

A memoir on the cutting gorget of Hawkins .. : To which is added, A biographical account of J.B. Carcano Leone .. / Tr. from the Italian by J.H. Wishart.

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Fig. II.



Fig. I.



Fig. III.



Fig. IV.

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A

MEMOIR

ON THE

CUTTING GORGET OF HAWKINS:

BY

ANTONIO SCARPA.

WITH AN ENGRAVING.

TO WHICH IS ADDED,

A BIOGRAPHICAL ACCOUNT

OF

J. B. CARCANO LEONE,

PROFESSOR OF ANATOMY IN THE UNIVERSITY OF PAVIA.

TRANSLATED FROM THE ITALIAN

By J. H. WISHART,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS OF
EDINBURGH.

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Lately Published, by the same Author,

I. A TREATISE on the ANATOMY, PATHOLOGY, and SURGICAL TREATMENT of ANEURISM, with Engravings, by ANTONIO SCARPA, Professor of Clinical Surgery in the University of Pavia. Translated from the Italian, with Notes, by J. H. WISHART, Fellow of the Royal College of Surgeons, and one of the Surgeons to the Public Dispensary of Edinburgh. 8vo, price 15s. in boards.

II. A TREATISE on HERNIA, by ANTONIO SCARPA, Professor of Clinical Surgery in the University of Pavia. Translated from the Italian, with Notes and an Appendix. By J. H. WISHART, Member of the Royal College of Surgeons, and one of the Surgeons to the Public Dispensary of Edinburgh. Illustrated by fourteen Engravings. 8vo, price 16s. in boards.

ADVERTISEMENT.

THE following Memoir was sent to me by the Author, with the gorget and four of his cataract needles ; and he particularly requested I would translate his Essay, that it might be made known to the principal surgeons of our hospitals. The Author gives precise rules for the placing of the staff in correspondence with the gorget, the inclination of the cutting blade of which instrument is calculated exactly for making a lateral incision, if the staff be held perpendicular to the line of the suture of the perinæum. He further assures me, that, with this instrument, he always makes the section of the prostate sufficiently large for extract-

ing stones of considerable size, without any risk of injuring the rectum, or of wounding the deep pudic artery.

I have added the Biographical Account of CARCANO LEONE, as it contains many interesting facts in the history of Anatomy and Surgery, which I thought would be acceptable to the medical men of this country.

J. H. W.

Edinburgh, August 1816.

A
M E M O I R
ON THE
CUTTING GORGET OF HAWKINS,
FOR THE
EXTRACTION OF STONE IN THE BLADDER.

IF, in performing the operation of lithotomy through the perinæum in the male, the surgeon could at pleasure proportion the length and depth of the section of the prostate, as well as the incision of the orifice and body of the bladder, to the size of the stone, he would, in every case of large calculus, make an opening of sufficient size to allow him to lay hold of the stone quickly, and extract it with facility, without bruising or lacerating the parts through which it must necessarily pass. But unfortunately, in the case of a very large stone, this is not practicable in the perinæum, on account of the limited extent of the triangular space be-

tween the arch of the pubes, the ramus of the ischium, and the neck of the bladder ; and because the incision of the base of the prostate gland, and of the orifice of the bladder, cannot be extended beyond a certain depth, without the danger of occasioning urinary fistulæ, and gangrenous suppurations in the cellular substance situated between the rectum and bladder.

It was a conjecture of Albinus, not supported by any certain fact, that Raw, in order to extract large stones from the bladder by the perinæum without difficulty, divided with success the body of the bladder so high up as to leave the orifice of this viscus untouched. Those acquainted with the history of surgery know into what discredit the methods of Foubert and of Thomas, which had the same object in view, very soon fell ; and they cannot be ignorant that the operation of Celsus is generally followed by very violent symptoms, whenever the calculus is of such a size that it cannot pass into and distend the orifice of the bladder and neck of the urethra,* so that, in

* Surgeons frequently are guilty of inaccuracy in denominating neck or cervix of the bladder, what is properly speaking the *neck or beginning of the urethra*,

extracting it, the incision may be made in the left lateral portion of the bladder, above the prostate. The best plan which anatomy has hitherto been able to suggest to surgeons, in order to facilitate the extraction of large stones from the bladder by the perinæum, is the incision of the prostate gland laterally to a certain determinate extent, and the prudent resolution of entrusting the rest of the operation to a gentle and gradual dilatation of the neck of the urethra and of the orifice of the bladder. And, indeed, since the operation of lithotomy in the perinæum has received this improvement, or since surgeons no longer divide only the apex of the prostate, but cut it completely, and cut to a certain depth, though not completely divide the base of this gland, and along with it a small portion of the orifice of the bladder, the very violent distending force, which, in former times, with the *great apparatus*, was employed for laying hold of and extracting the stone, is no longer

extending from the orifice of the bladder through the prostate gland, to the beginning of the membranous part of the urethra, which does not in the least belong to the bladder. This incorrectness frequently occasions great obscurity in the description of the operation of lithotomy.

necessary. A moderate dilatation of these parts is now found to be sufficient for extracting successfully calculi of considerable size, such as those of three ounces and an half in weight, and of sixteen lines in their smallest diameter. Therefore, in the present day, the *lateralizing of the great apparatus* is justly considered as the greatest degree of perfection to which the operation of lithotomy in the perinæum can be brought.

The lateral incision, although performed with the greatest precision, does not supersede the necessity of the surgeon employing a certain degree of dilatation of the orifice of the bladder and of the neck of the urethra. This dilatation, however moderate it may be, is always necessary, although the stone be of a middle size. The orifice of the bladder in the dead body of an adult man dilates, indeed, almost spontaneously, to the diameter of five lines, as may be seen on introducing the point of the finger from the cavity of the bladder within the neck of the urethra. The lateral incision, within proper limits, divides the body and base of the prostate to the depth of four, or at most five lines, which, added to five more, to which the orifice of the bladder yields, as

it were, spontaneously, form an aperture of ten lines; but, in an adult, a stone of an ordinary size, and of an oval shape, is sixteen lines in its smallest diameter, to which it is proper to add the size of the blades of the forceps. In this case, after the lateral incision is performed with the greatest attention, a stone, even of moderate size, will not pass out of the bladder, unless the dilatation of the base of the prostate and of the orifice of the bladder be extended to about eight lines more than the aperture made by the lateral incision. Because, if, in order to avoid this distention to eight lines, an incision were made to an equal depth in the base of the prostate, and in the orifice of the bladder, and a portion of its body, it would infallibly occasion infiltrations of urine into the cellular substance between the rectum and bladder, and subsequently gangrenous abscesses, fistulæ, and other severe accidents. We are informed, in fact, by Sharp,* that Cheselden, in his first trial, divided a portion of the body of this viscus; but Sharp likewise informs us, that Cheselden was under the necessity of laying aside this mode of operating, on account of the injury arising from the in-

* Critical Inquiry, Chap. v.

filtration of the urine between the rectum and bladder. *

The same fact is also mentioned by Bromfield, † and, subsequently, by several other celebrated and experienced surgeons. ‡

* Cheseldenus, ut omnia tentaret, vesicam aqua hordei implebat, quantum ægri ferre poterant; dein vesicam incidebat, sed infausto successu, propter urinam inter vesicam et partes vicinas remorantem, unde gangræna, qua ex decem octo moriebantur. Camper, *Demonstrat. Anat.* lib. ii. p. 14.

† Chirurg. Obs. Licet plerique chirurgi, quod sciam, glandulam prostatam per totam suam crassitiem dividere optent, ego tamen nollem factum. Dodrantem, aut paulo minus proxime ad partem urethræ membranosa satius et utilius, quam per totam sui crassitudinem dividi pro certo habeo. Nam primo nullibi alias præter quam in ea parte calculo obsistitur, et vesicæ cervix circa omnem lacerationem sufficienter dilatatur. Deinde partibus citius sanandæ facultatem hoc fortasse dabit, sphinctere revalescente, quam si perpetuo per eas transiret urina; licetque mihi, si foret opus, liquido jurare, nunquam post ullam mearum operationum fistulam remansisse, quod sæpe usu evenit illis qui glandulam usque ad membranosa vesicæ partem persecuerunt. Nam, tametsi aliter visum sit multis scriptoribus, fateor tamen, me non posse non putare valde perniciosum esse, partem membranosa vesicæ sauciari, et si nihil aliud affert mali, fistulas exinde orituras maxime est verosimile.

‡ The aphorism of Hippocrates, xvii. sect. vi. on the mortality of wounds of the bladder, is a fact, in regard to

Long experience had undoubtedly taught Franco,* the most celebrated lithotomist of his time, the dangers of too extensive and deep an incision of the base of the prostate gland, and of the orifice of the bladder, as on this subject he wrote "*bref il est requis de tenir médiocrité.*" In every operation of lithotomy in the perinæum, the apex of the prostate gland must be completely divided, as it opposes the greatest resistance to the introduction of the forceps, and to the extraction of the stone. But, with regard to the body and base of the prostate, a lateral incision to the depth of five lines through the whole length of this gland, and therefore including a small portion of the orifice of the bladder, is sufficient, with the assistance of a moderate and gradually increased dilatation, to allow the extraction of a stone of more than ordinary size, without the parts through which it must pass being violently contused or lacerated. In children, in whom the orifice of the bladder, and the base of the prostate, are ca-

wounds of this viscus, which do not allow a free exit to the urine, and occasion effusion of it into the cavity of the peritoneum, or into the cellular substance between the rectum and wounded bladder.

* *Traité de la taille*, chap. 32.

pable of being easily distended, an incision of the body and base of the prostate of only two lines, and in old men, in whom, in general, the orifice of the bladder and the neck of the urethra are much wider than in the adult, one less than five lines in depth, is sufficient for the extraction of a stone of ordinary size, with the aid of a moderate dilatation of these parts. It is only, properly speaking, a large calculus, the smallest diameter of which exceeds twenty lines, which makes it necessary to cut laterally the whole thickness of the base of the prostate, so as to penetrate into the cellular substance beyond this gland, and into the body of the bladder. But as this deep lateral incision is always followed by infiltrations of urine, by gangrenous abscesses, and by fistulæ between the bladder and rectum, it is evident that calculi of such a size ought never to be extracted by the perinæum.

There are therefore limits to the lateral incision, beyond which it cannot be carried without exposing the patient to affections more severe than those which may arise from the presence of the stone in the bladder. This fact, together with that which follows as a consequence to it, namely, the absolute neces-

sity of employing, in every case of lithotomy in the perinæum, a greater or less degree of dilatation of the orifice of the bladder, and of the base of the prostate, in order to supply the want of length and depth of the incision in these parts, performed even in the best possible manner, constitutes, in my opinion, the fundamental principle of lithotomy by the *lateral* method, and furnishes a certain rule for appreciating the value of the innumerable instruments proposed for the quick and safe performance of this operation. On this point I cannot omit mentioning, that all those have misled the student, who, deviating from the doctrine of Le Cat,* and exaggerating too much the advantages of the lateral method over the great apparatus, and still more the utility of the instruments proposed by themselves for performing it, have spoken of the operation in such a way, as if, after the lateral incision was made, the stone would drop out, as it were, spontaneously, without at all mentioning the necessity of dilatation.

Cheselden, to whom alone belongs the glory of having enriched surgery with the im-

* Pièces concernant l'operation de la taille, pag. 60-100.

portant discovery of the great apparatus lateralized, employed, in the performance of this operation, a small knife of his own invention, having a convex cutting edge four lines in breadth, fixed upon a long handle. With this very simple instrument he divided laterally the prostate gland through its whole length, to the depth of four or five lines; after which, with the assistance of a slow and gradually increased dilatation of the neck of the urethra and of the orifice of the bladder, he extracted large stones, without exposing the patients to severe symptoms consequent to the operation. But, in fact, it is not so easy, as some not sufficiently acquainted with this operation might perhaps imagine, to conduct a knife through the neck of the urethra beyond the orifice of the bladder, so that, in the course which it takes, it may not deviate sometimes a great deal from the lateral direction of the prostate, and fail in dividing that gland to the proper depth, especially at its base, which surrounds the orifice of the bladder. For, the point of the knife is easily arrested in the groove of the staff, made of soft iron, and the firm substance of the prostate generally opposes so powerful a resistance to the cutting edge, that it pushes it back to the opposite

side, or the prostate slips away before the edge of the knife, and induces the surgeon to suppose that he has divided this glandular body to a sufficient depth, when he has perhaps merely divided its apex, and only slightly cut into its body and base.

To facilitate to intelligent surgeons, but not so dexterous as Cheselden, the performance of the lateral incision, was the laudable motive which led Hawkins to propose his cutting gorget. He thought that two great advantages would be derived from the employment of this instrument; the one, that of performing invariably Cheselden's lateral incision; the other that of constantly preserving the patients, through the whole of the operation, from the wounding of the rectum, and of the deep pudic artery. There can be no doubt of the advantage proposed in the second place, as it is evident that the convexity of the conductor of the instrument guards the rectum from being injured, and that the cutting edge of the instrument, not being inclined horizontally towards the tuberosity and ramus of the ischium, but turned upwards, cannot, in passing through the longitudinal axis of the neck of the urethra, wound the deep pudic artery. But, with regard to the first advantage, or the per-

forming precisely the lateral incision of Cheselden, it must be allowed that Hawkins has not completely attained the intention which he proposed, both because the cutting edge of his gorget is not raised sufficiently above the level of the catheter, to be plunged as much as is required into the substance of the body and base of the prostate, and consequently to divide both of these to a proper depth, and because the cutting edge, being turned too much upwards, does not make an incision laterally, in that portion which it may cut of the body and base of the prostate, but rather at its upper part, pointing towards the upper part of the ramus of the ischium and arch of the pubes, which situation is the most straitened and difficult for the passage of the stone from the bladder through the perinæum. Farther, the width of the apex of the beak is so disproportioned to the calibre of the membranous part of the urethra, that, in consequence of the great resistance it meets with, the instrument may readily slip out of the groove of the staff, and insinuate itself between the bladder and the rectum; and this unfortunate accident has happened not unfrequently, although the instrument was employ-

ed by men versed in the great operations of surgery.

A few years ago some celebrated surgeons undertook to give a new shape to the cutting gorget of Hawkins, but their attempts were not attended with success, on account, I believe, of their having neglected to institute an exact comparison between the parts which ought to be divided, in the lithotomy of Cheselden, with the elevation and inclination to be given to the cutting edge of the instrument which they proposed to improve. B. Bell * diminished the width of the conductor, but gave the cutting blade a horizontal direction. Desault,† Cline, and Cruickshanks, retaining the horizontal position of the cutting blade, have again enlarged the conductor, and made it flat instead of hollow, which it originally was;‡

* System of Surgery, Vol. II. pl. xiii.

† Oeuvres Chirurg. Tom. II.

‡ Richerand *Mém. de la Soc. d'Emulation*, Tom. IV. Le procédé d'Hawkins est celui avec lequel on évite plus sûrement l'hémorrhagie, pourvu toutefois que l'on se serve du gorgeret de l'inventeur; le tranchant de l'instrument tourné en haut ne peut intéresser les vaisseaux du périnée. On pourroit les ouvrir si l'on faisoit usage du gorgeret corrigé par Dessault, ou par Cline. Les changemens que ces chirurgiens ont fait subir à l'instrument d'Hawkins, bien loin d'avoir ajouté à sa perfection, l'ont au contraire

which is as much as to say, they have done nothing else but convert the cutting gorget of Hawkins into a knife less adapted than any other surgical instrument for making the lateral incision, and undoubtedly not at all more secure or more manageable than that which Cheselden employed. The difficulty, indeed, has not escaped the above mentioned surgeons, that the horizontal direction of the cutting edge would have rendered unavoidable the injury of the deep pudic artery; and therefore they have taught that the handle of the grooved staff ought to be inclined over the right groin of the patient, and that the cutting gorget should be made to run along it, inclined in such a manner that its blunt part was towards the rectum, and that the cutting edge should be kept as far from the tuberosity and ramus of the ischium, as was necessary to avoid wounding the deep pudic artery. Even in employing Cheselden's knife, it is undoubtedly necessary to give the grooved staff the same inclination towards the right

privé de tous ses avantages. Deschamps, *Journ. de Med.* Tom. XX. Nous avons vû le gorget d'Hawkins que l'Anglomanie voulait à force préconiser, subir tant et tant de corrections, que d'un gorgéret on en a fait une lame plate et tranchante, dont on ne se sert plus.

groin of the patient, that the knife may divide the prostate laterally, and not fall down upon the rectum, or wound the pudic artery. Whoever has experience in such cases, knows how difficult it is to give a due degree of inclination to the grooved staff; and is not ignorant how arbitrary this inclination is, how unsteady, and inconvenient to the operator, in comparison with that mode where the handle of the staff is kept in a perpendicular line with the body of the patient, and its concave part against the arch of the pubes; on this steadiness of the staff depends the safety and precision of the lateral operation.

On comparing, therefore, the instrument of Hawkins, such as it was proposed by the author, with the parts which ought to be divided, and the direction, extent, and depth of the incision which is required in the great apparatus lateralized, I have found that the defects of this instrument consisted in the excessive breadth of the conductor, especially at its apex; in the want of a sufficient elevation of the cutting edge above the level of the groove of the staff; and in the inaccurate inclination of the cutting edge to the axis of the neck of the urethra and of the prostate. The calibre of the neck of the urethra in a man between

thirty and forty years of age, is only three lines in diameter at the apex of the prostate; four about its middle, and five lines in the vicinity of the orifice of the bladder. The size or thickness of the prostate at its apex is a little more than two lines; four at its body, and six or even eight lines at its base, where it surrounds the orifice of the bladder. In the middle-sized adult, from eighteen to twenty-five, the thickness of the base of the prostate is two lines less than that of a man of forty, and of large size. The precise line, which in an adult the lateral incision of the prostate ought to have, is found to be inclined to the longitudinal axis of the neck of the urethra and of the prostate at an angle of 69 degrees. According to principles, deduced from the structure of these parts, the conductor or director of the cutting gorget of Hawkins which I employ* is only four lines in breadth, and two in depth, and the breadth decreases at the beak.† The cutting edge of the instrument is a straight bistoury in the vicinity of the point, but it gradually becomes elevated and convex above

* Fig. 1. *a*, *a*.

† *c*.

the level of the grooved staff, so that its greatest convexity * is seven lines in breadth. Lastly, the inclination of the cutting blade to the longitudinal axis of the conductor, is exactly at an angle of 69 degrees; that is to say, the same which the left side of the prostate gland has to the longitudinal axis of the neck of the urethra.

The following is the method of employing this instrument: Having introduced into the bladder the grooved staff, the curvature of which corresponds exactly to that of the axis of the neck of the urethra and of the prostate gland, and the beak of which is a little longer than that of the ordinary grooved staff, so that it may penetrate about an inch and half into the bladder; having made in the usual manner the external incision, and that of the membranous part of the urethra, not touching the *bulb*, the surgeon, with his left hand, must hold the grooved staff very firmly in a perpendicular line to the body of the patient, and pressed against the arch of the pubes; then taking in his right hand the cutting gorget, and having inserted its beak into the groove of the staff, so that the convexity of the conductor is

* *d, e.*

placed directly over the rectum, he will make the gorget run in a line as much as possible parallel to the horizontal extremity of the staff placed in the bladder, and he should not stop until he feels the beak of the gorget reach the closed extremity of the groove of the staff. After this, he withdraws the staff from the bladder and urethra; and along the gorget, as a director, he will introduce the forceps; and close to them draw the cutting instrument gently towards him, removing it in the same direction as that in which it was introduced. Finally, having ascertained, by means of the forceps, the position of the stone, he will carefully open the blades, and with them gradually dilate the neck of the urethra and the orifice of the bladder, as much as to enable him to lay hold of the stone with facility, and extract it without bruising or lacerating the parts through which it must pass.

It is a fact, confirmed by repeated observations and measurements, taken by me on the dead body of adults, that a line, inclined to the axis of the neck of the urethra and of the prostate gland, at an angle of 69 degrees, runs laterally through the body and base of this gland, at the most proper place for the ex-

traction of stones by the perinæum; that is to say, not too near to the arch of the pubes, nor towards the inferior and posterior surface of the prostate. * And as the cutting blade of the gorget is inclined to the longitudinal axis of the conductor at the same angle, and the conductor being held in the same direction, which the axis of the neck of the urethra and of the prostate naturally has, it must necessarily follow mechanically, that in pushing the instrument into the bladder, in a line as much as possible parallel to the horizontal groove of the staff, all the prostate, with the orifice of the blad-

* The anterior surface of the prostate is shorter than its posterior surface; and the neck of the urethra does not pass, properly speaking, through the centre of this gland, but through that portion of it which is nearest to the arch of the pubes. On this account, if we consider the greater shortness of the neck of the urethra, and the less thickness of the substance of the prostate, the shortest way from the membranous part of the urethra to the cavity of the bladder would be through the anterior part of the prostate; but as the incision made in this smaller portion would fall immediately under the arch of the pubes, which would oppose a great obstacle to the passage of the stone, the lateral incision, therefore, although it runs through the greater length and thickness of the body, and base of the prostate, will always be preferable to the anterior division of this gland.

der, must be cut laterally, and at the most convenient place for the extraction of the stone. * Holding the grooved staff in a line perpendicular to the body of the patient, and firmly against the arch of the pubes, so that the conductor of the instrument has its convexity towards the rectum, and runs exactly along the axis of the neck of the urethra and of the prostate, we have a certain rule why the cutting edge, being at the determinate angle, can only make a lateral section of the prostate at the most advantageous place for the extraction of the stone. This rule is the more easily determined, and more surely retained, as the grooved staff nitches of itself, to use the expression, under the arch of the pubes ; and as, of all the positions which can be given to it, this is the most convenient for the surgeon, and the most steady during the operation.

With regard to the depth of the incision, it may be proper to remark, that the conductor of this instrument is four lines in width, and two in depth ; and that the cutting blade is seven lines in width for a man of full size, between thirty and forty years of age. At

* In the construction of the instrument, uncommon intelligence and accuracy are required on the part of the artist.

the moment that the cutting gorget enters the membranous part of the urethra, and the apex of the prostate, the canal of which is three lines in diameter, the cutting edge divides completely the apex of the prostate through its whole thickness, which is a little more than two lines. Afterwards, the gorget, running through the axis of the neck of the urethra, to which the body and base of the prostate correspond laterally, the former four lines in thickness, the latter six, and sometimes eight, the conductor of the instrument enters a canal four lines in diameter, that is, of the same width as the conductor itself. There the cutting edge, repelled by the hardness and density of the prostate to the opposite side of the canal, susceptible of a certain degree of distention, does not divide the body of the gland with the whole breadth of the blade, but, as far as I have been able to ascertain, by about one line less. It divides it, however, completely. Lastly, the instrument having reached the shut extremity of the grooved staff, or being within the bladder, about an inch and half beyond its orifice, as the orifice yields spontaneously to the diameter of five lines, while the conductor of the instrument is only four,

and the cutting edge is forced back about a line by the hardness of the prostate, it follows from this, that the base of the prostate is only cut to the depth of about five lines, although the cutting blade of the conductor is seven lines in breadth. On this account, two or three lines of the whole thickness of the base of the prostate are always left uncut, according to the diversity of the subjects of the operation. This, as has been said from the beginning, is of great advantage to the success of the operation, both because what remains untouched of the thickness of the base of the prostate prevents the formation of urinary fistulæ, gangrenous abscesses, or fistulæ between the bladder and rectum, and because the undivided portion of the whole thickness of the base of the prostate around the orifice of the bladder, opposes only a weak resistance to the dilatation, which, in every case, must necessarily be made after the incision for obtaining the extraction of the stone. The same proportion remains in cutting a young man of the middle size from eighteen to twenty-five with a cutting gorget, the blade of which is only about five lines in breadth, as in that delineated in the plate annexed to this Memoir.

The lateral incision with Cheselden's knife, performed carefully by a skilful hand on the dead body of a man of forty-five years of age, and of full stature, has, as its result, the complete section of the apex of the prostate, and the division of the base of this gland to the depth only of four, or at most five lines, which result is precisely the same as is obtained in performing the lateral operation with Hawkins's instrument now improved, the cutting blade of which is seven lines in breadth at its greatest convexity. And this instrument likewise maintains its place when compared with the *lithotome caché* of Frère Côme. For, on employing in the dead body of an adult, the lithotom opened to No. 12 or 13, the apex of the prostate is completely divided, and the body and base of the prostate surrounding the orifice of the bladder, are divided only to the depth of four or five lines; which coincides exactly with the numerous experiments which I have made on the dead body with my new cutting gorget. It is proper, however, to observe, that, to have these results in employing Cheselden's knife, the blade of which is only four lines in breadth, it is necessary to push the knife pretty far into the bladder, and to attend, in withdrawing it, to press on its

back, raising the handle, in order that it may penetrate sufficiently deep into the substance of the base and body of the prostate, the hardness of which is apt to push the knife back to the opposite side, so that it only makes a slight incision into these parts. In like manner, in employing the lithotom of Frère Côme, it is indispensable, in the act of withdrawing the cutting blade opened in the bladder, to raise the hand, that the base of the prostate, with the orifice of the bladder, may be divided to the proper depth ; and then, again, to depress the hand, that the apex of the prostate may be completely divided. In making these motions of elevating and depressing, every one must observe, that a hand not very dexterous may readily deviate from the proper limits, and therefore sometimes may not divide to a sufficient depth the base and body of the prostate ; and sometimes may go beyond the base of this gland through its whole thickness. The operator, too, having no certain rule for the inclination to be given to the cutting blade before withdrawing it from the bladder, may easily deviate from the proper and precise direction of the lateral incision, and consequently either wound the deep pudic

artery or the rectum.* On the other hand, employing my cutting gorget according to a fixed and invariable rule, determined by the perpendicular position of the grooved staff with the body of the patient, and by the inclination of the cutting blade to the axis of the neck of the urethra, the direction and depth of the lateral incision will always be exact, and within proper limits, and there will be no reason to fear that the cutting edge pass beyond the thickness of the base of the prostate, so far as to wound the deep pudic artery; and still less, that it should fall down upon the rectum.

The *deep* branch of the pudic artery,† from the point where it is given off from the

* Deschamps, *Traité Hist. et Dogmat. de la Taille*, Tom. III. § 95. Il est peut-être de tous les instruments celui qui conviendra le moins aux jeunes praticiens. And at § 916, Je dirai plus; de tous les instruments connus pour pratiquer l'incision au col de la vessie, celui du Frère Côme sera peut-être le plus dangereux quand il ne sera pas conduit avec prudence; parcequ'il peut, s'il est plongé trop avant dans la vessie, intéresser la partie postérieure de ce viscère; il peut aussi manquer l'incision projetée, s'il n'est pas poussé assez avant dans cet organe. La manière de la placer en le retirant, influe encore sur la régularité de l'incision.

† Sull' Aneurisma, Tav. IV. 7.

common pudic, close to the tuberosity of the ischium, sends the greater number of its branches to the bulb of the urethra, and is exposed to be wounded even in the act of cutting into the membranous part of the urethra, if the point of the knife be not carried beyond and below the bulb. It is likewise exposed to be divided in the withdrawing of Cheselden's knife, or of the lithotom of Frère Côme, if the blade of these instruments be inclined too much towards the ramus or tuberosity of the ischium. But none of these accidents can happen in employing the new cutting gorget; because its blade, being directed obliquely upwards, never passes beyond the body and base of the gland, so far as to wound the above-mentioned artery.

The abettors of the lithotom of Frère Côme, among the advantages which may be derived from the use of his instrument, lay great stress upon the facility and safety with which, by means of the lithotom opened to No. 5, the incision of the neck of the urethra may be enlarged, whenever the first incision has not proved large enough in proportion to the size of the stone to be extracted. Although I am of opinion that this can never be necessary with the new cutting gorget of

Hawkins, the blade of which is proportioned to the size of the prostate of an adult, and farther, that it is very difficult, both with the lithotom of Frère Côme, as well with any other cutting instrument, after it has been withdrawn from the wound, to make the second incision fall precisely in the bottom of the first; yet, if this were to be considered as an advantage of the lithotom of Frère Côme, it would be common to my improved cutting gorget. For, having made the internal incision, and introduced the fore-finger of the left hand into the bladder, along the conductor of the instrument, if the operator found it necessary to extend the lateral incision farther into the substance of the base of the prostate, he would only have to rest the same fore-finger on the blunt margin of the conductor, while with his right hand he pushed onwards and backwards the cutting gorget, in the manner of a saw, with which he might extend the incision of the neck of the urethra and of the prostate at pleasure, and certainly with less danger of making a new incision, than when making use of the lithotom of Frère Côme, or of Cheselden's knife, after they had been withdrawn from the bladder.

In general, with regard to surgical instru-

ments, and in particular those which have been proposed for the lateral operation of the stone, Deschamps is of opinion, that the most perfect and useful instruments are those in which no improvement has ever been proposed. This opinion generally allowed, does not bring any discredit on the gorget of Hawkins; for the improvements proposed on this instrument by B. Bell, Dessault, Cline, and Cruickshanks, instead of being improvements, were so many deviations from the principles on which this instrument had been constructed by the author. The shape in which I re-introduce it is less an improvement than a modification of its original form, because it fulfils, more accurately than it did in its primary form, the indication of cutting the prostate laterally, and to a proper depth, as Cheselden did, without running the risk of wounding the deep pudic artery or the rectum. Repeated experiments which I have made on the dead subject, and the operation successfully performed on the living body in this school, in the presence of its numerous students, authorize me to declare, that this instrument deserves to occupy a distinguished place in the modern surgical apparatus, and therefore particularly to recommend the employment of it to young surgeons.

EXPLANATION OF THE PLATE.

FIG. I.

The instrument of Hawkins recently improved. Posterior view :

a a The conductor.

b The handle.

c The beak.

d e The cutting blade.

FIG. II.

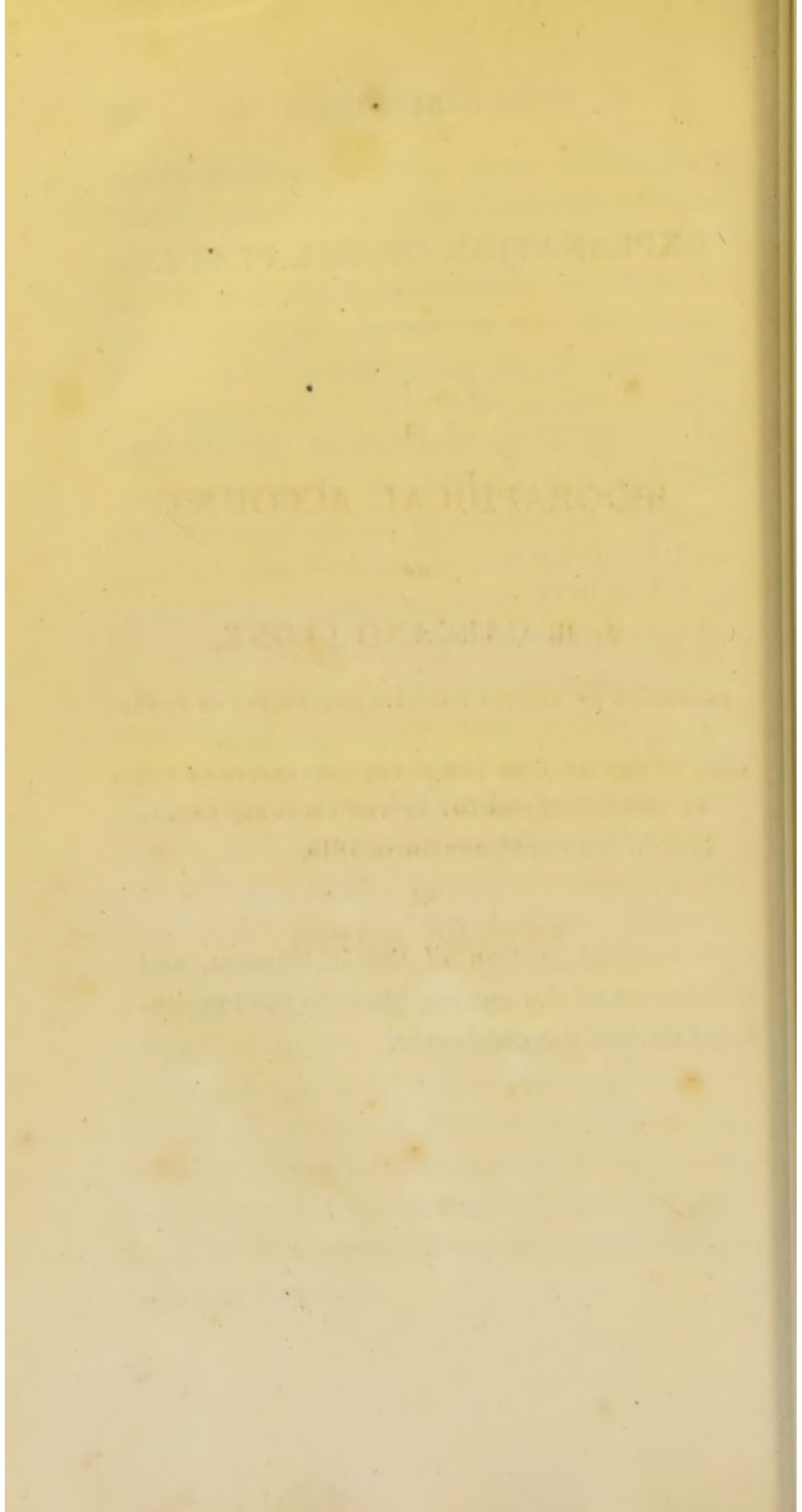
Anterior view of the same instrument.

FIG. III.

The instrument seen in profile.

FIG. IV.

A vertical section of the instrument, and inclination of the cutting blade to the longitudinal axis of the conductor.



A
BIOGRAPHICAL ACCOUNT

OF
J. B. CARCANO LEONE,

PROFESSOR OF ANATOMY IN THE UNIVERSITY OF PAVIA.

READ IN THE HALL OF THE ROYAL UNIVERSITY OF PAVIA,
AT THE COMMENCEMENT OF THE LECTURES THERE,
12TH NOVEMBER 1813,

BY
ANTONIO SCARPA.

PHOTODUPLICATION ACCOUNT

1. The first of the two items is a copy of the original manuscript, which is a letter from the author to the publisher, dated 18th March 1845. The letter is written in the author's own hand, and is in the original language of the manuscript, which is Latin. The letter is a request for the publisher to publish the manuscript, and is signed by the author.

2. The second item is a copy of the original manuscript, which is a letter from the publisher to the author, dated 25th March 1845. The letter is written in the publisher's own hand, and is in the original language of the manuscript, which is Latin. The letter is a response to the author's request, and is signed by the publisher.

3. The third item is a copy of the original manuscript, which is a letter from the author to the publisher, dated 1st April 1845. The letter is written in the author's own hand, and is in the original language of the manuscript, which is Latin. The letter is a request for the publisher to publish the manuscript, and is signed by the author.

4. The fourth item is a copy of the original manuscript, which is a letter from the publisher to the author, dated 8th April 1845. The letter is written in the publisher's own hand, and is in the original language of the manuscript, which is Latin. The letter is a response to the author's request, and is signed by the publisher.

5. The fifth item is a copy of the original manuscript, which is a letter from the author to the publisher, dated 15th April 1845. The letter is written in the author's own hand, and is in the original language of the manuscript, which is Latin. The letter is a request for the publisher to publish the manuscript, and is signed by the author.

6. The sixth item is a copy of the original manuscript, which is a letter from the publisher to the author, dated 22nd April 1845. The letter is written in the publisher's own hand, and is in the original language of the manuscript, which is Latin. The letter is a response to the author's request, and is signed by the publisher.

7. The seventh item is a copy of the original manuscript, which is a letter from the author to the publisher, dated 29th April 1845. The letter is written in the author's own hand, and is in the original language of the manuscript, which is Latin. The letter is a request for the publisher to publish the manuscript, and is signed by the author.

8. The eighth item is a copy of the original manuscript, which is a letter from the publisher to the author, dated 6th May 1845. The letter is written in the publisher's own hand, and is in the original language of the manuscript, which is Latin. The letter is a response to the author's request, and is signed by the publisher.

9. The ninth item is a copy of the original manuscript, which is a letter from the author to the publisher, dated 13th May 1845. The letter is written in the author's own hand, and is in the original language of the manuscript, which is Latin. The letter is a request for the publisher to publish the manuscript, and is signed by the author.

10. The tenth item is a copy of the original manuscript, which is a letter from the publisher to the author, dated 20th May 1845. The letter is written in the publisher's own hand, and is in the original language of the manuscript, which is Latin. The letter is a response to the author's request, and is signed by the publisher.

BIOGRAPHICAL ACCOUNT, &c.

JOHAN BAPTISTA CARCANO LEONE, of a noble Milanese family, the younger son of Bartholomew Carcano, was born at Milan, in the year 1536. Being endowed with a quick and lively understanding, he acquired, in a short time, the Latin and Greek languages, advanced with incredible celerity in the knowledge of the philosophical doctrines of his time, and afterwards devoted himself to the study of medicine.

The science of medicine was at that period held in high estimation, and no one thought that the exercise of the art, which preserves to man health and life, could stain the purity of blood, or obscure the splendour of family. This young man was initiated in the study of anatomy, under the direction of his elder brother Pietro Martire, (1.) an able disciple of Vesalius, and the first who taught this science in a proper manner at Milan. He afterwards

came to this university, where, with unwearied study, and singular diligence, he cultivated every branch of medicine, and in particular surgery, which was taught here by Troni, at that time one of the best masters of this most noble science and art.

Carcano was scarcely nineteen years of age, when, having acquired the name of a skilful pupil in this school, he was appointed chief surgeon of the artillery, (2.) forming a part of the Spanish army which the Duke of Alva led to the siege of Santia in Piedmont. The young Carcano profited in a wonderful manner by this opportunity of examining attentively the phenomena which accompany gun-shot wounds, in order to acquire a knowledge of their nature, and to determine, by the aid of observation and experience, the most proper and effectual treatment of these injuries. He discovered and exposed the errors of the Spanish surgeons, followers of the doctrine of John de Vigo, with regard to the poisonous principle asserted to be communicated to gun-shot wounds by the gunpowder, and pointed out to them (3.) that the livid appearance of these wounds does not arise, as they thought, from the contact of any poisonous agent, but solely from the violence of the contusion,—from

the friction and laceration of the soft, sensible parts,—and consequently, that the practice of cauterising these wounds with boiling oil was evidently erroneous and hurtful, and the too long continued application of unctuous and relaxing topical remedies after the eschar had separated, injurious and irrational. The numerous successful cures which he accomplished, by substituting, instead of the unnecessary incision and cauteries, more simple and milder methods for the cure of these hitherto ill-understood wounds, and the successful treatment of many other very severe injuries among the soldiers, and officers of every rank, increased his reputation to such a degree, that, at the return of the army, he was reckoned worthy of being entrusted with the direction of the military hospital of Milan, containing at least five hundred patients.

At that time, the name of Gabriel Fallopius, professor of anatomy and surgery at Padua, a rival of Vesalius, and in some respects his superior, was very celebrated. The young Carcano was desirous of becoming the pupil of this great man, and of profiting by his instruction; but his laudable desire was opposed by the honourable charge of chief surgeon to the army and hospital which he

held, and likewise by the limited circumstances of his fortune. Both of these difficulties were removed by means of the benevolence and generosity of Don Alonso Pimentello, governor of Milan, a brave soldier and a distinguished scholar, who not only permitted Carcano to absent himself from the army for so laudable a motive, but also supplied him with a large sum of money, (4.) that nothing might be wanting which could contribute to the success of his honourable and useful intentions.

Carcano was received in Padua by Fallopius with particular civility and courtesy, and with the interest inspired by a young man of twenty-five years of age, of noble education and elevated talents, who, although advanced in the science of anatomy and surgery, thinks modestly of himself, and shows himself desirous of instruction. Fallopius, with great liberality, received him into his house, and, to use his own words, not as a guest, but as a beloved brother. (5.)

Having become the constant assistant of the first anatomist and surgeon of that age, Carcano resumed, to use the expression, his studies from the beginning, and, in imitation of his master, became, in like manner, more ac-

accurate and methodical than before, in comparing his own with the observations of others, and in instituting them anew, admitting no anatomical description, no opinion as true, and demonstrated with regard to the structure and action of the organs composing the human body, which he had not repeatedly, and by varied modes of dissection, recognised and confirmed in the dead body. The advantages which accrue from conversing with great masters, are not derived solely from their public lectures, but from these, conjoined with their private conversation, from which perhaps may be deduced, more clearly and usefully than from the chair, the accuracy of their judgment, the extent of their erudition, and its proper application, the methods which they observe in their studies, and the great circumspection which they employ in their researches in order to avoid error. These rare prerogatives, in persons destined to teaching, excite in the young student respectful emulation, modesty, love of truth, and a lively and constant desire of advancing the limits of the art which they cultivate.

After two years of unwearied study and labour in Padua, Carcano returned to Milan, where he soon gave shining proofs of

his profound knowledge in anatomy and surgery, in presence of the most renowned medical men of that city, Settala, Selvatico, Rovida, Molteni, Casati, Assandri. These illustrious professors, free from low jealousy, bestowed due praise on Carcano, and persuaded him, for the public good, to open a school of anatomy and surgery in Milan.

Several years having elapsed in this honourable occupation, he received notice from his venerable master, Fallopius, with whom he corresponded, that the valetudinary state of his health had obliged him to request of the Senate of Venice to be allowed to retire; and that, at the same time, he had proposed him as his successor in the chair of anatomy and surgery of Padua. (6.) The Venetian Senate delayed some time in deliberating on this, and in the mean time Fallopius died, and this distinguished professor was succeeded by Fabricius ab Acquapendente, likewise a pupil of that great master. In the many vicissitudes of human life, we not unfrequently see that fame, as well as fortune, caresses some, and exercises its rigour on others of equal merit, as happened in this circumstance. The choice, however, did not occasion any diminution of

the just estimation which Carcano had acquired ; for if Fabricius ab Acquapendente, not yet celebrated for any work, obtained the chair of Padua from the wisdom of the Venetian Senate, Carcano was declared worthy of occupying it by the greatest anatomist and surgeon of that age. Soon after this happened, that is, in the year 1573, Gabriel Cuneo, (7.) professor of anatomy in this university, resigned the chair, and the Senate of Milan appointed Carcano *spontaneously and unanimously* to this situation. The following year he began his anatomical lectures here, in presence of the most learned men of Pavia, of other cities, and of a great number of students, with unspeakable applause, according to his contemporaries. (9.) He was praised for his erudition, eloquence, and perspicuity ; his method of teaching gave peculiar satisfaction, as he pointed out the parts of the human body in the act of describing their texture and functions, not as was the custom of some teachers, who spoke from the chair, while others pointed out confusedly on the dead body what they were speaking of, losing precious time in long periods and useless disputes. (10.)

The same year he published his two splendid books on anatomical subjects, the first of

them *On the Union of the large Vessels of the Heart in the Fœtus*; (11.) the second *On the Muscles of the Eye and Palpebræ*. (12.)

The solution of the sublime problem, Why the fœtus in utero, deprived of respiration, lives and increases in size, while, when scarcely brought into the world, if it does not immediately breathe it dies, was the point to which our author directed his anatomical researches. Vesalius, in his great work, did not even speak of the particular manner in which the great vessels of the heart unite and communicate with each other in the fœtus; and only after having read the observations of Fallopius, in which are found some hints with regard to this subject, he wrote that the four great vessels of the heart, in the fœtus, communicated with each other by means of an opening; which is a very gross error in anatomy. Even Fallopius, who was acquainted with the true mode of union in the fœtus, between the pulmonary artery and the aorta, made no mention of the other mode of communication different from the first, viz. between the vena cava and the pulmonary veins; and it is proper to mention, he was not sufficiently accurate, where he described the union of the pulmonary artery with the aorta; for

he said, that this union takes place immediately above the base of the heart, while there is nothing more certain, than that it constantly happens at least two finger-breadths above the base of this viscus. Cæsar Aranzius of Bologna, in his work on the fœtus, thought that the great venous vessels, as well as the arterial of the heart of the fœtus, communicated by the interposition of a canal; which fact, with regard to the great *venous* trunks, is completely false. Farther, Aranzius had imagined, at the entrance of these communications, certain *semilunar* valves, which do not exist. Such was the state of imperfection, of obscurity, and of error, prevailing in the anatomical science upon this important point, when Carcano, free from prejudice, and not dazzled by the illusion of authority, devoted himself to the examination of it.

“The *canalis arteriosus*,” said he, “which goes from the aorta into the pulmonary artery, does not go off from the root of the great artery immediately above the base of the heart, but from its curvature, where the aorta inclines to the left side of the dorsal vertebræ; and to be more precise, where the aorta is surrounded by the *recurrent* nerve of the par vagum.

At the place where this arterial canal is inserted into the pulmonary artery, it seems, at first sight, as if this artery divided into three branches, the one of which goes to the right lung ; the other to the left under the aorta ; the third, more conspicuous and larger than the other two, inclining from above downwards, keeps up the communication between the curvature of the aorta and the pulmonary artery. On laying open the *canalis arteriosus* through its whole length, no apparatus of valves is found in it, either on the side of the aorta, or on that of the pulmonary artery." To this short and accurate description of the *canalis arteriosus*, because copied faithfully from nature, modern anatomists have been able to add nothing of importance, so that even Haller himself, who, in the present day, is more engaged in such researches than any other anatomist, allows it to be most accurate. (13.)

Carcano showed himself an equally careful observer and skilful dissector in the other investigation which he made with regard to the particular mode of union and communication in the fœtus, between the vena cava and the pulmonary veins, by means of the apparatus situated in the partition which separates the right from the left auricle of the heart. With

regard to this, our author was not ignorant of what Galen had written with much truth, but which had been improperly interpreted by the anatomists posterior to him, especially by Vesalius and Aranzius, who, in opposition to the judgment of Galen, were pleased to suppose, that, in the fœtus, the union of the cava with the pulmonary veins was effected by means of a canal, at the entrance of which some valves presided ; which Galen has not only not said, but not even hinted at in any part of his work. “ The union of the cava with the pulmonary veins,” Carcano observes very judiciously, “ does not require the interposition of a canal, such as is employed by nature between the aorta and the pulmonary artery, because the great venous trunks of the heart are already in contact with each other ; therefore the communication between them could be effected very conveniently by *anastomosis*, or by a simple aperture formed posteriorly in the partition of the two auricles of the heart, as in fact has been formed by nature, by means of a hole of an *oval* figure, through which the blood of the vena cava, in the fœtus, passes to be mixed with that of the pulmonary veins. Around the margin of this *oval* hole,” continues our author, “ on the side

next the left auricle of the heart, there is fixed, except at the upper part, a pellucid, but pretty firm membrane, which, from being unattached at the upper part of the aperture, falls down when it is compressed by the blood which passes from the right to the left cavity of the heart, and when the current stops, it raises itself, and prevents the regurgitation of the blood from the pulmonary veins into the cava. And as the extent of this membrane exceeds the circumference of the oval opening to which it is applied, therefore, in ascending, it not only exactly closes it, but passes beyond the opening." All the learned modern anatomists, among whom Haller, (14.) agree, that after Galen this was the first clear and accurate description which we have of the *foramen ovale* in the heart of the fœtus, and of the valve with which it is provided; and it was only on the ill-founded assertion, or rather the want of knowledge, of Riolanus, that the merit of this discovery was ascribed by some anatomists of the former age to Bottallus, when there can be no doubt that it unquestionably belongs to Carcano. It may be mentioned, as a farther proof of this, that soon after the publication of the observations of our author on this subject, Cæsar Aranzius hast-

ened to publish a second edition of his work on the fœtus, in which, at Chapter X. without exciting any dispute, he corrected the errors, all of which had been pointed out by Carcano. (15.)

In the infant, the two modes of communication, above described, between the two classes of great vessels of the heart, are closed. Galen was of opinion, that this closure took place between the first and fifth days after birth. Our author, after repeated observations on the dead bodies of infants at different periods after birth, and upon animals, (that is to say, with the assistance of comparative anatomy,) has demonstrated, that the above-mentioned modes of passage of the blood around the heart, are not closed so soon as Galen said, but in a space not less than two months after birth. He remarked farther, with wonderful care, that the membrane of the *foramen ovale*, in infants newly born, at first begins to become more compact and less pellucid than before, and then adheres firmly to the edges of the *foramen ovale*, so as only to leave, at the upper part, a narrow opening of communication between the two auricles of the heart, which opening, about the second month, close entirely. In a similar manner, with

regard to the *arterial* canal, it gradually contracts, and in the space of not less than a few weeks, it becomes ligamentous, and impervious to the blood of the two large arteries of the heart.

If, after the great discovery of Harvey, we have ascertained that the *ductus arteriosus* does not convey the blood from the aorta into the pulmonary artery, but from this artery into the aorta, and that by means of this canal, both ventricles of the heart in the *foetus* direct their powers on the great circulation: And if the modern physico-chemistry has taught us the nature of the ethereal principle which animals acquire with the inspired air, and the reciprocity of action of the organs of respiration with those of circulation, absolutely necessary to the life of new-born children, and not necessary for the life of the *foetus* in utero,—nevertheless, as the fundamental basis of the explanation of this phenomenon, is the perfect knowledge of the manner in which in the *foetus* the large vessels of the heart communicate with each other, there can be no doubt that Carcano deserves the credit of having paved the way to the discovery of so noble and so important a physiological fact.

Towards the end of the book of which we are speaking, our author has given a lesson for young anatomists, with regard to the most easy and certain method of preparing and considering the organs which he had described, under every point of view, and in their natural situation: A most excellent example, but appreciated and followed only by those few, who know that the habit of dissecting dead bodies is the most necessary science for the anatomist, or the examination of them in a healthy or morbid state; without which method the subject of investigation remains for the most part involved in obscurity and error.

The second book treats, as I have mentioned, of the muscles moving the eyeball, and of those of the eyelids. Carcano confirms to his master Fallopius the honour of the discovery of the levator muscle of the upper eyelid, in opposition to the boasting of Realdus Columbus, (16.) and of Valverde, and the affected doubts of Vesalius. He limited to six the number of the muscles moving the eyeball, and excluded the seventh as proper to brutes, except the ape. He described accurately the origin, situation, and insertion of these six muscles, but he more particularly occupied

himself in the examination of the two *oblique*. And, with regard to the *superior* oblique, the author points out, that in man this muscle, differently from the brutes, forms its small tendon before passing through the cartilaginous pulley, and its insertion is not horizontal between the internal angle of the orbit, and of the levator muscle of the eyeball, but below the insertion of this muscle, in the direction of from before backwards. This mode of insertion determines precisely the action of this muscle, which consists in drawing the eyeball downwards and forwards, and towards the internal angle of the orbit. Carcano, with equal care, described the *inferior* oblique muscle, with regard to which he apologizes, that he cannot avoid mentioning, that both Vesalius and Fallopius had fallen into an error, the former saying that the *inferior* oblique runs between the lower margin of the orbit, and the depressor and abductor muscles of the eye; the latter having stated in his writings, that the *inferior* oblique muscle is situated between the two depressor and the abductor muscles, and the ball of the eye. Our author was likewise the first who taught that the *inferior* oblique muscle, while it surrounds at the under part the ball of the eye, first passes over the depressor

muscle, and then is insinuated under the abductor, where it spreads out its tendon, and, ascending along with it, is inserted in the superior hemisphere of the eyeball; in the vicinity of the insertion of the tendon of the *superior* oblique, but rather more posteriorly. And this is undoubtedly the first perfectly accurate description we have of the two oblique muscles of the eye, especially of the *inferior* oblique. If this fact had been known to Zinn, (17.) he would not have ascribed the merit of it to Morgagni, who, with his usual ingenuousness, and being very skilled in the literature of the ancients, far from appropriating it to himself, candidly acknowledged that it was due to Carcano. (18.) There is farther in the work of our author a reflection on this subject, which seems even to have escaped Morgagni, viz. that if the insertion of the *inferior* oblique muscle had not passed under that of the tendon of the abductor, it might have readily occurred, that, in moving the eye quickly and forcibly towards the external angle, the tendon of the *inferior* oblique might have been displaced from its proper seat and direction, in which, on the contrary, it is retained as by a bridle by the tendon of the abductor; and this, it may be affirmed, would happen equal-

ly with regard to the *greater* oblique, if this muscle was not retained by the tendon of the rectus superior. (19.)

With regard to the external parts of the organ of sight, our author was the first to discover the use of the lacrymal gland, (20.) which had been till then regarded as an indeterminate substance, suspected to be muscular by Vesalius, and, what is still more strange, destined to raise the upper eyelid. He described accurately the lacrymal puncta and ducts, and their common opening in the sac of the same name, and from these careful investigations, on the passage of the tears from the eye into the nose, he deduced, with much truth and precision, the just principles of the cure of the fistula lacrymalis.

The publication of these two books secured to Carcano his place among the most skilled and learned anatomists of his time, which praise has been also confirmed to him at the present day by the most illustrious anatomist of our time, Morgagni, who does not hesitate to place Carcano on a level with Eustachius. (21.)

The reputation of so great a master rendered this school of anatomy very crowded.

It appears from a letter written by the author to a young physician, Rejna, (22.) that there were more than three hundred pupils, in spite of the great difficulties which were here opposed to the teaching of this science,—among which may be reckoned, in the first place, that the superior authorities only granted every year one body of a criminal. Besides the repugnance which a sensible man must feel in laying his hands on a body disfigured by marks of infamy, transported from the gallows to the theatre, where it seemed to be given over to the last instrument of vengeance ordered by the laws, may be added the regret of not being able to give every year a complete course of anatomy, and of affording to the young students an opportunity of exercising themselves in this science, and in the surgical operations. Nevertheless, guided by his unceasing zeal for the public advantage, he exerted himself so effectually with the Senate of Milan, and he did so much to elude superstition and ignorance, that not long after his entrance to the chair, this school was supplied with the principal means of instruction. In the above-mentioned letter, we read that, in his lectures on osteology, he was enabled to compare the bones of the adult man with those of the *foetus*

and infant, and both with those of animals and of the ape, in order, by means of comparative anatomy, to remove the errors which had been overlooked in the works of Galen and his commentators; and that he had even had the rare opportunity of dissecting publicly the body of a pregnant woman. It appears farther, that this school of anatomy was frequented not only by young students, but likewise by medical men already advanced, the illustrious philosophers, and the distinguished learned men of Pavia, and of the adjoining cities,—which inclines me to suppose that Carcano, in his lectures, did not confine himself to dry demonstration, but that he united to clearness and precision of anatomical description, medical observations, and useful and learned reflections, which were opportunely suggested to him by the profound study of medicine, as well as by speculative and natural philosophy.

From the teaching of anatomy Carcano never separated the practice of surgery, in which, when a young man, he had acquired great fame. And here it is proper to remark, that the history of surgery teaches us, that the celebrity of surgeons has always been preceded by the reputation of excellent anato-

mists. As the fruit of his surgical observations and reflections, Carcano published a work on wounds and contusions of the head in the year 1584. (23.) This work is divided into three parts, in the first of which he treats of wounds of the integuments of the head, of the aponeurotic sheath, and of the pericranium; in the second, of contusion and fracture of the cranium; in the third, of the accidents which render the operation of trepan necessary, of the instruments for performing it, and of the subsequent cure after this operation.

He begins, Why do blows on the head, apparently slight, become not unfrequently dangerous and mortal? The solution of this important problem, he adds, depends upon the attentive consideration of the continuity of the membranous laminæ, and of the vessels of the dura mater, with the texture of the pericranium. If the force of the contusion, apparently slight, be such as to bruise the pericranium, so that it passes slowly to a dead and putrid state, it follows that an equal injury affects the dura mater, which, from this cause, is gradually detached from the internal surface of the cranium, to the same breadth as the extent of the contused and dead peri-

cranium, with effusion and stagnation of acrid serum and matter within the head, the immediate cause, however, of very severe unforeseen symptoms, which endanger the life of the patient. Pott published this doctrine as new; but there can be no doubt that it is the same as was published by Carcano 230 years before. (24.) In fact, guided by these principles, and in consequence of them, he rejected the inconsiderate practice of his time of applying the actual cautery to the sagittal suture to prevent or cure the epilepsy, and to cause the derivation of catarrhs from the head to the eyes or breast, showing, by the history of the fatal effects, the great danger to the patient from these applications, in whom the burning of the pericranium might be readily followed by mortification and detachment of the dura mater, and consequently death, especially in patients of tender age.

In simple and recent contusion of the integuments of the head, unaccompanied by great swelling, or by acute pain, our author very judiciously observes, that the use of topical emollients is contraindicated, and, on the contrary, that great benefit is derived from the application of repellent and astringent remedies, as they resist the afflux of the fluids,

and do not relax the solid fibre already deadened by the blow. This very useful practice of the present day, according to the observations of Schmucker, is regarded as a modern discovery, and yet is most clearly stated in Carcano's work. (25.)

In incised wounds, with division of the bone still remaining attached to the reverted integuments of the head, he disapproves strongly of the practice of those surgeons who cut away completely the separated integuments, leaving a wound of tedious and difficult cure. In proof of this assertion, he relates three very precise cases, from which it results that, on replacing the divided and reverted integuments in their natural situation, so that there remains at the lower part a free exit to the matter, not only the skin, but even the segment of bone, re-adhere to the subjacent parts. (26.) With regard to the subject of the effused and coagulated blood under the skin or pericranium from the violence of the blow, although Hippocrates only authorized surgeons to make an incision through the integuments of the head in cases in which there are certain marks of injury of the cranium, our author, supported by reason and experience, establishes, as a fundamental rule,

that we ought quickly to make an incision through the integuments, in order to extract the clots of blood; for, as he prudently reflects, the dispersion of the effused blood, which we call *absorption*, in similar cases, takes place slowly, and, in the meantime, the pressure occasioned by the clots of blood induces inflammation and suppuration in the integuments and pericranium; on the contrary, after removing the grumous blood, the distention and pain cease, and the incision heals in a short time by the *first intention*.

But, continues our author, *if the collection of grumous blood be under the temporal muscle, would the incision be practicable?* The father of medicine avoids dividing the temporal muscle, as this operation, he said, was always followed by convulsions and death. Carcano, with laudable boldness, has powerfully opposed this doctrine of the schools, and, supported by reason and the most decided practical facts, has demonstrated that the temporal muscle may, and ought to be divided, whenever the blood, extravasated and collected in quantity under it, renders the removal of it necessary, especially when the effusion of blood is accompanied by fracture of the subjacent temporal bone. The reading of the facts, prov-

ing the truth and utility of this doctrine, excites the greatest admiration in professional men. (27.) A young man, struck by a stone on the right temple, fell down insensible. On the arrival of Carcano, the effused blood had elevated the temple into a large tumour. Having made an incision through the integuments and aponeurotic sheath of the temporal muscle, and having removed a large portion of black coagulated blood, the temporal bone was discovered to be fractured. Our author did not hesitate to divide the temporal muscle, in order to open a sufficiently large passage to raise the fractured and depressed temporal bone, which he effected by means of the *lever*. After this operation the young man gradually recovered his senses, and on the twentieth day was able to speak a few words. The cure was tedious on account of the numerous fragments of bone which were successively discharged from the wound, but he ultimately recovered.

A man, during the night, received a blow of a stick upon the right temple, which brought him to the ground apparently dead. At day-break he was carried into a neighbouring house. There was an enormous tumour of the temple produced by the effused blood.

Carcano divided, with one stroke of the knife, the integuments and temporal muscle down to the bone, in order to allow the blood to be discharged; and, at the same time, to ascertain the state of the subjacent temporal bone, which he found fractured and depressed. In spite of the extensive vertical incision, being unable to elevate the depressed bone conveniently, he made a second transverse cut across the temporal muscle, after which he obtained his desire. The patient recovered his senses, and was cured in the space of three months.

A carpenter received a blow of a sabre, which made a complete transverse section of his left temporal muscle, and penetrated through the bone of the temple to the dura mater. This patient was likewise cured without having experienced symptoms of partial spasm, or of general convulsions.

A regular canon fell headlong from a tower, and among the many contusions which he received, there was one on the left temple, with effusion of blood under the temporal muscle, with fracture and depression of the bone. In this patient, also, the incision of the temporal muscle was performed, without the supervention of local or general spasm.

Hercules Biffi received a blow with a cut-

ting instrument upon the head, which separated the temporal muscle from its situation, and turned it back over the ear, with dreadful hæmorrhage proceeding from the division of the temporal artery. After stopping the blood, the divided parts were brought together, and retained *in situ*, and the patient recovered his health, without having been affected with the slightest symptom of trismus or of general spasm.

Carcano having communicated the history of the first of these patients to Fallopius, the latter expressed great surprise at it, and said that *he would not have attempted to do the same*; in which answer timidity seems to have taken the place of prudence. For, however unlimited we may suppose the veneration for Hippocrates's authority to have been, (as, in the cases above detailed, the great collection of coagulated blood under the temporal muscle was evident, and as there was no doubt of the fracture, with depression of the subjacent bone of the temple, which evils nature alone cannot remedy,) reason suggested the employment of the only means which surgery furnishes, although of uncertain event, rather than abandon the patient to a death otherwise inevitable. This trait alone suffices,

in my opinion, to develop the genius of the art, which, nourished by study and experience, comprehends rapidly a great number of objects, and compares them together, and, despising the common rules, soars beyond the limits by which the art itself seemed to vulgar eyes to be invariably circumscribed.

Our author then proceeds to explain the phenomena of commotion of the brain, in consequence of a violent blow on the head, and to distinguish them from those which are the effect of compression of this noble organ, one of the most intricate and obscure subjects in surgery. *In the commotion*, says he, *a short time after the accident, the patient is less insensible than in compression; he complains during the act of examining his head, and sometimes raises his hand to it; the pupils are contracted; the motions of the limbs are unimpaired; the pulse is not slow; the breathing not stertorous. On the contrary, in compression of the brain, the patient is completely insensible; the pupils are dilated; the limbs relaxed; the pulse slow; the respiration apoplectic. Vomiting is rather a symptom of commotion than of compression of the brain, which fact I can confirm from having repeatedly seen it verified in practice.* A speculative surgeon, a writer of

systems, would have contented himself with this explanation of the symptoms, pointing out the two forms of the disease ; but our distinguished practical surgeon, a careful observer and lover of the truth, adds ingenuously, that, in spite of the above explained difference of symptoms, the diagnosis is very often difficult from the many anomalies which supervene, (28.) and that, therefore, the justness of the diagnosis is derived partly from the consideration of the symptoms, partly from the good judgment of the surgeon, in being able to estimate all the more minute circumstances of the case ; as, for example, the posture of the patient when he was struck ; the violence of the blow ; the nature of the wounding instrument ; the age and constitution of the patient, and the like. The violent fever, he remarks, which arises on the second or third day after the blow, without any diminution of the cerebral symptoms, is a sign of speedy and inevitable death. Carcano farther observes, very properly, that the perplexity of the surgeon is unusually great with regard to the kind and severity of the injury, when there is a permanent loss of sense, with paralysis of the limbs, without evident external fracture of the cranium. It may, indeed, be conjectured, that the brain is

compressed, but it is not easy to determine if the compression be occasioned by depression of the inner lamina of the cranium, or by blood effused within the head; and when it even seems probable that the cause of it is effused blood, it remains to be ascertained if the bloody effusion is between the cranium and the dura mater, or between the latter and the pia mater, or within the substance of the brain. With regard to this very difficult and obscure point of the diagnosis of injuries of the head, Carcano declares his opinion, which, in my belief, deserves the most attentive consideration of practical surgeons, from being deduced from very accurate observation and long experience. His precise opinion was, (29.) that, from a violent blow of the head, the cranium remaining unbroken, if, from the violence of the blow, effusion of blood takes place in the head, this effusion never, or almost never, takes place between the cranium and the dura mater, but between the dura and the pia mater, or in the substance of the brain, from the rupture of the vessels of the pia mater, which are, without doubt, less resistant than those of the dura mater, both on account of their fine texture, as well as from not being applied over a dense membrane

From which our author very prudently and usefully infers, that, in similar cases, in performing the operation of trepan, although the surgeon is sufficiently fortunate, which is rare, to perforate the head precisely opposite to the place of the effusion of blood on the pia mater, as he is under the necessity of dividing the dura mater, and of laying bare the brain, in order to evacuate the blood, the operation of trepanning only accelerates the loss of the patient, and the discredit of the art. It is not so, he continues, when the cranium is evidently fractured by the violence of the blow; if this accident be followed by effusion of blood within the head, the effusion takes place between the cranium and the dura mater, from the rupture of the vessels of the dura mater; in which case the trepan is not only indicated, but necessary and useful.

However, this effusion and accumulation of blood under the cranium, provided it does not proceed from the rupture of the trunk of the *spinous* artery, generally takes place slowly; on which account, the symptoms of irritation and of pressure, produced by this kind of effusion of blood on the brain, are slow in their approach, and they cannot, consequently, be confounded with those which appear im-

mediately after the blow, which does not injure the cranium, but ruptures the vessels of the pia mater. And still less can we confound with these symptoms those which arise from slow suppuration of the dura mater from *necrosis* of the whole thickness of the contused bone, which symptoms sometimes do not appear for several months after the accident; and if the patient dies from the violence of them, the surgeon is not warranted to infer that he has died from a different cause than that of the blow inflicted on the head, as the surgeon Manardi (30.) inconsiderately did in similar circumstances before the tribunals of Milan, and was therefore very justly censured by our author. It is true, that all of these cases of secondary symptoms of cerebral affection are not fatal, as art very often remedies them, by the speedy application of the trepan on the *necrosed* portion of bone; and not unfrequently nature forces the matter through the porosity of the carious bone, and detaches the dead from the sound bone, showing the dura mater red and granulous, and disposed to form a cicatrix with the common integuments of the head. The pus, adds our author, is forced in jets, in the first case, through the carious bone, as water, when

boiling, bubbles up in a pot; which is as much as to say, in the modern language of surgery, according to the elevation and depression of the brain, corresponding with expiration and inspiration. I am not afraid of committing an error in saying, that in these few passages of Carcano's work is included the whole of our most important and useful knowledge with regard to the *diagnosis* and *prognosis* of severe injuries of the head from external causes.

The phenomena of the *introcession* of the one or other of the laminæ of the cranium, in consequence of blows on the head, did not escape the attentive observation of our author. (31.) He placed both of these accidents among FISSURES, as in fact the internal lamina cannot be detached from the external without fissure, and he very properly calls the first a *formidable* case, because it eludes the conjectures of the surgeon, and the application of the curative means, in the same manner as fissures of the cranium from *contre-coups*. In the second case, he remarks, that although this accident is not accompanied by symptoms of injury of the dura mater, and of the brain, it may, notwithstanding, become the cause of very fatal consequences, on account of the

contusion of the *diploe*, the effusion of blood into its cells, the corruption of the medullary oil, the suppuration and *necrosis* of the internal lamina of the cranium; he therefore points out, with clearness and precision, the means he employed for preventing these melancholy consequences. In general, the points which regard the cure of fissures and fractures of the cranium, are explained by our author with profoundness of learning, and from rational experience. In these times, the practice prevailed of scraping the denuded cranium, whether the bone was fractured or not. It was scraped when simply laid bare, to ascertain the depth to which the contusion penetrated, and it was scraped when fractured, to ascertain if the fissure included both tables of the skull. Carcano demonstrated, in the most convincing manner, the absurdity and disadvantage of this practice, which he restricted to some rare and particular cases, and proved, that if there are not symptoms indicating injury of the important parts contained in the head, the scraping of the cranium is unnecessary; and if these symptoms be present, we ought not to have recourse to the scraping, but to the trepanning of the cranium. (32.)

With regard to the propriety or impropriety of the trepan, he declared, in the most precise manner, that this operation ought never to be performed but for great and evident reasons, never from simple conjecture, nor the fear of the supervention of evils greater than those with which the patient is affected. There are three circumstances he distinctly states, in which this operation is indicated ; *first*, when there are certain and evident marks of fracture of the cranium, with depression ; *secondly*, when there is no doubt of effusion and collection of blood between the cranium and the dura mater ; and *thirdly*, when the fissure, caries, or *necrosis* of the cranium, even a long time after the injury, are followed by stagnation of matter under the cranium, with evident marks of irritation and pressure of the brain. The depression of the cranium in children, not accompanied by cerebral affections, forms, our author prudently observes, an exception to the general rule.

Carcano described the instruments and steps of this operation with precision equal to the description we read in modern surgical works. And, as a farther assistance to the young student, he showed, with proper outline figures, in what manner the crowns of the trepan

ought to be placed, when one is not sufficient for allowing the introduction of the lever to raise the depressed pieces, and extract the blood and pus. (33.) He pointed out the eligible places, and those of necessity, not excepting the sutures, and fixed the quantity of the bone to be removed, which, he observed, ought not to be in proportion to the extent of the fracture, but to the greater or less detachment of the dura mater from the cranium. He expressed surprise, not without reason, why Hippocrates said that the trepan ought not to be applied till after the third day from the appearance of cerebral symptoms, and refuted Berengario da Carpi, who, to account for this precept of Hippocrates, said that it was proper to wait until the dura mater was sufficiently detached and separated from the cranium, so as to run no risk of being wounded by the crown of the trepan. A vain fear, adds Carcano, if the instrument is employed by a dexterous hand, and if all those useless instruments proposed by the more ancient writers are laid aside. Finally, he combated vigorously the opinion of those who attributed the unfortunate event of the operation of the trepan to the hurtful qualities of the air of Milan, showing them, that, instead of wander-

ing on this point into hypotheses and conjectures, they ought to recognise the true reasons of this misfortune in the severity of the injury, —in the softness and importance of the brain, —in the improper application of the trepan, as well as of the internal and external remedies. If the badness of the air of Milan had any share in that, I would not have cured, said he, a hundred of poor people severely wounded in the head, living in miserable houses, without fire in the coldest season, scarcely sufficient to warm the plasters. (34.) We may rather consider as the causes of the unhappy event of this operation, in addition to the above-mentioned causes, neglect of the internal treatment, especially as to what regards the prevention of the morbid consent of the digestive and biliary organs with the head, (35.) the errors of the patients in diet, the improper application of external remedies, either irritating or too relaxing, to which, he said, ought to be preferred the ointment of Oenelo, or that composed of oil and wine, because, from its moderately astringent and corroborant qualities, it opposes putrefaction, and favours the mild suppuration and granulation of the wound. From which suggestion, as well as from several others similar to it, in

speaking of the cure of gunshot wounds, of abscesses, and of ulcers, I may be allowed to infer that our author had already felt the necessity of a reform in surgery, in regard to the simplicity of external remedies, and on the advantage of few dressings, which subject was afterwards resumed and amply treated by Magati, so honourably to the author, and of so much benefit to Italian surgery.

If we consider the state of this science from the time of Gulielmo de Saliceto, of Lanfranco, of Cauliaco, of John de Vigo, of Vido Vidio, of Berengario, of Andrea della Croce, to the period when our author lived, when there was taught little more than a jumble of truth and errors copied from the Greek and Arabian writers; and if we compare their surgical doctrines with this excellent treatise on injuries of the head, founded on anatomy, on pathological observations, on reasoning free from the prejudices of authority, it will appear how high Carcano had raised himself above the knowledge of the surgeons of his time. And our admiration increases as well as our gratitude to this great man, if we reflect, that on the important subject of injuries of the head, modern surgery has hitherto added nothing of importance to the steadiness of the

precepts which have been transmitted to us by this excellent anatomist and surgeon; and the rather that I am grieved to be obliged to mention, that, if we except Morgagni, whose immense erudition nothing has escaped, none of the most esteemed writers on injuries of the head have even spoken of Carcano, while we see quoted by them, in almost every page, writers justly censured and convicted of error by our author. And this is not the only example of men, illustrious in the sciences and useful arts, of whose merit the just acknowledgment, as well as the memory, in the course of ages, have been dissipated and lost. Placed, as we now are, in a wide sphere of light, turning our view backwards, we no longer see the luminous centre from which so much splendour has emanated.

In the year 1584 the archbishop Carlo Borromeo died. On this occasion Carcano, in preference to every more accredited anatomist, was fixed upon to perform the dissection of the body of the reverend archbishop. (36.) From the accurate account, as well as the prudent reflections published on this subject, it appears that our author was not only a skilful anatomist and surgeon, but a learned physician. The profound study of his art rendered

him worthy of the numerous successful cures which he continually obtained, in consequence of which, his assistance and advice were sought for by the most distinguished princes and persons in Italy and from abroad. (37.) His constant employment in practice is probably the reason why he was not able to finish some works on anatomy and surgery, such as the complete description of the eye, (38.) the treatise on tumours, (39.) the observations on the *vena azygos*, valuable writings which have been lost. We learn from his contemporaries, as appears from several passages of his works, that he was generous, humane, and particularly attentive to the wants of the poor; (40.) which qualities, united to knowledge, always procured him the esteem, friendship, and love, of every class of society. During the space of twenty-seven years, he held the honourable charge of professor of anatomy in this university. He died, full of years and honours, in the year 1606. (41.) By Violante Soldata he had several sons, among whom Carlo (42.) distinguished himself. Following the bright path of his father, he deservedly succeeded Gaspare Asellio, (43.) another of the great ornaments of this already celebrated school of anatomy.

The memory of John Babtista Carcano will always be honoured by all the cultivators of anatomy and surgery, an ornament to this university, and from his studies and example, valuable to the young student. For, if he has been able to do so much in teaching and illustrating anatomy and surgery with moderate assistance, how much more ought we not to expect from equal activity and diligence employed by the student supplied with abundance of means of instruction? The anatomical science, allow me to repeat it, is perhaps the only one with regard to the utility of which no dispute has ever arisen. It is perhaps the only one for the teaching and progress of which sovereign munificence has contributed very little. But it is not so in this university in the reign of the Great Napoleon. Here the study of anatomy and surgery is protected and promoted by every kind of royal liberality. A complete collection of anatomical preparations,—a cabinet of comparative anatomy,—a collection of parts of the human body in a morbid state,—a large assortment of instruments for the use of those who choose to exercise themselves in anatomical researches, and in surgical operations, form a vast combination of means not readily met with in any

other of the principal anatomical and surgical schools of Europe. Add to all this the rewards and honours which our august Emperor and King liberally bestows on those who, with unusual diligence or zeal, engage in the exercise of these sciences and arts to the benefit of humanity, in the cities, as well as in his numerous and invincible legions. Following this great example of wisdom, of valour, and munificence, Eugene Napoleon has placed among the principal cares of the government, that of exciting and effectually promoting our studies. The regulations flowing from him, with regard to the rules to be observed by us, will prove a monument of eternal praise to this great prince, and especially that with regard to the Latin language, which, from the great sloth and ignorance of those who presided over the public instruction, was banished from its native soil, not foreseeing the very great loss which the want of it would occasion to the education of youth, and the cultivation of pleasant and scientific learning. The wise administration of the enlightened minister, the zeal of the director of public instruction, conspire in a wonderful manner to the accomplishment of so many benefits bestowed on us by the sovereign authority. Under the pow-

erful Ægis where we are all assembled, is now solemnly re-opened this renowned seat of the Muses, and I see already rekindled in the minds of these illustrious professors, the most lively ardour for the instruction and progress of the sciences and arts, which they cultivate, with so much honour to themselves, and ornament to this university. I perceive in the countenances of the young students the desire of instructing themselves in every branch of human knowledge, the base and principal foundation of every private and public happiness, and I anticipate the most abundant fruits from the cultivation of their talents. I offer fervent vows for the perpetual prosperity of this school, and may these crown the long career which I have run in it.

NOTES.

(1.) De Vulneribus Cap. Sermo III. p. 116.

(2.) Loc. cit. Sermo I. p. 25.

(3.) Ibid.

(4.) Sermo II. p. 76. Atque eo etiam tempore, quo excell., ac non modo rei bellicæ, verum et literariæ peritissimus arcis Mediolani præfectus dignissimus D. Alonsius Pimantellus mihi adeo favit, ut non modo me Fallopium audiendi intenso desiderio detentum hac occasione demi-serit, verum etiam et magnam argenti copiam exporrexerit, quo, quod valde cupiebam, et rectius et facilius assequi valerem.

(5.) De Musc. Ocul. et Palpeb. p. 36. Quidquid boni dixero in eum, et ad eum relatum esse volo. Is enim fuit, qui me, tanquam fratrem optimum, amavit. Is fuit, qui me domi suæ, dum anatomen ab ipso discendi magno desiderio detentus ad celeberrimum gymnasium me contuli Patavinum, liberaliter excepit.

(6.) Sermo III. p. 116. Præterea Patavii celeberrimi illius medici, anatomicique Gabrielis Fallopii vestigia sum æmulatus, adeo ut Mediolanum me, absoluta anatome, contulisset, suis me certiozem fecit literis, se eo pacto, cum magnificentissimis Venetis de me esse loquutum, ut dicerent se velle omnino ejus loco me Patavii esse substitu-

tum, ita ut publice chirurgiam, anatomenque in celeberrima illa academia edocerem; ac mihi scripsit, hujus rei gratia mihi a magnificentissimis Venetis trecentos aureos singulo quoque anno offerri; quod quidem munus minime recusavi. Ac cum interim mors ipsum, maximi animi mei mærore præoccupasset, me ab hujusmodi munere obeundo continui.

(7.) Gabriel Cuneo, a pupil of Vesalius, published some anatomical plates, along with another work, entitled *Universæ Medicinæ Synopsis*. Farther, he undertook to defend Vesalius against the imputations of Francisco Pozzo, *Apologiæ Francisci Puthei examen*. Cardano *de vita propria*, thought that this essay was, properly speaking, one of Vesalius's, to which Cuneo had only lent his name; but this opinion is devoid of every proof.

While Cuneo taught here, that is, about the year 1560, the anatomical theatre was erected for the first time in this university, in imitation of that at Pisa.

(8.) Sermo II. p. 77.

(9.) Morigia, *Nobiltà Milanese*, p. 252.

(10.) Sermo III. p. 124.

(11.) De cordis vasorum in fœtu unione. Ticini, 1574.

(12.) De musculis palpebrarum, atque oculorum motibus deservientibus. Ticini, 1574.

(13.) Elem. Physiolog. T. VIII. "Ductum arteriosum Galeno non ignotum Carcanus accuratius descripsit."

(14.) Loc. cit. "Foramen *ovale* a Galeno minime male descriptum, non perinde ab iis qui post instauratam anatomen scripserunt, a J. B. Carcano, accurate restitutum."

(15.) The first edition of the work of Cæsar Aranzio, *De Humano Fœtu*, appeared in the year 1564, at Bologna. In the second edition in the year 1576, the author has not

only corrected the errors which are met with in the first, but in addition has added a description, sufficiently accurate, of the *venous canal*, which, in the fœtus, keeps up the communication between the vena portæ and the cava.

(16.) It must be allowed, that, on this occasion, Carcano has suffered himself to be carried beyond the bounds of politeness. So far, however, it appears, he was not led on by bad intentions, but by the great love which he cherished for the truth, and from seeing that an anatomist, who dared openly to assert, that the penis has neither veins nor nerves, (see the work of Colombo *De re Anat.* lib. ix. cap. xv.) should speak contemptuously of Vesalius and Fallopius, his masters, and should refuse to the latter the deserved praise of the discovery of the levator muscle of the upper eyelid.

(17.) *De Ocul. Hum.* cap. viii. p. 181.

(18.) *Epistol. Anat.* xvi. 34, 35.

(19.) *Lib. II.* p. 31. Et quamvis Vesalius hanc sub musculis occultationem in musculi usu et insertione præter omnem rationem esse censendam, ideoque noti fuisse necessariam, asserat, attamen cum hæc tendinis sexti musculi occultatio fiat, sub tendine musculi oculorum extrorsum agentis, quis inficias ibit hanc a natura necessario esse factam? Propterea scias eadem ratione et hanc sexti musculi sub tendine musculi oculum extrorsum agentis occultationem a natura necessario esse factam, qua et diximus necessariam fuisse occultationem tendinis quinti musculi sub tendine musculi oculum sursum ducentis; hac ratione, siquidem occultationem hanc factam a natura fuisse facile credere nos possumus, ne dum se ad minorem retorquet oculi angulum, sextus musculus, quem et transversim amplexatur, ad hanc vel illam partem divagaretur,

verum a tendine musculi hujus oculum extrorsum agentis, tanquam a freno vel habena quadam firmiter detineretur.

(20.) De Muscul. Ocul. et Palp. p. 11.

(21.) Epist. Anat. xvi. loc. cit. *Prosectorem alioquin ea diligentia ut propemodum cum Eustachio certare possit.* Haller, likewise, in his *Bibliot. Chirurg. t. i. page 245*, speaking of our author, said, *Vir insignis et in anatome, ut est notissimum, et in chirurgicis.* In anatomy, as well as in the natural sciences in general, the discoverer of new facts has not a greater title to celebrity than he who frees the discoveries from the errors with which they are often combined. Carcano, at the beginning of his anatomical works, places himself, with great modesty, in this class. And, indeed, the discovery in physics is very frequently due less to the sublimity of genius, diligence, and dexterity of the discoverer, than to the accidental combination of particular circumstances. On the other hand, the placing in a clear light a discovery of such a kind free from error, the extending its limits, the demonstrating its relations with the other parts of the science to which it belongs, and the advantage derived from it to mankind, comprehends a series, to use the expression, of discoveries due alone to the acuteness, to the unwearied labour, and industry of the observer. For example, in speaking of the great discovery of the circulation of the blood, no one will say that greater praise is due to Cesalpino, Realdo, Colombo, Acquapendente, Serveto, than to Harvey, to Malpighi, or Haller. And, discoursing upon the other important anatomical discovery, viz. of the lymphatic absorbent system, no one versed in these matters would think that greater encomiums were due to Asellio than to the investigators and promoters of this important branch of the animal economy in man, as well as

in the principal classes of animals, Rudbekio, Bartolino, Jolivio, Nuck, Pecquet, down to Mascagni.

(22.) *Lettera di G. B. Carcano Leone pubb. anatomico nello studio di Pavia del felice successo di sua notomia fatta quest' anno 1585, al nob. e dottissimo giovane il Signor Antonio Reina, figlio del molto illustre Signore il Signor Gotardo Reina Regio e Ducale Senatore. Milano, 1585, per Giacomo Maria Meda.* This very rare work is preserved in the Ambrosian Library, at No. 25.

(23.) *De Vulneribus Capitis liber absolutissimus triplici sermone contentus. Mediolani, 1584.*

(24.) Sermo I. p. 4. Ratio est, eo quod, etsi nullum cranio et partibus ipsi subjacentibus nocumentum evenerit ex tali vulnere, attamen ob magnam quam pericranium cum dura membrana habet colligationem (siquidem verum sit id ex fibris ab ipsa exortis, vel ex ligamentis suturas intercurrentibus ortum trahere) mortem tale vulnus in cute capitis existens offerre potest; proinde lethale nonnunquam tale vulnus est dicendum ratione qua læsio pericranii duræ membranæ, inde cerebro facile communicari possit.

Dessault doubted the truth of this doctrine, pointing out, that very frequently the pericranium has been found lacerated, and detached from the cranium, without the dura mater being therefore diseased. But upon this subject he has not remarked that Pott, and, prior to any other, Carcano, do not speak in this place of recent manifest contusions of the pericranium, but of the occult, and of those which, after a longer or a shorter period after the blow, produce swelling, with putrid and fetid suppuration under the sound integuments, and then separation of the pericranium from the cranium, which accidents, some time after the injury, are accompanied by fever, afterwards by symptoms indicating extravasation of serum, or of matter, with

severe injury of the parts contained within the cranium. And it is precisely in this combination of circumstances of slow appearance of tumour, and of suppuration, that the dura mater is constantly found putrified and detached from the cranium for an equal space as the detachment and loss of the contused pericranium. If, in some cases, the injury of the pericranium, and along with it the *necrosis* of the whole thickness of the cranium, take place, without considerable effusion of serum and of matter, between the cranium and the dura mater, and without cerebral symptoms, then the necrosed portion of the cranium is detached entirely from the sound part, and exposes the dura mater granulous, and disposed to form a cicatrix with the integuments, these fortunate cases ought not to be contrasted with the first, and on this point they do not render less true the doctrine of Carcano and of Pott, established on experience.

(25.) De Vuln. Capitis, Sermo I. p. 14.

(26.) Sermo II. p. 79.

(27.) Sermo I. p. 37.

(28.) Sermo II. p. 79.

(29.) Sermo II. p. 84, 85. Vas de cujus timemus abruptione vel est in dura, vel in pia membrana; at in dura rarissime evenit ut frangatur; igitur hac ratione rarissime perforatio convenire videtur, quod est contra aliorum sententiam. Vasa piæ meningis sunt, quæ meo judicio, molissima cum sint, facile abrumpuntur in ictibus capitis, rarissime autem quæ in dura consistunt membrana ob eorum duritiem. Quod cum ita se habeat, quid prodest perforatio hac prima ratione facta?—Perforationem magna cum difficultate hac prima ratione ego aggredior. Etsi enim aliquando fieri possit ut vas in dura habitum frangatur, attamen cum rarissime hoc dicam evenire, et hac in re nul-

lam habeam certitudinem, propterea hoc satius existimo ab hujusmodi operatione abstinere, quam istam, ut multi solent, ita prompte tentare. Quod si operationem talem non aggrediens fieri potest ut decipiar, hacque ratione fortassis culpandus veniam ex vasis aliquando in dura contenti abruptione, dico quod melius est semel et bis, quam centies et millies decipi, vase scilicet potius in pia quam in dura contento abrupto, p. 91. In the great perplexity in which we are placed, as to the propriety of trepanning, for removing blood effused within the head, in consequence of a blow without any external wound, this important observation, omitted unfortunately by modern writers, will serve as a guide.

(30.) Sermo I. p. 50.

(31.) Sermo I. p. 58. Vel est ossis introcessio, depressiove. Hæc autem est duplex, vel cum depressione utriusque laminæ ex quibus prævenit duræ membranæ compressio, vel cum introcessione alterius tantum laminæ, quibus semper accedit rima ex Hippocratis sententia, quando os non possit introcedere, nisi ab osse sano introcedat. On this subject, see Morgagni *De Sedibus et Causis Morb.* Epist. 52. Art. 37.

(32.) Sermo II. p. 82. Quare viri egregii hoc est quod de cranii abrasione censeo; ut nunquam in contusione simplici ipsa fieri debeat; nec etiam in rima, sive ipsa sit profunda, sive non; quandoquidem et post abrasionem, si profunda fuerit fissura, ad terebrationem soleant devenire chirurgi. In a matter so evident, it must excite surprise that Dessault should still follow the erroneous practice of scraping the cranium in a case of fissure.

(33.) Sermo III. p. 130, 131. It is an excellent precaution, observes Carcano, to have in readiness two crowns of trepan perfectly alike and equal, because, at the mid-

dle of the operation, if the one should become blunt, the other might be substituted for it without any delay in the operation. On this point our author quotes a passage of Hippocrates: "Verum terebrantem oportet, ubi jam parum abest ut os sit perforatum, et os jam movetur, a terebratione desistere et sinere, ut os sua sponte decidat: *De vulneribus capitis*;" from which it may with certainty be inferred, that the crown of the trepan was an instrument known to the father of medicine; and this being the case, it is difficult to comprehend the reason why Galen and Paulo preferred opening the cranium, by making many holes with the perforator, (terebellum,) and then cutting from one hole to another with *scalpels* and a *mallet*, when, by following the practice of Hippocrates, they might have obtained their end quickly and easily, employing the crown of the trepan.

(34.) Sermo III. p. 110.

(35.) Sermo III. p. 113. From the following passage it appears, that Carcano was well acquainted with the fatal influence of the *bilious* congestions of the primæ viæ on severe injuries of the head: *Fæces sunt expurgandæ ita ut ea propinentur quæ alvum subducere valeant, et humorem sui natura fluere (qui quidem biliosus est) ac inflammationem parere aptum educere.*—Quantum in passionibus capitis enematum usus sit approbatus nulli non constare potest.—Unde cum magnam ciborum ac vini copiam in suum ipsorum ingerunt ventriculum, nil mirum si magna læsio capiti multoties inferatur, ratione qua invicem cerebrum et ventriculus valde compatiuntur.

(36.) *Exenteratio cadaveris illustrissimi cardinalis Caroli Borromæi.* Mediolani, 1584.

(37.) Morigia, *Nobiltà Milanese*, pag. 253.

(38.) Oper. Anat. lib. i. pag. 21; lib. ii. pag. 42, 43.

(39.) De Vuln. Cap. Sermo I. pag. 15.

(40.) Neque enim mirandum est pauperes mihi testes adhibeam, quando in me mos talis semper viguerit, ut hisce lubentius mederer quam divitibus atque principibus, quando pauperes nobis magis obtemperantes, ex quo etiam facilius evadunt habeamus; fortassis etiam majorem ex his consequamur utilitatem.

(41.) The letter of appointment, given by the Senate, is dated the 17th November 1573. Mention is made of this professor in the successive registers of this university, as far as the whole of the year 1603. In 1609 Lorenzo Lazari is substituted for Carcano. It is impossible to discover why, in 1588, Carcano hesitated if he should go to Pavia. This circumstance excited much displeasure in the students and literati of this city, as appears from the following letter of the celebrated philosopher, Gironimo Casoni: *

“ Molto magnifico ed eccellentissimo,

“ Signor mio osservandissimo.

Venga adunque V. S. allegramente, ed io le so dire che verrà aspettativissimo e desiderativissimo dai migliori e piu finiti ingegni di quest' università, che sperano d'imparare da lei tutto quello, o poco meno, che imparerebbero dalla natura medesima, se ella sapesse discorrere e tagliare i corpi umani, ed aprir con parole il misterioso artificio delle sue opere. Io veramente conchiudo ed affermo palesamente che chi non onora e non ammira sopra modo e l'éléganza e la dottrina sua, è ignorante o maligno affatto. Amatemi, signor mio, e comandetemi, spendendomi per quel che vaglio, ed anche per qualche cosa di più; poichè in virtù dell' affezione che vi porto, mi sforzerò di valerlo, e vi bacio le mani. Pavia, 9 Dicembre 1588.”

* I have inserted the above letter in the original, as a curious specimen of an Italian complimentary letter.—T.

There is no doubt, however, whatever may have been the cause of this delay, that the name of Carcano is found recorded in the register of the following year, 1589.

In the year 1600 Carcano had his tomb built in the church of St Erasmus, in Milan, to which he affixed the following epitaph :

BAPTISTA CARCANUS
IN GYMNASIO TICIN. PROFESSOR PUBLICUS
ANATOMIÆ
ET IN CHIRURGIA EXERCENDA SOLERTISSIMUS
ATQUE VIOLANTA SUDATA
CONJUNCTISSIMI CONJUGES
MORTIS INEVITABILIS MEMORES
SIBI ET POSTERIS POSUERUNT
ANNO MDC.

(42.) Carlo Carcano, in the year 1625, was appointed by the Senate *ad lecturam anatomie et sectionis cadaveris*, with the salary of 800 livres, and with the usual expressions, *quoad expensas itineris et moræ Senatus providebit*. Carlo continued to teach till the year 1632, when he died. For in the register of the following year is found written : *Cum obitu doctoris Caroli Carcani vacet munus legendi anatomiam et secandi cadaveris valde necessariam in Gymnasio Ticinensi, alium ejus loco sufficiens censuit Ecell. Senatus, qui edoctus de peritia et idoneitate doctoris J. B. Melii, illum loco dicti Carcani ad annum elegit cum salario librarum octo centum.*

(43.) Mention is made of Gaspar Asellio, in the register of the year 1624, in these terms : *Ad lectionem anatomie et sectionis cadaveris Gaspar Asellius ad triennium*. This great man died the following year, 1625.