbow was kept closely pressed inwards, the hand could not be lifted over on the table, (as usually done both by natural and artificial arms,) by raising the elbow. The endeavour to obtain the grasp-action, by the movement of the stump in the socket, was certainly the best idea of all, but wholly impracticable in the generality of cases, from the tenderness of the point of the stump. On an average, I believe that not more than one in twenty patients could be found to bear this pressure.

The poor man, who was employed by the Directors of the Polytechnic Institution, to exhibit an Artificial Arm made on this principle, gladly, I believe, relinquished the salary they paid him, in order to get rid of so painful an occupation. Many persons were induced at the time to purchase them, (some, I am sorry to say, amongst the poorer classes,) but I never yet heard of a single case in which they were successful, or in which the patient could continue to use them.

By several other amateur inventors it has been tried to work the grasp by the action of the elbow-joint. One of these instruments was exhibited in the late Paris Exhibition, but all have been failures, when regarded in any other light than as specimens of ingenious me-

chanism: were it otherwise, I should have been happy, as also, I feel sure would one or two of my competitors, to have purchased, and introduced to the public, any invention which would be found to answer better than the Hand and Arm now in general use.

A few years since, a clever Artist in Gutta Percha—a maker of the grotesque heads and squeezable faces, conceived the idea of making a hand to represent the flesh, and so avoid the necessity of wearing a glove. He displayed great talent in his art, and his productions were certainly in form and colouring excellent, but the clammy deathlike appearance which they presented, and which foils almost every effort to represent the living flesh, rendered them of no avail.

I felt that I could not, with due regard to my reputation, introduce them to the public, and am much mistaken if the gentleman who incurred the expense and trouble of doing so, has not suffered in estimation thereby. At all events, he has long since ceased to recommend them, and I believe that at the present time there is not a person to be found who either makes or uses them.

I have made many similar experiments myself, in forming Artificial Noses, Ears, and portions of the Face, in *Gutta Percha*, but the same livid, ghastly look always presented itself, and on the patient approaching the fire the form would sometimes alter, and curl, so that the 'fit' would be destroyed,—but not so the offensive smell, which always remained unchanged.

A Hand, shaped in 'Cork,' for the purpose of filling the glove, was made by some mechanics, many years since, but the material was too fragile to admit of any instrument being firmly attached to it; and as it was not an uncommon occurrence for the patient to *pull off a finger*, when endeavouring to change the glove, it was soon abandoned, and like the 'Cork Legs,' existed for the future only in name, having been replaced by better constructed and more durable appliances.

The superiority of the Hand, carved in light wood, (with jointed fingers, and palm socket for the instruments) — over all these various attempts is most evident. The improvements which have been made in its details of construction, by my own and other houses, have rendered it as perfect an apparatus as can well be imagined. As a specimen of workmanship it is a complete master-piece of art; and I think a considerable time will elapse before the ingenuity of inventors will discover anything more efficient, more durable, or of lighter weight.

For Amputations below the Elbow.

When the length of stump exceeds five inches from the elbow-joint, the apparatus fig. 3, is all that is requisite. It consists of the leather stump case, (moulded in its interior to the exact form of the stump, and its exterior shaped to the size and form of the perfect arm,) to which is attached the hand I have described. The hand can be taken off at the wrist, at pleasure, and a hook for common purposes, also a fork or knife, flesh brush to wash the sound hand with, and any other instrument instantly affixed to the wrist plate. Similar instruments are also readily placed in the hand, by means of the palm socket, which securely holds them, and prevents all strain on the fingers. Those most usually supplied are the fork or knife, and the book, card, rein, and pen holders, and when fixed, and the fingers placed in the accustomed position for holding the article, the wearer is enabled to perform all the offices with ease, and with good appearance.

The modifications I have recently introduced in this apparatus are, a new description of palm socket, to which the instruments are affixed with greater facility than to the old one; being made to fasten into it without the small spring usually attached to them, and which was liable to break or get fixed in the socket; several new

Instruments, and a better method of blocking the Arm-piece, by which the exact form of the stump is obtained. The material for covering it is also new,—the exterior (when required to be highly finished) being enamelled, so as to render it washable.

When the length of stump below the elbow is less than five inches, the aid of light steel joints, placed on each side the elbow, and working in juxtaposition with the natural joint is requisite, to assist the stump in its control over the hand, (see fig. 4) and when the length does not exceed two or three inches, a ratchet or sliding stop is added to the steel joints, which still further increases the power, and makes up for the deficiency in length of stump;—the joint being then set stiff in any position required, but easily released by touching the small stud placed on the side of the Arm.

For Amputations above the Elbow.

The Artificial Limb for amputations of this class cannot be made to render as efficient service as those for cases where the natural elbow joint is retained. I have, however, recently introduced a new description of locking joint, which holds the lower part so firmly in position, that many of the hand instruments are used with great advantage.

The patient can maintain a good pressure with the Artificial Hand, on the paper while writing with the perfect one; he can also use the fork while cutting, and by raising the hand to the proper level, and affixing the Book or Card-holder to the palm, he can write memorandums, &c. See fig. 2. Besides the new joint, I have also made improvements in the workmanship and appearance of the limb, by modelling the whole of the exterior form in light willow, instead of the heavy sole leather generally used, (excepting only the portion which fits the stump, and

which requires to be yielding,) and am enabled thereby to save considerable weight. In the arrangement of my new limb, I have also caused the spring, which stops the action of the joint, to be placed in the lower part of the arm, (see fig. 2,) in a position where it can be much more readily touched by the sound hand, and where the act of doing so excites no attention.

When the patient has been amputated at the Shoulder-joint, (no stump remaining,) the same limb, fig. 2, is used, with an addition to the upper portion to form the shoulder, and extra attachments to secure it more firmly to the body. In this case, there is little hope of his being able to make use of it, and the restoration of his appearance is the chief object to be sought in making the limb, which should therefore be constructed as light in weight as possible. I have two or three patients who have managed, by fastening the wrist to the waist, to use the pamphlet or card-holder in the hand, with advantage; beyond this, in the way of *utility* I do not think any thing can be accomplished, for this class of Cases.

For the many deformities of the Hand and Arm, occasioned by birth or growth, and for loss of portions of the hand and fingers, equally efficient contrivances to those I have enumerated are supplied. A reference to some of the concluding Cases at the end of the pamphlet will sufficiently explain the kind of apparatus suitable to most of these, but should any reader be unable to find a case approximating to his own, he can at all times obtain the fullest information by writing to my house.

From the above brief description, and from the list of cases given, the newly-amputated patient will, I trust, be able to form an estimate of the relief he may expect to receive from a well-constructed Artificial Limb. He will see that many of my elder patients have passed through the greater portion of their lives with comfort and health by the aid of those supplied by my predecessors; although

they had not the benefit of modern improvements and artistic principles, in their early days.

I am aware of the great anxiety a patient feels, after being amputated, to obtain the fullest information upon this subject, and of the number of contradictory statements with which he will be perplexed, in the course of his enquiries. If he has lost a leg, some will recommend a Pin-Leg first, His medical attendant will, perhaps, join in this suggestion, without for a moment thinking of the injury he will do his patient by causing him to contract a stiff habit of walking, which, when he has the Artificial one, he will be long in overcoming. Some will advocate a continuance of the Crutches,—the use of which not only ties his hands perpetually, but causes deformity of the body, and generally produces ill health. He will also be attacked by a number of Amateur leg makers, (perhaps some professional ones too,) who will be anxious to afford him their assistance. He will not find it profit him to attend to these polite advances. No maker of respectability or celebrity would make such applications. During the many years my house has been established, an order has never been *solicited* either by myself, or predecessors or any one in our employ. When he has selected a Maker, he will next be anxious to learn of what *materials* the limb will be constructed, some advocating wood, some cork, some leather, some gutta percha.

Upon this point, he need not have the least concern. The manufacture of a good limb depends no more on the kind of materials used, than does the execution of a painting by an Eminent Artist on the quality of his paint or canvass, and although I prefer the willow wood, to all other materials, I would rather if I were about to have a limb made by an inexperienced hand, that it should be constructed of any of the others I have named, as there are none so clumsy, heavy and badly made as the wooden ones, when attempted by an unpractised workman,

who has no prepared willow, no machinery with which to mould the socket to the form of the stump, and no idea how to obtain an easy bearing with such inflexible material.

I am not at all desirous to press harshly in my remarks on the unskilled, but the injury they do to the established practitioner, and the amount of misery they inflict on the patient is incalculable. During the present week my attention has been called to two *newly invented* limbs, one constructed wholly of leather and steel, the other upon the principle of the American one I have described, except that its tendon bands are elastic, and allow the foot to remain flat on the ground till the weight is pressed, instead of the heel rising as in the natural foot action. Its knee-stop is a leather strap fastened across the back of the joint, and a canvass bag fastened round the upper edge of the socket causes a portion of the weight to be taken on the end of the stump.

The inventors are both amputated, but although it is a matter of business with them to appear to walk perfectly easy, and such *constant practice* ought to enable them to accomplish wonders, they do not walk nearly as well as the ordinary wearers of my own patent, or the tendon systems, who have no such pecuniary object in view, and will not take the trouble to make a study of that which is only a matter of comfort and necessity.

Of these latest efforts I will not speak critically, beyond stating that all the points of construction claimed as improvements have been previously tried and condemned by old practitioners. I could not therefore make an offer to purchase the one submitted to my notice; I believe that no old established house will be found to introduce either of them, and that if not greatly modified and rendered nearer to the present approved method of construction, they have no more chance of success than the twenty or thirty others which have been invented,

patented, advertised, and forgotten during the last few years.

I must now, with reference to the enquiry of Dr. DEBOUT, make a few suggestions, as to which may be considered

THE PREFERABLE AMPUTATIONS.

In doing so, I beg to disclaim all intention of offering an opinion as to the merits of the various methods of operation. I would only give a summary of results, as obtained from the list of cases I now present, and from my general observations as a Mechanician, in the hope, that an available hint, worthy the consideration of the operator, may be elicited.

Amputations above the Knee.

Patients amputated close to the *Perinæum* were unable to walk safely on an Artificial Limb, (with acting Knee-joint,) until the new systems of construction were introduced.

Those who have not more than two inches length of stump remaining, can now do so with ease, and are enabled to fulfil active duties. Of the thigh amputations the place of operation which best suits the mechanician is about four or five inches above the patella. If, however, the locality of the disease, or accident will not admit of its being well performed, so as to leave the stump sound, well covered, and not of a conical shape, the mid-thigh, or upper-third is preferable.

Amputation at the Knee-joint.

This operation is not a common one, and if proper regard is taken with reference to the patient's future comfort and progression, it should certainly never be performed on Adults. The natural action of the joint is destroyed, and the stump, when the point is well covered, is brought so low, that if a cushion, and an artificial acting-joint are placed beneath it, a most awkward gait, and unsightly appearance are produced,—the flexion of the knee being necessarily three or four inches lower than in the natural limb. A better appearance is made

if a bearing on the end of the stump is not attempted, and steel joints (as in the limb, fig. 5,) placed on each side of the knee; but even then, the joints are required to be made so strong, to sustain the whole weight of the body, and so much extra mechanism is necessary to throw the foot forward, that the limb is rendered heavy and clumsy, and the patient will never walk as well as those who are amputated at the thigh.

In infancy or childhood, however, I think this method of operation advantageous. In young subjects, the stump can scarcely be left too long, as the growth of the frame and atrophy of the stump differ,—the latter remaining without increase in size or length, (or nearly so) while the body obtains its growth in due proportions.*

In an article which appeared in the *Lancet*, in 1854, it was asserted that “Amputation of the Leg should never be performed on Children, but the lower-third of the thigh unhesitatingly selected.” I cannot assent to this proposition, because I believe that the “Knee-joint operation” would be preferable, as enabling the patient to take some weight on the end of the stump. The growth of the patient, from childhood to manhood, would allow the mechanician sufficient room to place the Artificial Knee-joint parallel with the natural one, and the power of such a stump over the limb would be excellent.

Amputations between the Knee and Ankle.

Here again I am compelled to dissent from a general opinion which seems to prevail amongst the profession, that stumps of the leg may be considered relatively good, in proportion to their length from the lower to the upper third. I am convinced, from long experience, that the *middle of the calf* is a far preferable place to select for the operation, than the *lower third*,—the stump produced by the former operation, being always better covered, and less liable to excoriations and neuralgic shootings. With reference, also, to the construction of the Artificial Limb, the amputation immediately above the

* I am confirmed in this remark by a letter recently received from Dr. WILLIAM HARRISON, of Gargrave, a gentleman of high professional attainments, whose opinions, on this subject, are the more valuable from his having been amputated in youth, and long used to wearing Artificial Limbs. (See Case 34.)

ankle is highly objectionable. The Mechanician is compelled to leave so much room in the interior, for the point of the stump, that the exterior of the limb is rendered considerably larger at the ankle than the natural leg. Notwithstanding, therefore, M. ARNAL's able advocacy of the lower-third operations, I cannot help submitting my decided convictions, that this class of amputations will invariably be found to give greater discomfort to the patient in after life, and more trouble to the mechanician than any other.

Symes' Ankle-joint operation.

The suggestions I have offered upon the Knee-joint operations would be equally applicable to those performed at the Ankle-joint, but that the amount of flexion required at the ankle is considerably less than at the knee; still the mechanician cannot apply the usual artificial acting-joint,—as the stump when well covered at the point (to form the heel cushion) reaches to within one and a half or two inches of the ground;—he is therefore obliged to place metal-joints on each side of the point of the stump, (see fig. 11,) by which the foot is kept firmly fixed to the leg, and in cases where the patient is unable to take his whole weight on the point, an upper socket is attached to obtain a bearing under the knee. In appearance, the apparatus will never be as neat and well-formed as that made for the mid-calf or upper-third operations; but whether the patient is sufficiently compensated for this defect, by his being enabled to take a bearing on the end of the stump (and some as will be seen by reference to the list of cases, do so with extraordinary firmness,) is a matter I must leave for the consideration of the Surgeon, and those who are about to be amputated.

I cannot close my remarks on this subject, without mentioning how greatly the operator could contribute to the patient's future comfort, would he but kindly instruct him to keep the stump *straightened* as much as possible, immediately after the amputation; so as to prevent contraction of the joints. I find that fully two-thirds of the number of patients placed under my care, have allowed their stumps to become *drawn upwards*, and although the use of the Artificial Limb

will generally restore the proper flexion in a short time, still, during that period, the patient feels disheartened, and in many instances (see Contraction Cases) the free use of the joint is never wholly recovered.

The Surgeon would also greatly benefit those of his patients whose means will admit of the purchase of an Artificial Limb, by cautioning them not to wear a common Pin-Leg previously to obtaining the better one. The use of the wooden pin, if only for a few weeks, causes them to raise the body at each step, in order to lift the Pin clear from the ground, and afterwards when they have the Artificial Limb, they continue the same awkward movement, instead of using the acting knee-joint;—a habit it often takes years to overcome. I know that this hint is not in accordance with the accredited opinions of the profession.* It is also against my own pecuniary interests, nevertheless I assert it as a fact, easily proved by observation, that none walk so well and gracefully on Artificial Limbs as those who have never used a Pin-Leg,

In conclusion, I beg to offer my grateful acknowledgments to the Medical Profession,—and especially to the Senior Surgeons of the London Hospitals, whose continued support and favor have contributed so greatly to the success which has attended my house during the last century.

* A patient (for whom I am now making a Limb), amputated by Messrs. GILL and O'DONNELL, at Liverpool, informs me that those gentlemen and other members of the profession, strongly recommended him to try the wooden leg first.

CASES.

IN forming the list of Cases, I have selected my patients from every sphere of life. Some are members of the Court circle and the Legislature,—some belong to the Commercial and Industrial Communities, and some are of the humbler Classes, who were supplied through private benevolence,* or public Institutions. All are wearing Artificial Limbs of my construction.

I have not published their letters *in extenso*, as the contents would have filled a large volume; neither have I (for obvious reasons) inserted their names *in full*, but I shall be happy to authenticate the description I have given of any Case, respecting which a newly-amputated patient, or the operator may desire further information.

* By her Majesty the Queen, Miss Burdett Coutts, and other Ladies.

AMPUTATIONS ABOVE THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c,

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
1. Miss F.	1843	disease	flap	very good	7 inches
2. Mrs. W.	1840	disease	circular	not good	8 inches
3. Miss T.	1840	disease	circular	very good	7 inches
4. Mr. S.	1820	accident	circular	very infirm	4 inches
5. Mr. W.	1843	accident	flap	good	8 inches
6. Mrs B.	1845	disease	flap	good	5 inches

CASE 1. *Amputated* by Mr. BRANSBY COOPER. Had Artificial Leg in 1850; has worn it every day since; has never experienced any inconvenience, and walks well.

2. Had Artificial Limb in 1847, and is still wearing it. Walks well.

3. This young lady was a patient of the late Mr. LISTON. Had an Artificial Limb first of another London house, but after repeated trials and continual alterations could not even wear it; commenced wearing mine in 1851; and has worn it every day till this time.

4. This gentleman (a Solicitor in the city) had his first Artificial Leg of my predecessor, Mr. WILLIAMSON, in 1821, which he wore for 36 years. During that period he had two others made, one on the Yorkshire and one on the Tendon principle, but never used either, except while his favorite one was under repair. He walked extremely well, considering his infirm health and shortness of stump.

5. Had his first Artificial Limb of me in 1847. Still wears it.

6. This lady has worn Artificial Limbs for some years. I have recently made her one upon my new patent system, and she states, April 14, 1857, "I am much pleased with the new principle,—in fact, have never walked so comfortably with any leg, as with the one you have now made me."

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
7. Mr. Y.	1850	accident	flap	fair	9 inches
8. Mrs. H.	1850	disease	circular	not good	7 inches
9. Mr. E.	1846	—	flap	good	8 inches
10. Miss F.	1837	accident	circular	good	4 inches
11. Mr. M.	1847	accident	flap	good	8 inches
12. Miss S.	1845	disease	circular	good	9 inches
13. Mr. C.	1848	accident	—	—	9 inches
14. Mr. S.		accident	circular	good	8 inches
15. Miss B.	1809	disease	circular	excellent	7 inches

7. Had Artificial Limb in 1851. Walks and rides well; stump excellent.

8. Amputated by Mr. LAWRENCE. Commenced wearing Artificial Limb in 1851, and has worn it every day since that time. The stump having wasted, a second thigh socket was required in 1856; this is the only alteration or repair that has been made to it. Walks very well.

9. This gentleman resides in Gibraltar and his leg was made from measurements sent to me. When I last heard from him he was getting on well.

10. This young lady was run over in Fleet Street, and amputated by Mr. LLOYD, of Bartholomew's Hospital. Being then a child she wore a common pin leg for some years till she had attained her full growth. Had my Artificial Limb in 1850, and is very expert in using it; walking, running and dancing with perfect ease. She has never suffered the least pain or uneasiness from its use, and writes thus, March 17, 1857. "I should be very sorry indeed to have to use my wooden leg again even for a day. I have seen many wearing Artificial Legs, but none who walk as well as I do."

11. This patient had the Artificial Limb in 1848. Walks well.

12. This young lady resides in Scotland, and the leg I made from measurements supplied, in 1848. She is still wearing it with perfect comfort.

13. This gentleman resides at the *Cape of Good Hope*. He wears Artificial Limb (fig. 8.) and is much pleased with it.

14. Had Artificial Limb (fig. 8.) in 1847. He is a gentleman well known in Wales, and uses it with great activity in hunting, shooting, &c.

15. This lady was amputated when quite a child, by the late Mr. BELL, of Edinburgh. Being in affluent circumstances, she had worn Artificial Limbs, made by several makers, before she applied to me. She much prefers the one constructed by me to any other she has ever used. She writes thus, March 4, 1857. "It gives me the greatest pleasure to hear of your distinguished success, and most heartily do I offer you my warmest congratulations. You have contributed by God's blessing so much to the comfort of my declining years, that I feel it a gratification to be able to oblige you."

AMPUTATIONS ABOVE THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
16. Count K.	—	war.	circular	—	4 inches
17. Mr. F.	1833	disease	flap	very good	5 inches
18. Mrs. W.	—	disease	circular	very good	8 inches
19. Mr. M.	1846	accident	flap	good	7 inches
20. Miss S.	1808	disease	circular	not good	8 inches
21. Miss F.	1846	disease	circular	very good	7 inches
22. Mr. P.	1847	accident	flap	good	8 inches

16. This Nobleman lost his limb in the Hungarian War; had several limbs made on the continent, but never could walk with any till he had mine in 1851. The stump is much mutilated.

17. Had his first Artificial Limb of my predecessor in 1834, and wore it every day till 1856, when he wrote thus,—June 30, 1856, “I have decided on having another leg with all your recent patent improvements. I should like you to make it, as this one I have, has been an old servant, being in wear upwards of twenty years.” He was amputated by Messrs. THURSFIELD and ROWLAND, in Shropshire. The stump has been perfectly healthy during the whole time and continues to bear the pressure with ease. He is now wearing my new action-limb, and is much pleased with it.

18. This lady also had her first leg at my house 18 years since. She wore it with great comfort during 16 years, and would still have continued to do so, but was anxious to try one of my *new construction*; and on my assuring her it would be lighter in weight and easier in action than her old one, she gave me an order in 1855 for it, and is now wearing it with perfect satisfaction.

19. Had Artificial Limb, on the old principle in 1848, and is still wearing it.

20. This lady resides in Sussex. She had her first leg of my predecessor, Mr. WILLIAMSON, 42 years since, and has worn it, except while under repairs, during the whole of that time. She writes thus,—March 16, 1857. “I have found the substitute of very great utility, and have walked remarkably well with it. We are now both grown aged and I have lost my muscular strength which is not to be wondered at being in my 70th year.” This lady I am about to supply with one on my new system.

21. Amputated by Mr. FREEMAN, Minster. Had Artificial Limb, 1856. She had used a common pin leg for 6 years; and consequently walks much more stiffly than those who have never used the wooden one. She lifts it straight off the ground instead of using the action of the knee joint. As soon as this habit is got over, she will walk well; she is now rapidly improving.

22. Had Artificial Limb in 1851 (new action). Walked exceedingly well at once—his loss being quite imperceptible.

AMPUTATIONS ABOVE THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
23. Mr. P.	1834	disease	flap	excellent	8 inches
24. Mr. H.	1848	accident	flap	good	9 inches
25. Miss L.	1842	disease	circular	not good	10 inches
26. Mrs. C.	—	disease	flap	good	7 inches
27. Mr. F.	1829	disease	circular	perfect	6 inches
28. Mr. A.	1848	—	flap	good	9 inches
29. Mr. N.	1842	disease	flap	excellent	8 inches

23. Had Artificial Limb in 1856; found some difficulty at first having so long used the pin leg, and being a very heavy man; but is now walking well.

24. Writes thus,—March 5, 1857. "I was lame for 12 years before amputation, but have enjoyed good health ever since. I still use the same Artificial Leg I had from Mr. GROSSMITH, 1848, and the stump bears the pressure with ease. I was amputated by MESSRS. CLEMENT and Mc KNIGHT, in Salop, in my own house, and was out of doors in 26 days after." This gentleman had my new action put to his Artificial Limb, in 1851, and thinks it of great value.

25. Had Artificial Limb in 1848, (old principle.) Walks very fair, and is still using the same limb.

26. Had Artificial Limb in 1848. Walked well in a few days.

27. This gentleman had had several Artificial Limbs previous to coming to me in 1848. He then had one from my house, made on our old patent system, which he wore till the present year, and was much pleased with it. I have now supplied him with one made on my improved principle; and he thus writes,—Jan. 27, 1857. "I have written to my brother, in the Temple, to pay you your account. I have worn the new leg, and already find walking much easier; the knee joint moves very freely; and when on the toes I feel the spring beneath me, which I find pleasant, if I can shake off the impression that my weight, on account of the mechanical pressure at that point, may break the ankle joint. If there is no reason for my fear, do not trouble to reply; the leg is certainly *much more* comfortable than any of my old ones. Yours very truly, &c"

28. Had Artificial Limb in 1851. Writes thus,—"Dec. 15, 1855. Please send me a foot-spring by return of post, for the ankle joint. This is the only one that has failed, the others are all everlasting, I mean your new compressible ones. I have had no trouble whatever with the limb, which has suited me admirably." This gentleman walks perfectly easy, and his loss is not noticeable, even in the ball room.

29. This man was amputated by Mr. NEWINGTON, surgeon, of Goudhurst, Kent; and the leg was presented to him by some ladies and gentlemen in that vicinity. It enabled him to walk and ride well, and to fulfil his original occupation as servant.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
30. Miss C.	1845	disease	flap	good	9 inches
31. Mr. S.	1852	accident	flap	good	7 inches
32. Major G	1855	war	flap	good	10 inches
33. Mr. G.	1840	disease	flap	good	6 inches
34. Dr. H.	1847	disease	circular	very good	9 inches
35. Mr. H.	1845	disease	circular	middling	4 inches
36. Mrs. C.	1855	disease	flap	good	10 inches

30. This young lady was amputated by Mr. IMAGE, Surgeon, of Bury St. Edmunds. Had her Artificial Limb in 1851. Her case is rendered difficult from her stump being liable to vary in size, occasionally making the Artificial Limb appear too long, and then too short; she is, however, much pleased with her substitute; and were it not for the above difficulty would walk exceedingly well. She has worn it constantly for 6 years.

31. Had Artificial Limb (new action) 1856. Walked quite easily in a week.

32. This gentleman lost his leg at the taking of *Sebastopol*. Had two Artificial Limbs made last summer, one by myself and one by another London maker, in order to ascertain which would best suit him. Both were completed about the same time, but he has never been able to walk comfortably on the substitute supplied by my competitor. He, therefore, only uses the one made by me, and much prefers the principle on which it is constructed.

33. Has worn Artificial Limb (fig. 8.) since 1847. He is most expert in its use; plays at cricket, rides, hunts, &c. He never experiences the least inconvenience from the pressure on the stump although so very short.

34. Had Artificial Limb (with new action) in 1853, when a student at St. George's Hospital. He had worn limbs made by other makers previously; but none afforded him the satisfaction either in durability or in the system of action that mine has given him. He writes thus,—“March 6, 1857. I have much pleasure in answering your queries and in adding my recommendation of your patent. I am much pleased to find you have been so successful at the Paris Exhibition.” This gentleman was amputated by Mr. TEALE, of Leeds.

35. Had his first Artificial Limb of me in 1845, which he used till 1854. I then made him one on my *new system* (from measurements retained in my books) and forwarded it to Australia. In acknowledging its receipt, he writes thus,—“Melbourne, Nov. 1854. Give my best thanks to Mr. GROSSMITH for the very able manner in which he executed my order; the workmanship and fit of the new leg are admirable; and I am much pleased with the patent action.”

36. Supplied with Leg (fig. 8.) 1856. Wears it with great comfort.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
37. Mr. S.	1852	disease	circular	good	8 inches
38. Mr. S.	1844	disease	flap	generally good	7 inches
39. Mr. T.	—	accident	—	good	8 inches
40. Mr. C.	1850	accident	flap	good	7 inches
41. Mrs. T.	1849	disease	circular	good	9 inches
42. Mr. W.	1851	gun shot	circular	better than before	8 inches
43. Mr. C.	1854	accident	flap	—	9 inches

37. A patient of Mr. TATUM, George Street, Hanover Square. He first used a pin leg for a few years; and only commenced with my Artificial Limb two months since having been deterred from getting one previously through a friend who had procured a limb from *W****** with which he could never walk. He was enabled to throw aside his wooden leg two days after my Artificial Limb was completed.

38. Amputated by Messrs. DAVENPORT, GODDART, and HARRISON, in the Potteries. He had the Artificial Limb in September, 1856; writes thus,—“ March 4, 1857. I have now worn the Artificial Leg six months. The pressure on the stump does not at all interfere with my ease and comfort in walking, whilst the peculiar construction of the socket keeps it perfectly cool and healthy.”

39. This gentleman resides at *Aix la Chapelle*; and the limb was made to measurements, sent to me in 1849. He had tried several makers in Germany but could not wear their productions.

40. This gentleman is well known in London and Edinburgh. He is a heavy man but walks with activity. He has contrived a peculiarly ingenious apparatus, and attached it to his Artificial Limb, by which the fastenings for the shoulder belts are made to revolve through the *thigh socket* as he sits down, preventing the sliding of the belts on the shoulders. Had his Artificial Limb in 1854.

41. Had her first limb of me (fig. 8.) in 1851. This she changed for the Artificial Limb, with new action, in 1853, with which she walks very well. She has never suffered the least pain from the pressure.

42. Amputated by Mr. ALLISON, of Retford. Commenced with my Knee Joint, Pin Leg (fig. 8.) in 1851. Had the new action Artificial Limb in 1855, and has worn it till now. His activity with it surprises all in the neighbourhood in which he resides. He rode and won a *steeple chase* a few months since, which was reported at the time in the *Doncaster* and other journals. He writes thus,—“ March 14, 1857. I both walk and ride well with the leg I got from Mr. GROSSMITH, which I have worn every day since I had it. I have never anything the matter with either the stump or the Artificial Limb.”

43. A resident in *Sofala*, New South Wales. The Artificial Limb was made from measurements and drawings sent to me in 1855, and was found to fit perfectly without the least alteration.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
44. Mr. B.	1850	accident	circular	—	7 inches
45. Miss F.	1850	disease	flap	not very good	7 inches
46. Mrs. —	1854	disease	circular	good	8 inches
47. Mr. A.	1839	disease	circular	good	9 inches
48. Mr. B.	1851	disease	flap	bad	1½ inches
49. Mr. —	1852	—	flap	—	8 inches
50. Mr. G.	1855	accident	flap	good	7 inches
51. Mr. A.	1854	—	flap	good	8 inches

44. This Artificial Limb was also made without seeing the patient, for Dr. WHEELER, Cape Town, Cape of Good Hope. No alterations were required.

45. Had Artificial Limb in 1852, and still wears it. Suffers much from neuralgic shooting in the stump; but walks pretty fair.

46. This poor woman was amputated in Addenbrook's Hospital, Cambridge, and was supplied with an Artificial Limb through the benevolence of some friends in that University, in 1855. She belongs to the gipsy tribe; and being a well-known character great interest was taken in her case, the existence of herself and children depending on her ability to walk the country. A letter from a clergyman (one of the subscribers) states that she was able to use the leg easily in a few days.

47. This gentleman was amputated when a child, by Dr. JAMIESON, of Peterhead. I supplied him with a common pin leg, in 1844, which he wore till he had attained his full growth in 1851. Being then abroad he had his first Artificial Limb, of a maker at Berlin. He thus writes,—“Feb. 9, 1857. I first tried an Artificial Leg made by GOLDSCHMIDT, of Berlin, which proved *useless*. I have worn Mr. GROSSMITH's leg since 1852; and it has given me every satisfaction; and required little repairing. My stump has remained perfectly healthy, and bears the pressure well.”

48. This patient, (a surveyor by profession) has scarcely any stump, being amputated close to the *perinæum*. He was for some time dissuaded by his medical attendants from having an Artificial Limb. They asserted he could not possibly use it, having little or no stump. He had the leg of me in 1852, and it enabled him to renew his professional duties.

49. Amputated by Mr. BELLYSE, Nantwich. Had leg (fig. 8.) in 1855; it answers well.

50. Amputated by Messrs. HODGKINSON and LACEY, Newark. Had Artificial Limb 4 months after the operation and has worn it every day since. Walks and rides well, and the stump remains perfectly sound, bearing the pressure with ease.

51. Had Artificial Limb in 1855; still wearing it; no repairs yet required.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
52. Mr. M.	1848	accident	flap	good	9 inches
53. Miss S.	1854	disease	flap	good	7 inches
54. Mr. C.	—	—	flap	good	6 inches
55. Mr. H.	1841	accident	flap	good	8 inches
56. Mr. B.	1849	—	circular	good	5 inches
57. Mr. C.	—	accident	flap	good	8 inches
58. Major—	1854	war	flap	good	2 inches
59. Miss L.	1847	disease	circular	good	7 inches

52. Had Artificial Limb in 1849. Walks well and is still wearing the same limb.

53. Amputated by Messrs. SPACKMAN and LIPSCOMB, at Harpenden. The patient had been confined to her bed for ten years, and the case was considered hopeless when it came under Dr. SPACKMAN's care. The sound leg from inaction had wasted and was long in recovering power, even now appears less efficient than the *artificial one* which I supplied in 1855; and which she has worn nearly two years, with comfort, the stump continuing healthy; and bearing the pressure perfectly well.

54. This gentleman, a well-known Manchester manufacturer, had worn Artificial Limbs some years previous to his having mine in 1853. The stump being very short, he experienced great benefit from the security afforded him by my new action; and expressed his high opinion of the mechanism and workmanship of my limb,

55. Had Artificial Limb in 1855. Writes thus,—“ March 14, 1857. I have now worn the leg 1 year and 5 months. The stump continues to bear the pressure with ease, and is quite healthy.” Amputated by Mr. CHOBUREY, Oxford.

56. Had Artificial Limb in 1855. Walks rather stiffly being so short a stump and having for years been accustomed to the pin leg.

57. Had Artificial Limb in 1855, and has worn it every day since. Walks well, being a good, sound stump.

58. This was one of the earliest amputations performed in the Crimea, and was a very difficult case for the limb maker, being only 2 inches, or scarcely so much, length of stump. I fitted the Artificial Limb in 1856. I have not seen the Major since, but believe he is getting on well. He has sent me several friends since I made his limb, who suffered a similar loss in the late war; and they have all been most satisfactory cases.

59. This lady resides at Hackney. Had the Artificial Limb of me in 1849; and although she uses it roughly, walking a great deal every day, it has never required any repairs worthy of notice. She is still wearing it, and walks remarkably well.

AMPUTATIONS ABOVE THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
60 Mr. B.	1845	accident	flap	—	8 inches
61. Mr. L	1851	accident.	circular	good	7 inches
62. Mrs. D.	1847	disease.	circular	good	8 inches
63. Mrs. M ^c K.	1852	disease	flap	not good	8 inches
64. Mr. T.	1850	accident	flap	good	7 inches
65. Miss H.	—	disease	flap	good	8 inches
66. Mr. J.	1852	accident	circular	very good	8 inches

60. This gentleman had worn a Pin Leg for some years previous to having the Artificial Limb in 1855. He writes thus: (a few days after receiving the leg, Sep. 1855.) "I received the Leg all right, and I find it far easier to walk with than I expected.

It seems a little too short, but that is perhaps owing to my being used to the Pin Leg. I was enabled to walk a considerable distance after two hours' practice. The socket fits uncommonly well; and the action of the knee, on sitting, rising, &c., is quite a wonder. I shall be happy to show the Leg to any of your Scotch patients in Edinburgh; and hope to have the pleasure of a call from you when you visit our Metropolis." The amputation was performed by Messrs. R. and J. MEIKLE and DICKSON, at Douglas.

61. Had Artificial Limb in 1855 (new action). He is an Engineer on board of one of our large commercial steamers. He is able to fulfil all his duties as well as if he had not suffered loss of limb. Walks excellently.

62. This patient had the Artificial Limb in 1849, (old action), with which she is still performing the various duties of domestic life, as actively as those who have not suffered amputation. well after a few weeks' practice. She has been married since she had the Artificial Limb—a convincing proof of its efficacy.

63. This lady was far advanced in years when amputated. She had Limb (fig. 8,) in 1853, and walked very well.

64. A young man employed on the Great Northern Railway; lost his limb by an accident on the line, and the Company supplied him with the Artificial Limb in 1853, to enable him to continue his duties. He has worn it every day to the present time.

65. Had the Artificial Limb in 1853; walked exceedingly well, and has become a wife. The stump has considerably altered in form and size since the leg was made; and I am now about to put a new socket.

66. This gentleman is well known in the City of Hereford. He lost his leg through the running away of his horse. He was twice amputated, (first below, and then above the knee,) by Mr. CAM. Had Artificial Limb in 1853. Writes thus: "March 18, 1857. In respect to your capital Leg you can use my name as you like. I do not know what I should do without it. I have worn it four years—the stump bearing the pressure very easily, and remaining quite sound. I use it to the *bare wood*, without any stuffing—which is much best. Yours very truly, &c."

AMPUTATIONS ABOVE THE KNEE,

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c,

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
67. Mr. L.	1838	disease	flap	very good.	8 inches
68. Mr. R.	1853	accident	circular	good.	7 inches
69. Mr. C.	1852	disease	flap	excellent.	8 inches
70. Mrs. —	1849	disease	flap	improved.	7 inches
71. Rev. Mr. F.	1847	disease	circular	good.	8 inches
72. Mrs. C.	—	disease	flap	good.	8 inches
73. Mr. B.	—	accident	circular	good.	9 inches
74. Mr. R.	1849	accident	flap	good.	8 inches
75. Mr. H.	1842	disease	circular	not very good	8 inches
76. Mr. W.	1855	—	flap	good.	7 inches

67. This gentleman had worn Artificial Limbs for eleven years previous to having mine in 1856. He was much pleased with my new action, and writes thus: "March 19, 1857. In answer to your inquiries, the Leg is quite easy, and I shall ever feel grateful to you."

68. Had Artificial Limb in 1853, and has worn it every day till a few months since, without repairs of any kind. It was then cleaned, and is now again in constant hard use—the patient being in the employ of the Peninsular and Oriental Company.

69. Amputated by Messrs. THOMPSON, HUNTER, and REED, Belfast. Had Artificial Limb in 1853; walks very well, and writes, "March 23, 1857. The stump bears it well, and continues most healthy."

70. This lady was very delicate in health, and after being amputated by the late Mr. ASTON KEY, suffered so severely from neuralgic pains in the stump, I had scarcely any hope of her being able to walk on the Artificial Limb. I made the Leg in 1849 (old action), and she is still wearing it, finding great comfort from it, and improving in her health.

71. Had Artificial Limb (fig. 8) in 1849. Walks well.

72. Had Artificial Limb in 1855, and after using it some time the stump wasted, and a new thigh-socket was necessary. She now walks well. She previously tried a common Pin Leg, but could not walk with it. Amputated at Oxford.

73. This gentleman had walked with a Pin Leg some years previous to having my Artificial Limb in 1850. He is very heavy, but continues his business as a Timber Merchant, using the limb very roughly. He has worn it constantly to the present time.

74. Had Artificial Limb in 1850. Walks exceedingly well, and is still using the same limb he first had of me.

75. Had Artificial Limb in 1850. Is still wearing it.

76. This gentleman was recommended to me by a lady whom I had supplied with an Artificial Hand. He had never used an Artificial Limb of any kind previous to having mine in 1856. The stump being very short, and slightly contracted, I considered it a case in which the tendon-action could be beneficially applied, in connexion with my own system. The leg answered admirably and he was able to walk well with it at once.

AMPUTATIONS ABOVE THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
77. Mr. H.	—	—	flap	good	8 inches
78. Mrs. R.	—	disease	flap	not very good	8 inches
79. Miss —	1843	accident	flap	good till lately	7 inches
80. Mrs. S,	1852	disease	circular	not good	8 inches
81. Miss B.	—	disease	—	not very good	8 inches
82. Miss A.	1839	disease	circular	good	9 inches
83. Mr. H.	—	disease	circular	good	7 inches
84. Mr. C.	—	accident	flap	good	7 inches

77. Had Artificial Limb, in 1850. Had worn several limbs previously, but had not found them durable. Has worn mine seven years.

78 This lady had a leg made in the city in which she resides, but it being very badly fitted to the stump, she was unable to wear it, and continued to use her Crutches. Her attention being called to the specimens exhibited by me in the IRISH EXHIBITION, she procured one of me in 1853, and has succeeded with it well.

79. This lady was amputated by Messrs. White and Wright, of Nottingham, and had worn artificial limbs for eight years previous to having mine in 1853. She is still wearing the one I supplied four years since, and no repairs have been wanted.

80. Amputated by Dr. TAPP, of Dorchester. Had an Artificial Limb made in the country, which proved quite useless; and the various annoyances she suffered for weeks, through the unskilful endeavours of the Artist to make it answer, brought on a serious fit of illness. She therefore put it aside, and continued her Crutches. She came to my house in 1853, and has now worn my Limb with perfect comfort for four years.

81. Had the Artificial Limb in 1855, with the new action. The young lady being of very delicate health, her friends were doubtful of her having strength sufficient to use it, I received the warmest expressions of delight and gratitude from them, on the success which attended my efforts in the case. She has worn it constantly since then, and I am informed has now outgrown it.

82. Amputated when a child, by Mr. VICARY, of Warminster. Had a common Pin Leg of me in 1844, which she wore till 1856, When she had Limb fig. 8., the stump bears the pressure quite easily, and has never been at all painful

83. Had Artificial Limb of me in 1856. Had previously worn one made by a London House, which after a few months wear was quite destroyed. The stump being wasted nearly to the bone, and scrofulous, required to be fitted with great care. He has now worn my limbs with perfect comfort for eight months.

84. Had Artificial Limb in 1856. This gentleman was fully competent to judge of the merits of my new system, having had limbs from several makers previous to coming to me. He expresses his high approval of them in every point, construction, action, weight, fit, &c.

AMPUTATIONS ABOVE THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP,
85. Rev. Mr D.	1851	—	flap	good	8 inches
86. Mrs. S.	1849	disease	flap	good	9 inches
87. Mr. W.	1842	accident	circular	good	8 inches
88. Mr. B.	—	—	circular	good	10 inches
89. Mrs. B.	1853	disease	circular	good	8 inches
90. Mr. N.	1856	accident	flap	good	9 inches
91. Mr. K.	1843	accident	circular	pretty good	4 inches
92. Mr. H.	1846	war	circular	good	8 inches

85. Had Artificial Limbs (fig 1. and 8) in 1854. Writes thus: "January 22nd, 1855. I am happy to say both the legs are very good, and reflect credit on your skill and workmanship, adding another instance to the boon, which I doubt not you have conferred upon so many."

86. Had Artificial Limb in 1850. (old action.) Is still wearing it.

87. Wore a common pin leg, some years previous to having the Artificial Limb of me in 1854. Walks well, but not with the same freedom as those who have never used the common wooden leg. He is actively engaged in business not far from my own house.

88. This patient was born without the lower portion of the left leg, and is able to bear pressure on the end of the stump, an advantage of which I took occasion to avail myself in constructing the limb. When a boy, the stump was about the length of the thigh of the well leg, but as it did not grow equally in proportion with the other, it is now only the length of an ordinary amputated stump, which admits of the action of the Knee-joint being placed in its proper position; and the patient walks so well, his loss cannot be detected by the slightest limp or stiffness.

89. This lady being advanced in years, was some little time acquiring confidence in using the Artificial Limb which I supplied her with in 1854. She is now able to use it well, and would not on any account be a day without it.

90. Lost his leg by an accident while in the employ of the North Western Railway Company. Had Artificial Limb in 1856. Walked well with it in a few days.

91. This gentleman has scarcely any stump, and it was as difficult a case to fit as could well be imagined. I feel confident that he could not have worn a limb made on any other principle than my own. He writes thus: "March 9th, 1857. I have great pleasure in filling up the form, and in stating that I get on very comfortably with my leg, much better than I could have expected considering the smallness and shortness of my stump. I am Dear Sir, &c." He has worn the limb constantly since 1853.

92. Amputated on the field at Aliwal, by Dr. CURRIE, of the 16th Regiment. Has worn a pin leg till the present year. I have now supplied him with an Artificial Limb, with which he walks excellently.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
93. Capt. B.	—	—	circular	good	7 inches
94. Capt. S.	1855	war	flap	good	9 inches
95. Mr. A.	1852	—	flap	good	8 inches
96. Mrs. S.	1852	accident	flap	good	6 inches
97. Miss D.	—	disease	circular	not good	8 inches
98. Mr. S.	1853	accident	circular	good	7 inches
99. Miss H.	1852	—	flap	good	7 inches
100. Mr. R.	1850	disease	flap	good	1½ inches

93. This gentleman resides in the South of France. He has worn Artificial Limbs for many years. I have recently made him one from measurement papers only, and forwarded it to him. He writes thus: "I received the leg, and it fits me so well I could not in that respect perceive any difference between it and my old one. December 13th, 1856."

94. Amputated on the field in the Crimea. Had Artificial Limb in 1856, and walks well. Had procured one previously of another Maker, but it did not fit comfortably and he could not wear it.

95. Amputated by Mr. EVANS, Belper. The stump bears the pressure well, and continues perfectly healthy. Has worn the Artificial Limb three years and a half.

96. This lady was amputated by Mr. HESTER, Surgeon to the Radcliffe Infirmary, Oxford, by whom, and other members of the Medical Profession she was strongly persuaded not to have an Artificial Limb; as they assured her, from her being heavy in person, and having so short a stump, she could not walk with it. She determined, however, to give it a trial, and has succeeded well. She has worn the limb since 1854, and has expressed her thanks and gratitude to me for the relief I have afforded her.

97. Had limb, (fig. 8) in 1855. Walks perfectly easy.

98. This was rather a difficult case,—the stump being short, and of a perfectly conical form. I succeeded, however, by making the thigh socket of peculiar shape—in getting a comfortable bearing on the *ischium*, and he walked well, although not so freely as those whose stumps are of the usual form. Had Artificial Limb (which he is now wearing) in 1854.

99. Had Artificial Limb in 1854. Walks well, and the leg has required nothing to be repaired up to the present time. Had worn a Pin Leg previously, and was most delighted to get rid of it.

100. This was an extremely difficult case—being amputated (by Dr. HOBART, of Cork,) almost close to the perenæum or fork—leaving scarcely any stump to which the limb could be fitted. This gentleman is actively employed in one of our largest Engineering Firms, and pursues his avocations with an agility and punctuality that would put many of us, who have two sound limbs, to the blush. He writes thus: "March 4, 1857. I have never suffered any illness or pain since the wound healed—three months after the operation. The leg does not press the stump,—in fact, *there is no stump*. I sit, as it were, on the leg, which is held to the body solely by means of the straps. If I walk much more than usual, the skin chafes and becomes a little sore, but heals up in the course of a day or two,—that is the only inconvenience I am ever put to. I have worn the legs you made me four years, and am perfectly satisfied with them. Yours truly, &c."

AMPUTATIONS BELOW THE KNEE

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
101. Mr. T.	1840	accident	flap	good	5 inches
102. Mrs. T.	—	birth.	—	good	2 inches
103. Mr. W.	1849	accident	flap	good	6 inches
104. Mr. H.	1849	accident	flap	very good	7 inches
105. Mrs. P.	1848	disease	circular	ill health	6 inches
106. Rev Mr B.	1847	—	—	good	7 inches

101. Supplied with Artificial Limb, (fig. 5.) in 1848, and is still wearing it. This gentleman is a Surveyor, and has consequently a great deal of rough usage for the limb, ascending ladders, scaffolding, &c. He takes his bearing partly above and partly below the knee.

102. In this case the patient was born without the lower portion of her limb, having a short stump, two inches below the knee articulation, on the end of which she is able to bear considerable pressure. I fitted her with the leg, (fig. 5,) having a cushion for the point of stump attached, and it suited her case admirably. She has worn it since 1849.

103. This amputation was well performed by Messrs. TUNALEY and NICHOLS, of Wymondham and Norwich. I supplied the half leg, (fig. 10,) in 1849. The pressure is taken round the stump immediately below the knee, and the patient walks well. He writes: "March 10, 1857. I have worn the Artificial Limb nearly seven years and three quarters, and the stump bears the pressure with ease and continues healthy."

104. Amputated by Messrs COOKSEY and BEADLES, of Worcester, through being thrown from a Horse. Had the Half-leg, (fig. 10,) in 1849, and his business compels him to be almost constantly upon it. He writes: "March 11, 1857. I have worn the leg about seven years. The stump continues healthy, but gets painful sometimes after I have had the leg on ten or twelve hours." This patient should have limb, fig 5.

105. This lady also had the half-leg, (fig. 10.) in 1849. Her stump was exceedingly bare—the bone almost projecting; but she would not have the limb, (fig. 5,) which in her case was necessary to relieve the stump from pressure, and she does not, consequently walk so well as the two previous patients.

106. Had limb, fig. 10, in 1849. Walks well, and although not a very firm stump, the application of the limb was quite successful.

AMPUTATIONS BELOW THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
107. Mr. B.	1849	accident	flap	excellent	8 inches
108. Mrs. H.	—	disease	circular	not good	6 inches
109. Mrs. C.	—	disease	flap	not good	9 inches
110. Mr. M.	1840	accident	circular	good	5 inches contracted
111. Mr. B.	1846	war	circular	good	8 inches
112. Mr. F.	1850	disease	flap	not good	6 inches

107. This young gentleman was amputated at Portsea. He was fitted by me with limb, (fig. 10,) in 1850, and immediately walked so well that his loss could not be perceived, and was scarcely felt by himself. The limb has required lengthening, in accordance with his growth, which he has now fully attained.

108. This lady resides at Brighton. Was amputated some years since, and through using a Pin-leg the stump became contracted. Had limb, (fig. 9,) in 1850, on the old principle, with locking-joint at knee, and is still wearing it. Walks perfectly easy.

109. A patient of very delicate health, and suffering constantly from neuralgic pains in the stump. She had tried Artificial Limbs from another London House, (on the Tendon principle), previous to applying to me, but the maker had not been successful in adjusting the pressure, or in fitting the stump, added to which they had been so lightly constructed that one of them broke to pieces on her endeavouring to take a few steps on the Margate Sands. I fitted her with one of my improved construction, in 1851, and it has given her every comfort possible in her case. She has worn it daily to the present time, and expresses her gratitude for the assistance I rendered her. I do not take so much credit to myself as the lady and her friends are inclined to award me. By observing the failures of the maker who had preceded me, my task was made easy and success more readily attained.

110. This gentleman, a manufacturer in the North of France, had worn Artificial Limbs made by Parisian and other makers, for some years previous to having one from me, in 1850. He greatly approves of the principle on which mine are constructed. He wears the limb, fig. 9.

111. Amputated on the field, during the War in the Punjuab. I had some difficulty in this case—the bone being scarcely covered at the end of the stump, and projecting. I supplied him with limb fig. 10, and by making grooves in the socket, succeeded in getting a comfortable bearing.

112. Amputated by Mr. COULSON. The stump being larger at the point than at the knee, rendered it necessary in this case to take the principal bearing on the thigh. I therefore supplied limb, fig. 5, and the patient was enabled to resume his official duties at the Custom House.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
113. Mr. G.	1849	accident	circular	good	4 inches
114. Mrs. W.	1839	accident	flap	pretty good	5 inches
115. Mr. M ^c C.	1850	disease	circular	good	3 inches
116. Mr. P.	1850	disease	circular	—	10 inches
117. Mrs. W.	—	birth	—	good	—
118. Mr. K.	1849	—	flap	—	4 inches
119. Mr. R.	1850	disease	circular	not good	6 inches
120. Mr. C.	—	accident	flap	good	5 inches
121. Miss J.	1840	—	—	good	9 inches

113. A workman on the Great Northern Railway. Supplied with limb, fig. 5, in 1850, by the benevolence of a lady, whose unbounded charity is well known, and felt throughout the British nation, and to whose generous kindness I am still indebted for continued patronage.

114. A lady now residing in St. John's-Wood. Was amputated through diseased ankle, produced by a sprain, in dancing. Had worn Artificial Limbs made at Manchester, previous to having my limb, fig. 10, in 1850, but none of them proved so durable as the one I supplied, and which she is still wearing. Walks extremely well. Her loss is quite imperceptible.

115. Had limb, fig. 5, (old action), in 1851. Having scarcely any stump below the knee, but little weight could be taken under the patella, but the patient walks well.

116. A long stump, but very much wasted, requiring great care in fitting. Had limb, fig. 10, in 1851, and when I last saw him two years since, was walking well and comfortable.

117. This lady was born with the ankle articulation almost immediately under the knee. I supplied her with foot, fig. 12, in 1851, with which she has since walked well. She had previously worn a "Wooden pin" attached to her boot.

118. A gentleman in Wales. I have not seen him since I fitted him with limb, fig. 5, in 1851, but have had several other patients from the same locality, who were induced to visit me from seeing Mr. K's easy locomotion with the artificial leg.

119. The stump in this case is little more than the bone, and extremely tender, so that the slightest pressure chafes. I supplied the Half Leg, fig. 10, in 1851, but finding the stump would not sustain the whole weight, I tried limb, fig. 5, and with this the patient gets on well. He has worn it six years.

120. An excellent well covered stump. The Half-Leg, fig. 10, was quite sufficient in this case.

121. This lady had limb, fig. 10, of my predecessor, Mr. SLEATH, many years since. She has a good length of stump, and walks well. I have had the limb sent me to clean and repair twice only during the last fifteen years.

AMPUTATIONS BELOW THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
122. Mr. R.	1840	accident	flap	good	8 inches
123. Mr. D.	1848	gun shot	circular	very good	3 inches
124. Mrs. P.	1850	accident	flap	good	6 inches
125. Mrs. L.	1829	disease	circular	very good	7 inches
126. Mrs. B.	1852	accident	circular	much improved	6 inches

122. This Gentleman was amputated by Mr. LYFORD, Winchester. He writes thus: "May 13, 1857. I have experienced more comfort since I have had the Leg you made me, than I have been accustomed to for years. There are hundreds of unfortunates who have no idea of the comfort your new patent-action affords."

123. Amputated by Messrs. ROBBS, of Grantham, and BARBER, Colsterworth. I fitted this gentleman with the Artificial Limb, fig. 5, in 1852, made on the old system of action. This leg he wore till 1855, when, from the favourable account I gave him of my new system, he determined on having a second limb, and he has found it fully to realize all the advantages I had described. He writes thus: "March 8, 1857. I have great pleasure in filling up the form you sent me, and shall be glad to answer any question respecting my Artificial Leg at any time. I can, to the surprise of myself and all who know me manage so well. I have worn your Artificial Legs five years. The stump has been in every way easy and generally healthy."

124. Had Artificial Limb, fig. 10. Ordered through Messrs. GREIG'S Cornhill, for a lady in Australia, whom I had supplied with a common Pin-Leg before leaving England. It fitted well, and she is much pleased with it.

125. This lady had worn Artificial Limbs of the description of fig. 10, for nearly twenty years before coming to me. They were made by Yorkshire and London Houses. The stump having become much wasted I supplied her with limb, fig. 5, in 1852, with the view to relieve the stump, and take a portion of the weight on the thigh. She has been pleased to pass the highest encomiums on my efforts, and her approval is the more valuable from the fact of her long experience in wearing Artificial Limbs, having made her fully competent to judge of the merits or demerits of their construction.

126 Amputated by Messrs. TATUM and CUTLER. Had Artificial Limb in 1852. The stump being an exceedingly good one I considered the Half-Leg, fig. 10, would answer every purpose in this case, and it has proved so to do. She writes: "March 18, 1857. I have worn the foot every day for five years, the stump being all the time quite healthy, and bearing the pressure well." The patient has given it a great deal of hard wear, but it still remains quite sound.

AMPUTATIONS BELOW THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
127. Mr. C.	—	accident	flap	good	4 inches
128. Miss T.	—	birth	—	good	—
129. Mr. H.	1852	disease	flap	good	7 inches
130. Mr. D.	1852	—	Symes'	good	anklejoint
131. Mr. W.	1849	—	circular	good	4 inches
132. Mr. S.	1853	accident	flap	good	6 inches

127. A Canadian Merchant. I fitted him with limb, fig. 10, in 1852, with which he was much pleased, and walked well. I have since made him a second limb and forwarded it to Canada. He has sent me many patients from that country for Arms, Hands and Legs, since his return.

128. This is not a case of Amputation, but of shortened limb. I supplied the foot, fig. 12, in 1853, (with my new Ankle-joint action) and her defect is quite imperceptible. She is an accomplished lady, of high literary attainments, and I am happy to say has since become a wife.

129. An excellent firm stump. The Half-Leg, fig. 10, answers well.

130. This was a case of Symes' operation, excellently performed by Mr. FIELD. I supplied limb, fig. 11, in 1853. It was some time before the patient could bear pressure on the end of the stump and I found it necessary for him at first to take the entire bearing under the knee. After a few months' wear, however, and the gradual application of pressure, by cushions, to the end of the stump, the tenderness was got over. He now walks firmly, taking his principal weight on the point, and using the knee-bearing only at times when relief is required. The case must be considered a decidedly *successful one* in favor of Symes' operation. He states, that the loss of his foot is hardly felt or thought of, by him, and certainly when I last saw him his step was as firm, and gait as natural with the Artificial, as with his perfect foot.

131. Supplied with limb, fig. 5, (new foot action) in 1853, and walks exceedingly well; pursues an active business in one of our fashionable watering places, without any apparent inconvenience.

132. Amputated after a Railway accident, by Messrs. WARD, ISAACSON and FOSTER, Huntingdon. A very good stump. The patient also lost one of his Arms at the same time. I supplied him with the Half-Leg, fig. 10, four months after the amputation. He gets on very fairly considering he has only the use of one hand to properly adjust it. He writes thus: "March 3, 1857. I have filled the form up, to the best of my knowledge, with pleasure. You will have to make the leg for my young friend Miss ***** directly the Surgeon gives his opinion that the stump is fit to have one. I have seen Mr. G ***** of our town, many times, and he walks well with the limb you made him. I have heard several complain, who have had limbs of ——— at N——— and I know a man who had one made at L——— but he cannot use it with any comfort."

AMPUTATIONS BELOW THE KNEE,

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c,

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
133. Mr. T.	1853	accident	flap	excellent	4 inches
134. Mrs. —	1854	disease	circular	not very good	5 inches
135. Mr. N.	1853	accident	flap	very good	4 inches
136. Miss A.	1843	disease	flap	ill health	4 inches
137. Miss S.	1835	disease	flap	very good.	contractd.
138. Miss —	1853	disease	circular	—	contractd.
139. Miss B.	1845	disease	flap	good.	contractd.
140. Mr. B.	1856	disease	flap	not good.	5 inches

133 A famous flap operation, but left rather too wide at the point, spoiling the appearance of the Artificial Limb, fig. 5, which I supplied him with in 1854. He is a heavy man, and the stump, from his great weight is inclined to chafe. He has, however, worn the leg every day since he had it, and is highly pleased with it.

134. A Cornish lady. had limb, fig. 5, in 1854. Her skin was extremely sensitive, and she required the greatest care to be taken in fitting and adjusting the thigh and stump bearings.

135. A well-performed flap operation. Amputated by Messrs. WHIPPLE, SQUARE and FOX, Plymouth. Had Artificial Limb, fig. 5, (old action) in 1854. Walked very well in a few days. Writes: "March 18, 1857. I have worn the leg since September 1854. The stump bears the pressure very well, and continues quite healthy."

136. Amputated by Mr. PAGE, of Newmarket. The stump has never been sound, and this patient is obliged to have two legs, (fig. 5 and 9,) so as to change the bearing occasionally. By these means, she is enabled to proceed comfortably, and is actively employed in business.

137. Amputated by Messrs. GORE and COLLETT, Worthing. The stump, from wearing a common Pin-Leg had become contracted, and could not be straightened; I therefore supplied limb, fig. 9, with my new-action to the joint, and it answers well. She has worn it daily since 1854, requiring no repairs, and only once cleaning. The patient walks perfectly easy, and as rapidly as those who have no artificial substitutes.

138. A similar case to the last, the stump being firmly contracted. The patient a poor girl, was supplied with limb, fig. 9, through the benevolence of the Rev. Mr. P ***** Rector of the village, in Oxfordshire, where she resides. He wrote to me shortly after, to inform me how well she progressed with it.

139. Supplied with limb, fig. 9, in 1854, having the acting-joint on my new system. Walks perfectly safe, and with much more freedom than those who have the old locking-joint, and walk with the knee stiff. The stump continues quite sound, and free from excoriations.

140. The stump in this case, is slightly contracted, but by adapting the lower socket to the inclination of the stump, and taking the principal bearing on the thigh, the patient is able to use the limb, fig. 5, which was supplied in January last

AMPUTATIONS BELOW THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
141. Mr. C.	1850	accident	flap	good	7 inches
142. Mr. B.	—	disease	flap	good	5 inches
143. Mr. L.	—	accident	circular	good	contractd.
144. Miss E.	1847	cancer	circular	excellent	contractd.
145. Mr. W.	1853	accident	Symes'	good	anklejoint
146. Mr. P.	1840	gun-shot	circular	middling	9 inches

141. An excellent flap operation, performed by Mr. WHIPPLE, Plymouth. The Half-Limb, fig. 10, was sufficient to enable him to walk well. Supplied in 1853.

142. This patient had worn a common Pin-Leg some years previous to having my Artificial Limb, fig. 5, in 1854. Writes thus: "Edinburgh, April 29, 1857. The leg I obtained from you about two years ago I am still walking with every day, and it is giving great satisfaction. Nothing has gone wrong with any of the springs or joints except one foot spring. I am using the extra one you gave me, so will thank you to send me another by post, and I will send the amount by return, as I do not like to be without one in reserve. The breakage of the last one was owing to my walking down a rather steep and coarse country road. Our Scottish hills are none of the best for Artificial Legs."

143. This gentleman holds a very high official position in Africa. The cause of his loss was singular: He was wrecked on one of his voyages, but with great presence of mind succeeded in getting on the back of a Cow, which had been thrown from the vessel. After being for a considerable time buffeted by the waves he was borne safely to land by the animal. The effects of the cold, and subsequent consequences however, necessitated the Amputation of one leg, five inches below the knee, and the stump became rigidly contracted. I supplied the Artificial Limb, fig. 9, in 1853, which he is still wearing, and he is much pleased with it.

144. This young lady was a patient of Mr. ANDREWS. She is amputated about five inches below the knee, but the stump became contracted principally through using a common Pin-Leg, which was incautiously recommended to her to wear till her full growth was obtained. She had my limb, fig. 9, in 1853, and has never experienced the least excoriation in the stump, or any inconvenience of any kind from the use of the Artificial Limb.

145. Another case of Symes' Ankle-joint Amputation. The patient was unable to bear much pressure on the end of the stump for some time after having the limb, and I found it necessary to take the chief bearing under the Patella. I supplied the limb, fig. 11, in 1854, and I have recently been informed he is progressing well.

146. This gentleman had worn Artificial Limbs on the tendon principle, some years before having mine in 1853. He prefers my action, and continues to wear the limb I supplied him with.

AMPUTATIONS BELOW THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
147. Mr. H.	1829	accident	flap	good	4 inches
148. Mr. S.	1848	disease	circular	good	3 inches
149. Mr. E.	1851	accident	circular	bad	7 inches
150. Mrs. C.	1851	disease	flap	very good	contractd.
151. Mrs. S.	1853	accident	Symes'	good	anklejoint
152. Mr. M.	1852	—	Chopart's	good	foot
153. Miss W.	—	disease	Symes'	—	anklejoint
154. Mr. B.	1849	accident	—	—	5 inches
155. Mrs. W.	1855	accident	knee-joint	good	12 inches

147. This was a famous flap operation, performed by Mr. DANIEL, of Dublin. The patient writes thus: "March 11, 1857. I have never felt any annoyance since the amputation. The stump bears the pressure well, and I have the greatest satisfaction in the leg you made me, which I have worn since 1851." The stump in this case is contracted, and the limb supplied was fig. 9.

148. Had limb, fig. 9, in 1853, and is still wearing it. The stump is contracted, but as I made the limb with my new acting joint, he has no stiffness in walking, he uses the knee motion freely at each step.

149. An Engineer in the employ of the Peninsular and Oriental Company. A most difficult case, the stump and thigh being wasted almost to the bone. He has worn the limb, (fig. 5,) three years, and walks very fairly.

150. This lady was amputated by Mr. FIELD, and the stump (from using the common pin) became contracted. She, however, walks extremely well on the limb, fig. 9, with my new-action, which she has now worn for years.

151. Another case of Symes' operation. The patient had limb, fig. 11, in 1854, and although a very stout person succeeds admirably with it,—walking with great firmness, but taking almost the whole of the bearing under the knee, not being yet able to sustain much pressure on the point of the stump.

152. Supplied with Artificial portion of foot, (fig. 11,) in 1854, and walked well at once.

153. This patient was supplied with limb, fig. 11, in 1854, and was able to bear some pressure on the end of the stump, soon after the amputation, but I thought it best, to take a portion of the weight under the patella.

154. The limb, fig. 5, was sent out to this gentleman, who resides in Nova Scotia, through the recommendation of one of my patrons, who came over to me last year.

155. This was an operation at the knee, performed by Mr. BIKKERT, at Guy's Hospital. The stump was so unusually long, and covered with such an excellent flap, it was necessary to use the hollow Ball joint, which I have described in a previous part of the pamphlet, in order to get the action of the knee placed in its proper position. She walks well.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP,
156 Mrs. K.	1853	disease	flap	good	7 inches
157. Dr. T.	—	birth	—	good	—
158. Mr. W.	1855	accident	circular	not strong	4 inches
159. Mr. E.	—	accident	flap	good	5 inches
160. Mr. C.	1855	accident	Chopart's	good	foot
161. Mr. R.	1845	accident	flap	very good	contractd.
162. Mr. M.	1855	accident	flap	good	contractd.
163. Mr. J.	1855	accident	flap	good	4 inches

156. A very badly-performed operation, the bone being left almost protruding. I made the limb, fig. 10, for this case in 1854, and by forming a groove in the front of the socket, succeeded in clearing the bone, and the lady is proceeding well with it.

157. Another case of shortened limb, and deformity from birth. Supplied with foot, fig. 12, in 1856, which (as in all the previous cases of this class) answers admirably.

158. Amputated by Messrs. CARVER and TINDALE, of Ashwell. This was a case requiring great care—the stump and thigh being much wasted, and extremely tender. The patient commenced wearing the Artificial Limb, fig. 5, in 1855, and has used it daily to the present time.

159. A good flap operation, performed some years since, by Mr. TATUM. The patient had worn the common wooden leg for a long period previous to having the Artificial Limb, fig. 5, in 1856, but the Knee-joint in this case had remained with free action and he wears the new limb well.

160. This gentleman was amputated at the foot, through a Railway accident, and I supplied the apparatus, fig. 11, in 1856. He bears firmly on the heel, and walks exceedingly well. His loss is quite imperceptible.

161. The patient is a working Engineer, in the employ of one of the Railway Companies. He was amputated (after a Railway accident) by M. FLOBERE, at Rouen in France. I supplied him with limb, fig. 9, in February 1856. I did not strongly recommend my acting-joint in this case, as he has a great deal of laborious employment, and rough usage, occasionally lifting heavy pieces of machinery. He was, however, so confident that he could use the "Patent action" that I made the limb on my new system. He has succeeded with it perfectly to his wishes, using the action freely as he walks, and keeping constantly at his work, daily with it till the present time.

162. The patient was amputated after an accident while Hunting. I supplied the limb, fig. 9, (with locking-joint and some modifications to make it more suitable for Riding,) in 1856. He walks well, and the stump is perfectly sound.

163. This gentleman also lost his limb from an accident while Riding. He has a good firm stump and wears the limb, fig. 5, which I supplied him with in 1856, with great ease, walking, riding, &c. He is a patient of Mr. WELLS, Stafford.

AMPUTATIONS BELOW THE KNEE.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERATN.	HEALTH SINCE.	STUMP.
164. Mr. J.	1855	accident	flap	good	contractd.
165. Mr. L.	1855	accident	flap	very good	4 inches
166. Miss N.	1850	disease	circular	good	10 inches
167. Miss H.	1855	disease	flap	improved	6 inches
168. Miss C.	—	birth	deformity	good	—
169. Mr. G.	—	birth	—	good	—
170. Mr. P.	1852	accident	flap	good	4 inches

164. A workman in the employ of the Great Western Railway. The limb was presented to him to enable him to pursue his occupations. Limb, fig. 9, with locking-joint.

165. Amputated by Messrs. FARMER and COLLIER, at Towcester. The stump and thigh are both wasted, and although the stump continues healthy, the patient does not get on so well as those who have a more fleshy stump—feeling a little discomfort after wearing the limb any considerable time. He has worn the limb, fig. 5, during the last eight months.

166. In this case the amputation was performed close to the Ankle, and the stump is extremely sensitive and liable to excoriation. I supplied the limb, fig. 5, last year, and the lady, who resides at Bath, has since informed me of her successful progress with it, stating that her only difficulty consists in ascending the steep hills which abound in the suburbs of that city. This lady is a patient of Mr. NEWTON.

167. Amputated by Mr. FEARN, of Derby. A famous flap operation, and the stump being sound, I considered the Half-Leg, fig. 10, would be sufficient in this case. She writes thus: "March 4, 1857. I have worn the foot almost five months; my health is much improved, and I can bear the pressure of the leg eight or nine hours with ease."

168. This is another case where the articulation of the ankle is joined to the knee, and a proper shaped foot is placed at about the level of the upper third of the Calf of the perfect leg. I supplied the Artificial foot, fig. 12, about four months since, and the patient is quite delighted with it. She had previously been supplied with a most cumbersome steel apparatus,—with a heavy clump of wood attached, intended to represent a foot, having no action at the ankle.

169. This was another case of deformity from birth. The limb had not grown equal in length with the fellow limb. The knee was contracted and deformed, and the foot pendulous. I contrived an apparatus in which the wasted limb was incased, and the bearing taken on the ischium, (a modification of limb fig. 5,) and it answered exceedingly well.

170. Amputated by Mr. P. B. GILES, of Byford House, Herefordshire, assisted by Mr. CAM, of Hereford. A good flap operation. I supplied him with limb, fig. 5, in 1853, which the patient is still using. He had previously had one made in London by a workman who had been discharged by a London limb maker, and it was broken to pieces in less than twelve months.

Artificial Limbs supplied by Mr. GROSSMITH. Time in use, &c.

CASES.	AMP.	CAUSE.	OPERTN.	HEALTH SINCE.	STUMP.
171. Miss J.	—	accident	circular	not good	contractd.
172. Mr. P.	1841	accident	circular	not good	10 inches
173. Mr. H.	1851	accident	flap	good	7 inches

171. This lady was amputated in infancy, by Mr. J. LIDDON, through dislocation of the Ankle. The stump is firmly contracted and she had her first Artificial Limb of my predecessor Mr. SLEATH, twenty years since, (fig. 9.) She wore it with perfect comfort for nineteen years, and would have continued using it to the present time, but was anxious to try my "Patent-action" limb, so as to get rid of the old locking-joint. She found some little difficulty at first from having been so long accustomed to walk with the knee fastened stiff. She, however, in a few days became used to the new system, and is much pleased with it. She writes thus: "May 5, 1857. Miss J ***** is sorry to have detained the enclosed so long. She hopes she has not inconvenienced Mr. GROSSMITH, and that the several queries in the paper are properly replied to. Miss J ***** begs to add that she prefers the action of the new Knee-joint, and if Mr. GROSSMITH would tax his talents for a remedy to prevent the leg from going too far back sometimes on sitting down, it would be as perfect as it could be—this being the only inconvenience." This lady commenced using the new-action about a year back, and has worn it constantly since. A trifling alteration in the position of the action will remedy the slight defect she alludes to, but not having heard from her since she was supplied with the limb till the present time, I was not aware that this was necessary.

172. This gentleman was amputated by Messrs WILLS, BURNARD, and BOWDAGE, at Crewkerne, and has worn Limb, fig. 10, some years. He writes thus: "March 7, 1857. According to your wish I have filled up the form, and beg leave to return it. I wear my Artificial Leg with ease, and the stump has continued healthy. The only time I suffer is in hot weather, when the stump swells, and is painful at the point." This case presents another instance of the disadvantages arising from leaving so long a stump. A complaint of this nature has not been made by any patient amputated at the middle of the calf, or upper third.

173. A patient amputated by Dr. WARDLEWORTH, Gumster Bridge. Writes thus: "May 27, 1857. I received my Leg safe, and have quite surprised my companions by walking so well. I do not make the *least limp*, and if it only keeps in good repair I shall be truly glad, and ever feel grateful to you.

AMPUTATIONS OF THE ARM AND HAND.

174. Mr. T.—Amputated four inches below the Elbow.

This gentleman, a patient of Mr. PADDON, of Truro, Cornwall, lost his arm by an accident; and the stump being short it was necessary to have the limb, fig. 4, with light steel joints working on each side of the Elbow, to give him greater control over the hand. The hand is fitted with the usual instruments. He has now worn the apparatus some years, and Mr. PADDON has informed me of the satisfaction it has given him.

175. Mr. P.—Amputated two inches from the Shoulder.

This patient, a farmer residing in Suffolk, was fitted with the Arm and Hand, fig. 2, in 1852. Having been amputated so near the shoulder, he is not able to make much use of the limb, but it restores his appearance, and assists him in writing, and in holding any light papers, or a memorandum book.

176. Mr. C.—Amputated six inches below the Elbow.

In this case, the Arm and Hand, fig. 3, were supplied; and the patient, who lost his hand by an accident at the South Eastern Railway Works, Ashford, is enabled to make great use of them. He has a good stump, and uses the fork, rein-holder, and other instruments, with advantage.

177. Mr. G.—Amputated at the Wrist.

This gentleman resides at Halesworth. He has a long stump, and his loss is quite imperceptible. He uses the fork, &c., as freely as if it were in the grasp of the natural hand. He was supplied with the apparatus, fig. 3, in 1852, and has had it in constant use daily to the present time.

178. Mr. W.—Amputated six inches below the Elbow.

The patient was in the employ of the North Western Railway Company when the accident occurred, which occasioned him to require my assistance. I fitted him with the Arm and Hand, fig. 3, about five years since, and he has the limb still in constant use. It enabled him to resume his previous occupation, being supplied with suitable instruments for that purpose.

179. Miss A.—Deformity from Birth.

This lady, residing at ——— Abbey, Yorkshire, was deficient of an Arm when born. She had worn several Artificial Arms made by various makers, previous to coming to me, in 1851. I then supplied her with the limb, fig. 2, with which she was much pleased, and she has used it without requiring repair to the present time. She writes thus: "April 3rd, 1857. Miss A., begs to inform Mr. GROSSMITH that the Arm and Hand he made her about six years since, and from which she has derived so much comfort, now requires new leathering and cleaning, and if convenient to him, she will come to town the first opportunity, to have it attended to. She desires her best remembrances to his family from whom she received so much sympathy and kindness, on her first visit to London, in 1851."

180. Mr. E.—Amputated seven inches below the Elbow.

An accident by machinery, in the mining districts of Cornwall, occasioned this gentleman to apply to me for assistance, in 1853. I supplied him with the Arm-piece and Hand, with instruments, fig. 3, and they are still in daily use.

181. Mr. C.—Amputated close to the Wrist.

This patient, was one of the earliest (and consequently most fortunate) visitors to the Diggings, in Australia. He was fitted with the Arm and Hand, fig. 3, with extra Arm-socket, and a variety of instruments to enable him to pursue his wealthy avocation. He made the voyage to London, for the sole purpose of getting the apparatus at my house, having seen one of my customers, Mr. Huntley, at Melbourne, wearing an Artificial Limb of my construction. So impatient was he to return to the land of gold, I had to complete the whole for him in three days, and on the fourth, he took his departure from Gravesend.

182. Miss ——. Amputated six inches below the Elbow.

A patient of Mr. HIND, Surgeon, Swindon. I fitted her with the Arm, &c., fig. 3, in 1853, and she has it still in use.

183. Mr. S.—Amputation of a part of the Hand.

This gentleman, a resident of the City, near my manufactory, lost a considerable portion of the hand by the bursting of a gun. I supplied an Artificial thumb and two fingers, and when covered with the glove, the loss is not perceivable.

184. Miss H.—Deformity from Birth.

In this case great care and ingenuity were required,—the patient having an irregular stump, projecting beyond the wrist, and considerably interfering with the mechanism of the Artificial Hand. I succeeded by enclosing the stump in a hollow in the palm, and by working the joints of the fingers close to the extremity of the stump, in forming a hand of good proportions. It enables her to appear amongst the circle of her friends, and in society, without exciting feelings of curiosity, or sympathy, which are at all times unpleasant, and are especially felt by the young and gay, to whom appearance is of so much value.

185. Miss C.—Amputated seven inches below the Elbow.

The hand and arm socket, with the usual instruments, fig. 3, were supplied in this case, by the kindness of Miss Sheddon, a lady whose benevolence is proverbial in the district where she resides in the Isle of Wight.

186. Mr. P.—Amputated above the Elbow.

A patient of Dr. KIDD, of Ballymena, Ireland. The Arm with stop action Elbow-joint, fig 2, was made for him in 1854, from measurements supplied by Dr. KIDD, without my seeing him, and it fitted, and answers well.

187. The Rev. Mr. F.—Amputated below the Elbow.

In this case, the patient was amputated so close to the Elbow-joint, that it was necessary to use the Arm, fig. 4, which has light steel joints each side of the natural elbow, by which means increase of power is given to the stump, and it is enabled better to control the hand and instruments. This gentleman writes: "April 18th, 1856. Your apparatus came safe to hand, and seems to fit

very satisfactorily. A degree of stiffness is felt at present, but that, of course, must ever attend newly-made machinery. I enclose order for payment of your account, and am, yours faithfully, &c."

188. Mr. W.—Amputated at the Shoulder-joint.

The patient being left without any stump, had little hope of making use of the Arm; but it restored his appearance, and with the stop action to the elbow-joint he was enabled to set the lower portion of the limb in any position. Also, by fastening the wrist with a small band to the coat, he could fix the hand sufficiently firm to admit of his using the card or pamphlet holder, or a memorandum book.

189. Mr. G.—Amputated eight inches above the Elbow.

This gentleman, a patient of Dr. GILL, of Longford, Ireland, was fitted with the arm and instruments, fig. 2, in 1854. He has them still in constant use, as yet requiring no repair.

190. Mr. S.—Amputated six inches above the Elbow.

This patient having a good length of stump, is able to make great use of the arm, although amputated above the Elbow. He is actively employed, and finds the arm, hand, and instruments, afford him every assistance. He has now used them constantly for two years, requiring no repairs, except new straps and fastenings which I have supplied during the present month. He is a patient of Mr. SHORLAND, of Westbury, to whom I am indebted for many other customers.

191. Mr. W.—Amputation near the Wrist.

I supplied this gentleman with the arm-socket, hand, and usual instruments, in 1854, and they have proved perfectly satisfactory in every way.

192. Mr. C.—Amputated six inches above the Elbow.

A Guard on the Eastern Counties Line, who lost his arm above the elbow by a Railway accident. I supplied the apparatus, fig. 2, fitted with instruments, &c., suitable to his future employment, and he has it still in daily service.

193. Mr. T.—Amputated at the Wrist.

This gentleman, a director of the "Infantas Mine Company," at Linares, in Spain, lost his hand immediately below the wrist joint. It was necessary in his case to make some modifications in the apparatus, fig. 3, so that the natural action of the wrist-joint should not be impeded. The hand was fitted with the usual instruments, which performed all the various offices of the natural hand with efficiency.

194. Mr. S.—Amputated seven inches below the Elbow.

The patient lost his hand by an accident, at Oakwood Mill, near Dorking. He was fitted with the Arm-socket, and hand, fig. 3, about two years since, and finds them perfectly satisfactory.

195. Mr. R.—Amputated close under the Elbow-joint.

In this case, there being scarcely any stump left below the elbow, the arm, which has steel elbow-joints, and stop-action was necessary. (see fig. 4.) The patient resides at Ramsey, in West Canada, and was recommended to apply to me, by several customers, wearing my Artificial appliances in Canada. I had not the opportunity of seeing him, but the limb fitted well and was highly approved of.

196. Mr. S.—Amputated four inches below the Shoulder.

A very short stump, but with the new action to the elbow-joint, fig. 2, and suitable instruments, this gentleman is enabled to make the arm and hand prove of great service to him,—more so than usual in cases where the amputation is above the elbow, and the stump short.

197. Mr. R.—Amputated four inches above the Elbow.

In this case the stump being considerably longer than in the last mentioned, the patient was enabled to make nearly as much use of the arm as those who have the natural elbow-joint. He wears the apparatus, fig. 2, and has written to me recently to express the comfort he derives from it, and his appreciation of the workmanship, which he considers quite a specimen of art.

198. Captain W.—Amputated seven inches below the Elbow.

This gentleman, a member of the "Junior United Service Club," lost his hand during the late Campaign in the Crimea. He was fitted with the arm-socket and hand, fig. 3, with the usual instruments, about a year since, (at which time I supplied many other officers of the Army and Navy similarly circumstanced), and the apparatus,—both with regard to fit and workmanship proved most successful.

199. Mr. L.—Amputated midway between the Elbow & Shoulder.

I have recently made the arm, (with improved elbow-joint) hand &c., for this gentleman, who resides near Barnet. He had worn the productions of other makers for some years previous to having mine, and was therefore the better able to appreciate the workmanship and construction of the limb with which I supplied him.

200. Mr. W.—Amputated three inches below the Elbow.

This gentleman, a Sheffield manufacturer, was a patient of GILLOTT, Surgeon, of that town. I made the apparatus, fig. 4, first, without the stop-action, but finding his stump had sufficient power over the lower part of the limb, to enable him to use the hand and instruments effectually, I have since attached a ratchet to the joints, and he is proceeding well with it.

201. Mr. C.—Amputated seven inches below the Elbow.

A gentleman residing in Clackmannanshire, Scotland, at the time of his being amputated. I supplied him with his first Artificial Limb, fig. 3, a few years since. He has since removed to the South of England, and I have this year made him a second hand that he might be prepared in case of accident. He informs me that in the neighbourhood where he now resides (and where he is connected with one of the largest of our Shipping Companies) no loss is not known. He carries the arm with a perfectly natural appearance, and uses the instruments with ease.

202. Mr. G.—Amputated two inches below the Elbow.

The patient, a gentleman connected with the Aberdare Iron Works, lost his hand and arm, by an accident with the machinery. I made the arm and hand, fig. 4, some time since, and they answered perfectly. He writes thus: "The hand &c., safely arrived Saturday last, and I have pleasure in informing you that it serves the purpose very well."