A lecture, containing plain descriptions of the situation of the large blood-vessels, of the extremities ; the instrument called tourniquet; and the methods of making effectual pressure on the arteries...Delivered to the scholars of the Maritime school, at Chelsea... / by William Blizard.

A

LECTURE,

CONTAINING

PLAIN DESCRIPTIONS

OF

The SITUATION of the large BLOOD-VESSELS of the Extremities;

The Inſtrument called TOURNIQUET;

AND

The Methods of making effectual PRESSURE on the ARTERIES, in Caſes of dangerous Effuſions of Blood from Wounds, &c.

DELIVERED TO THE SCHOLARS OF THE

MARITIME SCHOOL, AT CHELSEA;

Firſt printed for their Uſe;

And now publiſhed for general Benefit;

By WILLIAM BLIZARD,

Fellow of the Society of Antiquaries;

Surgeon to the London Hoſpital, and the Honourable Artillery-Company;

And Lecturer in Anatomy, and Surgery.

Prodeſſe quàm conſpici.

LONDON:

Printed, by J. W. GALABIN,

For C. DILLY, in the POULTRY.

M.DCC.LXXXVI.

PREFACE.

THE INTRODUCTION, prefixed to theſe pages when firſt printed for the uſe of the ſcholars of the MARITIME SCHOOL, explains their original deſign. The publiſhing them has been frequently urged by men of good ſenſe and benevolence. A paſſage, in Captain DRINKWATER's curious account of the ſiege of Gibraltar, expreſſes ſtrongly the probable utility, and therefore propriety, of ſuch a publication. —— "September, 1781. The 30th, a ſoldier of the 72d "loſt his legs by a ſhot from Fort *Barbara*. He bore "amputation with prodigious firmneſs; but died, ſoon "after, through the loſs of blood previouſly to his be-"ing brought to the hoſpital. This fact being repre-"ſented to the governor, the ſergeants of the different "regiments were ordered to attend the hoſpital, to be "taught by the ſurgeons how to apply the TOURNI-"QUET; which was afterwards productive of very be-"neficial

" neficial conſequences. Tourniquets were alſo diſtri-
" buted to the different guards, to be at hand in caſe of
" neceſſity."†

Were the knowledge of the ſituation of the blood-veſſels of the extremities, ſo far as is neceſſary for checking dangerous effuſions of blood, and the uſe of the tourniquet, generally underſtood; not confined to the navy and army, but extended to colleges and ſchools, particularly military and nautical academies, manufactories, hoſpitals of every deſcription, priſons, plantations, fire-offices, the clergymen of pariſhes in which are no ſurgeons, commanders of merchantmen, miners, &c. it could not fail of proving highly beneficial to mankind.

The late Sir BARNARD TURNER would have bled to death, on the ſpot of his fatal accident, if compreſſion had not been inſtantly made on the artery of the wounded limb. Laſt winter, a poor man, in Cornhill, did actually bleed to death, from a ruptured veſſel in his leg, for want of timely application of a tourniquet. —— But the experience of moſt perſons could afford

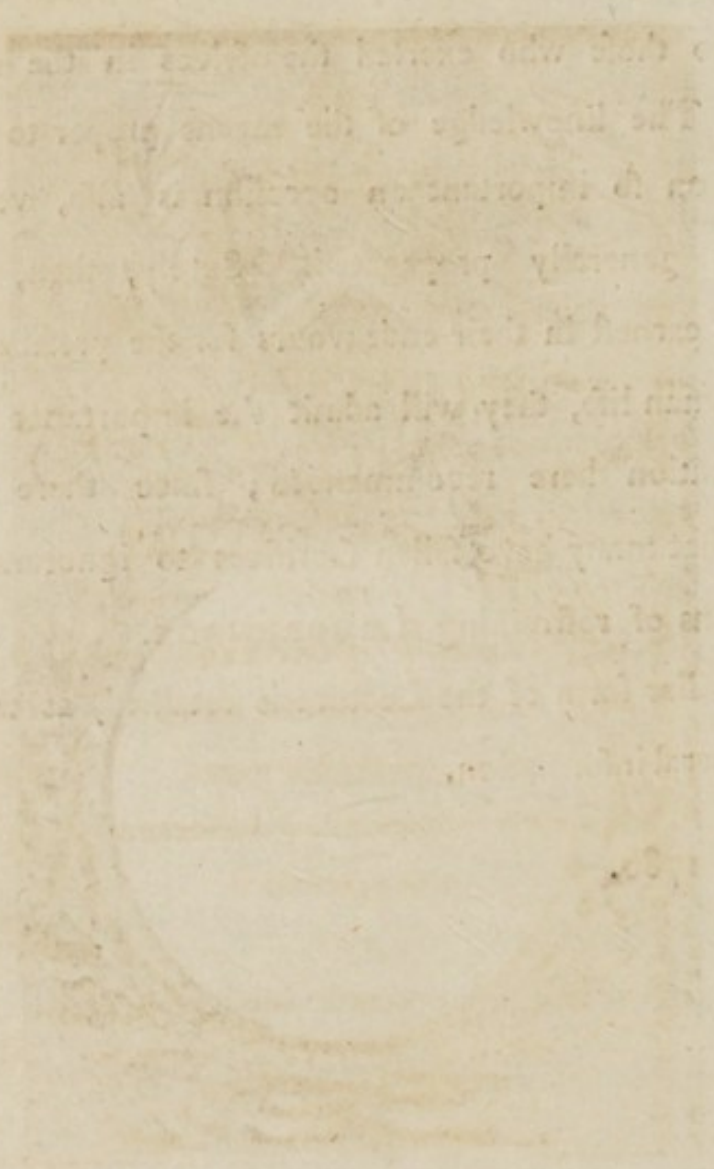
† Vide Drinkwater's Hiſtory of the Siege of Gibraltar, p. 190.

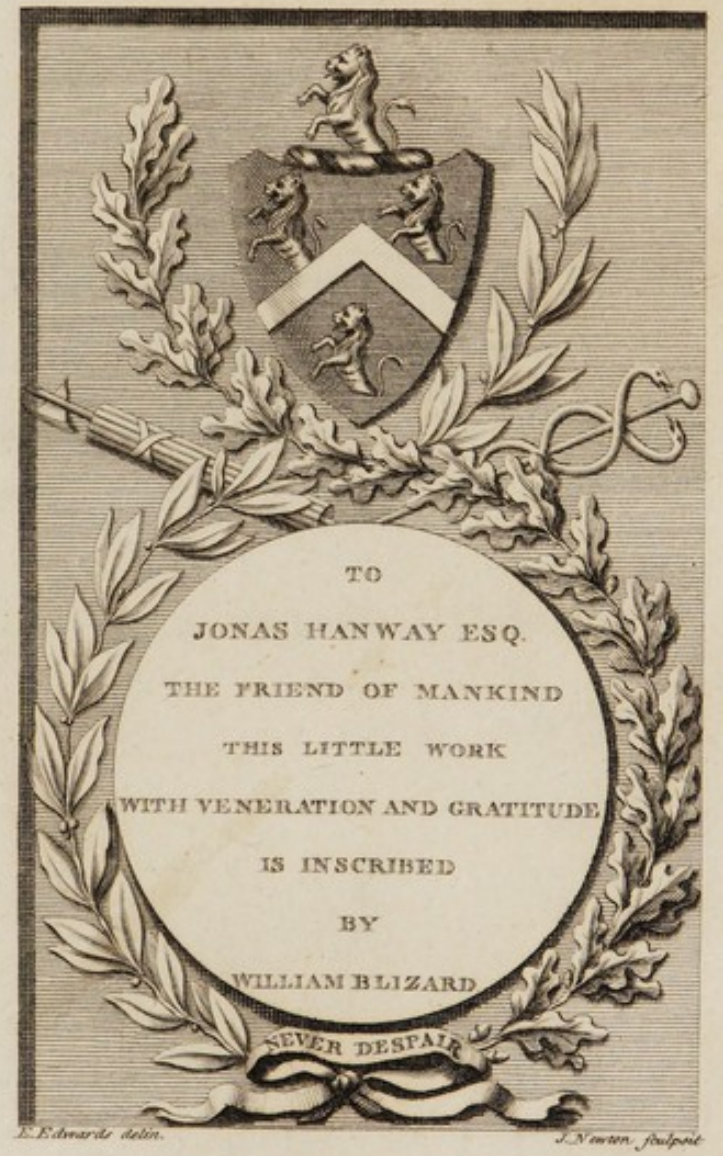
afford ſome inſtances of danger or death through defect of this knowledge; and every ſurgeon, of an hoſpital at leaſt, muſt have known many ſuch lamentable caſes.

When a fellow-creature is reſtored from a ſtate of apparent extinction of life by drowning, rewards are aſſigned to thoſe who exerted themſelves in the recovery. The knowledge of the means proper to be employed on ſo important an occaſion is alſo, very humanely, generally propagated. Surely, then, if men be in earneſt in their endeavours for the preſervation of human life, they will admit the importance of the information here recommended; ſince there is no doubt that many have fallen ſacrifices to ignorance of the means of reſtraining HÆMORRHAGE.

The familiar form of the Lecture is retained, as the beſt for general information.

July 30, 1786.




TO
JONAS HANWAY ESQ.
THE FRIEND OF MANKIND
THIS LITTLE WORK
WITH VENERATION AND GRATITUDE
IS INSCRIBED
BY
WILLIAM BLIZARD
NEVER DESPAIR
E. Edwards delin.
J. Newton. sculpsit

The 26th of February, 1782.

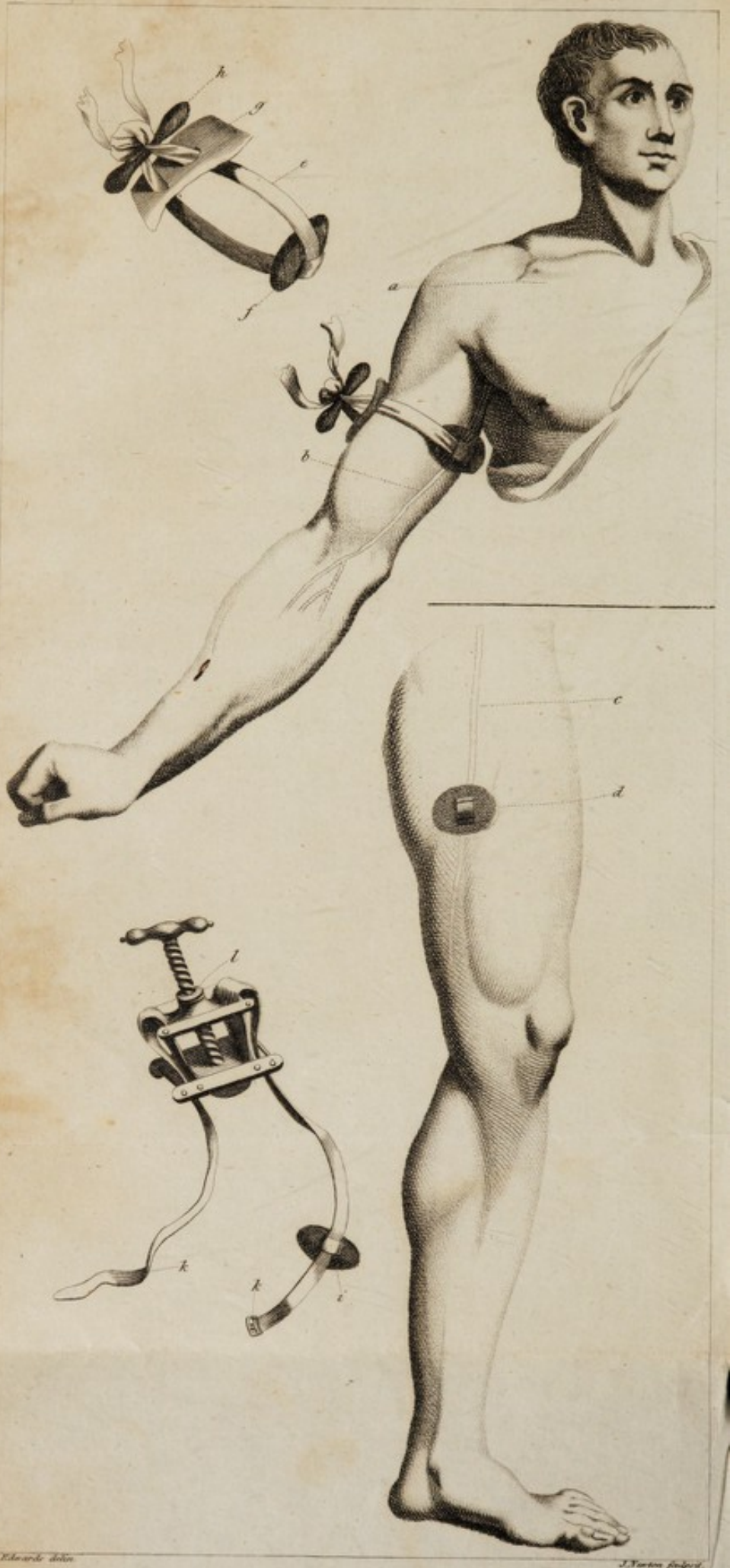
At an Extraordinary General Court of the Governors of the MARITIME SCHOOL:

Reſolved,

That the Thanks of this General Court be preſented to Mr. BLIZARD, for his genteel Offer of inſtructing the Scholars in the Method of applying the Tourniquet; which the Governors accept with Pleaſure.

By Order of the General Court.

JOHN PUGH,
Secretary.



F. Edwards delin.

J. Norton sculpsit.

INTRODUCTION.

FROM reflections on my duty, as SURGEON of the MARITIME SCHOOL, and a ſincere regard for the objects of my care, I propoſed to teach them the ſituation of the large blood-veſſels of the extremities, and the application of the TOURNIQUET. This I attempted, in the plaineſt manner in my power, in the way of LECTURE, as the moſt familiar and effectual method of impreſſing truths on juvenile minds: and it was pleaſing to obſerve the ATTENTION and FEELING expreſſed in the countenances of my young auditors.

From an anxious wiſh to promote the great cauſe of the naval intereſt of my country, in that eſſential concern, THE PRESERVATION OF THE LIVES OF SEAMEN, I have now endeavoured to render my Lecture an uſeful OFFERING to theſe young warriors.

In the navy and army, caſes muſt continually occur, in which the information it contains is abſolutely neceſſa-

ry for the preſervation of exiſtence : but there can hardly be a ſituation of life, in which, at ſome period, the knowledge might not prove of equal importance ; and it cannot fail of adding to confidence and courage in the moment of danger.

But knowledge of this kind may be productive of ſome degree of good, though never *practically* required ; for SCIENCE ever tends to improve the heart, and raiſe the mind to contemplate the power, wiſdom, and goodneſs, of HIM WHO MADE US !

No profeſſional fame can be acquired from explaining facts known to every ſtudent in ſurgery. This little work muſt, therefore, be conſidered as a tribute to HUMANITY ; and, if it ſhould happily prove the means of ſaving the life or limb of but one brave man, will, I flatter myſelf, be favourably received.

15th July, 1783.

A

LECTURE, &c.

Young Gentlemen,

AS one of the guardians of your health and lives, I requeſt your attention, while I point out what I think may conduce to the preſervation of theſe bleſſings when you are launched into the world, as well as during your reſidence in this ſeminary of naval ſcience.

You are here educated to a profeſſion of great honour, becauſe of high utility. It is the ſecurity of our country, our religion and laws, our commerce and riches. The SEAMAN, then, according to his rank and merit, has a claim to the reſpect and care of his countrymen.

You

You are ambitious to become SEAMEN, are ready to join the veteran band, to go forth to fight the enemies of your country; and therefore merit the eſteem and ſervices of your fellow-citizens.

We are excited to attend to the welfare of the BRITISH SAILOR by another conſideration.—Trained up in the principles of true honour and bravery, hardy in the practice of them, and properly conſidering his life as devoted to the ſervice of his country, he is leſs mindful of bodily evils, and the means of averting them, than the more wary and delicate landſman. He has a title, then, in generoſity, to that attention from others, which a martial ſpirit prevents him from ſhewing to himſelf.

I am aſſured, gentlemen, that, in his majeſty's ſhips, you will have many occaſions for the exerciſe of your judgement and ſpirit in reſpect of the health and lives of your men. You muſt, in almoſt every caſe, *reflect for them*; and, when they find that you are truly zealous in all things for their good, they will obey with more alacrity, will bear you with ſpirit through all danger, and prove themſelves worthy of your generous

regard.

regard. —— Theſe conſiderations will, I truſt, engage your attention to whatever ſhall promiſe benefit to your hardy companions in war.

Every good and brave man would lay down his life in the execution of his duty to his king and country. But, when ſick or hurt, he is not to neglect the means of relief which PROVIDENCE has afforded. On the contrary, we are commanded, by divine authority, to preſerve our lives and thoſe of our fellow-creatures.

For the preſervation of the health and lives of the officers and ſeamen of his majeſty's navy, there are appointed, by government, to each ſhip of war, a SURGEON, and a certain number of MATES according to the rate of the ſhip. During the time of action, the ſtation of theſe officers is in the COCK-PIT. From their neceſſary confinement to this ſituation, evils of a very ſerious nature may ſometimes happen; for they cannot poſſibly render inſtantaneous aſſiſtance to thoſe, in a remote part of the veſſel, whoſe bleeding wounds may urgently require the aid of ſurgery.

Some of the methods of chirurgical relief are very ſimple, though of the greateſt importance. Of this kind is the making an effectual temporary preſſure upon

a part,

a part, to prevent a fatal effuſion of blood, in the caſe of wound, till means of permanent benefit can be employed.

Men of true courage are not diſmayed at the ſight of blood. In firm poſſeſſion of themſelves on all occaſions, they are capable of exerciſing their judgement, and employing the means with which they are happily acquainted, either to their own benefit or that of others. It is proper, then, that they ſhould have information of whatever is uſeful, and in their power to execute.

I cannot omit this opportunity, my young friends, of exhorting you to be EXAMPLES of SOBRIETY as well as of the other VIRTUES. What advantage can flow from reaſon or true courage in a ſtate of intoxication? Many a brave ſeaman has loſt his life from having his mind clouded, by the effects of ſtrong liquor, at the time of receiving a wound.— By TEMPERANCE the body is preſerved free from various diſorders, and the mind maintained calm and firm, to direct under circumſtances of accidents and on every trying occaſion.

Induced by theſe reflections, I propoſed, to the wiſe and good men who direct your education, to teach you the application of the inſtrument, called TOURNIQUET,

employed

employed for ſtopping the flow of blood from wounded veſſels. With their ſanction, I have the pleaſure of addreſſing you on this ſubject, and moſt heartily wiſh the inſtruction may prove uſeful.

A circumſtance has occurred, ſince I propoſed to meet you on this occaſion, which has confirmed me in my notions reſpecting the utility of the intended explanations; and will, I have no doubt, be ſatisfactory to your governors.

I requeſted the ſentiments of an intelligent naval ſurgeon on the ſubject. This was his anſwer:

" I can beſt expreſs my opinion by relating to you the " practice of an ingenious ſurgeon in the ſervice, and " aſſuring you that his and my ſentiments perfectly " coincide.—— Mr. ****, ſurgeon of the BARFLEUR, " had obſerved, with great concern, the dreadful effects " of wounds that happened in time of action, from the " ſeamen being entirely ignorant of the manner of ap- " plying the tourniquet, many inſtances having occur- " red of men bleeding to death, particularly in the tops, " before aſſiſtance could poſſibly be rendered them.—— " To prevent theſe evils as much as was in his power, " he provided every ſeaman ſtationed in the tops with a

" tourniquet; and, on every opportunity, taught " them the method of applying it; ſo that, in a ſhort " time, they became perfectly expert in its uſe."

The pious pſalmiſt beautifully exclaims, " We are " fearfully and wonderfully made!" It would, indeed, require the ſtudy of a long life to learn the little that has been diſcovered of INFINITE WISDOM in the ſtructure of the ſeveral parts of the human body, and of INFINITE GOODNESS in the laws by which they perform their functions to the maintenance of health and life.

It is proper, however, that you ſhould have a general idea of the œconomy of NATURE in the circulation of the blood, to underſtand the practice that will be laid down, and to enable you to adapt it to particular caſes.

" In the BLOOD is the LIFE of man." That is to ſay, this fluid contains the principles of nouriſhment, and diſtributes them to every part of the body for its ſupply and refreſhment; like the water of the great ocean, which conveys the riches and good things of the world to every quarter of the globe.

The HEART is the ſource of this fluid. It is ſeated in the breaſt, a little to the left ſide, nearly in the center of the body. This organ is hollow for containing

ing the blood; and it has the power of contracting and ſtrongly propelling its contents. By this contraction of the heart, the blood is puſhed forwards, with an exceedingly rapid current, to the remoteſt parts of the body; as the tide of the ſea influences and preſſes on the waters of rivers, obſervable here in the ſwelling Thames.

The veſſels, or tubes, which proceed from the heart, to convey the blood to all the parts of the body, are called ARTERIES. From the power, with which the heart propels the blood through this ſyſtem of veſſels, it happens, that, whenever they are wounded, the blood flows rapidly and in jerks from the wounded part. They divide, to be diſtributed to parts, from trunks, like the branches of a tree from the body; ſo that, on preſſing together the ſides of any trunk, the flow of blood into the branches beyond the compreſſed part is prevented.

The veſſels, which return the blood to the heart, are named VEINS. In them the blood receives but little of the impelling force of the heart, and, therefore, moves not with a ſtrong tide, or current, but glides evenly and gently on, like the ebbing water; and, of conſequence, wounds of theſe veſſels are not of much im-

 portance;

portance: a ſmall degree of reſiſtance, by a finger, or ſome folded linen, applied to the wounded part, will generally ſtop the bleeding.

This tranſmiſſion of the blood from the heart through the arteries, and back to it by the veins, is the CIRCULATION; which, to the honour of this nation, was the diſcovery of our illuſtrious countryman, Dr. WILLIAM HARVEY.*

It is very plain, then, that, if a bandage, or ligature, be made ſufficiently tight around any limb, the flow of blood

* The uſe of the lungs in the circulation is here purpoſely omitted. —— The reader, who ſhall be deſirous of enlarging his mind with the principal truths of anatomy and phyſiology, will be amply gratified in his inquiries. It is to be lamented that this kind of knowledge is not generally purſued as part of a liberal education. The ſtudy of the animal œconomy affords the moſt beautiful and ſatisfactory ideas, and is calculated to prove highly beneficial to ſociety; for it enables men to diſtinguiſh between ignorance and real knowledge, and, conſequently, to encourage deſerving men, ſuppreſs quackery, and advance true medical ſcience. —— The medical books, that are too frequently to be found in the libraries of gentlemen, are likely to produce very different effects.— The ſummary accounts of diſeaſes, with receipts for the cure of them, are pillars of the moſt dangerous empericiſm: ſo far from furniſhing the mind with uſeful truths, they fill it with error, and beget a confidence in ignorance, often fatal to health and life.

blood into all the parts below muſt be prevented. But, to render this certain, the preſſure muſt be very great in the whole circumference of the limb; and, in ſome caſes, from the ſituation of arteries between bones, the effect cannot be obtained. To perform this proceſs, therefore, ſucceſsfully, in caſes of wounds and operations, and at the ſame time to prevent the conſequences of an exceedingly ſtrong *general* preſſure, ſurgeons have fixed on certain parts of the TRUNKS of arteries, before their ramification, for the application of a pad, or COMPRESS. —— Theſe parts are expreſſed in the annexed plate.

The PULSE is the beating or diſtending of an artery, from blood propelled into it by the heart. The ſpaces of time between the pulſations are periods when the heart itſelf is filling with blood returned to it by the veins.

Now it is evident, that there can be no pulſation when the flow of blood and diſtention of an artery are prevented. Where, then, a pulſe can conveniently be felt, as in the wriſt, the ceaſing of it, from a preſſure being made on the trunk above, will prove that the preſſure is made effectually. To illuſtrate this by an experiment: —— Let a friend feel the pulſe in your wriſt;

wriſt; then apply two or three fingers in *the little pit, immediately below the collar-bone, cloſe to the ſhoulder, marked* a *in the plate.* Preſs ſtrongly, and the pulſe will ceaſe, becauſe the artery that ſupplies the upper extremity *paſſes under the collar-bone, over the firſt and ſecond ribs, along this part,* and will be now preſſed againſt one of theſe ribs. Remove the fingers, and again apply them, and the pulſe will be found to alternate with the preſſure.

Suppoſe, then, a wound to be received, an artery of a conſiderable ſize cut or torn, and a copious bleeding, in conſequence, to happen, in any part of the arm *below* the place *a:* it appears manifeſt, that, by making a preſſure with the fingers, in the manner deſcribed, or aſſiſted by a pad between the fingers and the part, the bleeding would inſtantly ceaſe. Is not this an uſeful remark? Let this little proceſs be your firſt exerciſe; and, when you are expert in the practice of it, proceed to conſider the other places in the limbs where effectual compreſſion may be made, and the inſtruments proper for the purpoſe.

The arteries of the upper extremity, or arm, proceed from the trunk at *a*, after this manner: *the trunk paſſes*

into

into the arm-pit, deeply ſituated; it then proceeds along the ſide of the arm, next the body, obliquely towards the fore part of the joint, or bend, and here divides into three branches. In this courſe to its diviſion it lies near the bone, and may therefore be ſucceſsfully compreſſed. — The ſituation of this trunk to its diviſion is deſcribed in the plate by the lines *b*.

All compreſſive means, for preventing a flow of blood from wounded arteries of the upper extremity, muſt, therefore, be made either at *a*, or in ſome part of the courſe of the trunk of the artery, expreſſed by the lines *b*, between the arm-pit and the bend of the arm.

The diſtribution of the veſſels of the lower extremity is in this way. —— The artery paſſes from the cavity of the belly to the GROIN, where, in thin perſons, the pulſation of it may be felt.

At this place, in caſe of wound and effuſion of blood very high in the thigh, effectual compreſſion may be made, by ſome fingers preſſed very ſtrongly, in the manner deſcribed for compreſſion below the collar-bone; though it were better to have ſome kind of ſtrong pad, or firm body, ſuch as will be deſcribed, interpoſed between the fingers and the part.

From

From the groin, the artery proceeds in an oblique direction, downwards and inwards, as expreſſed by the lines c; *and, at about the middle of the inſide of the thigh, expreſſed by the compreſs* d, *it lies cloſe to the bone.* This is the moſt favourable part for making a preſſure upon it, becauſe of the reſiſtance of the thigh-bone behind. And, where there are opportunities of choice, as in caſes of wounds or operations *below* this part, this is the place which ſurgeons fix on for the application of the compreſſing body; it therefore deſerves your particular attention.

The courſe of the veſſel is then *downwards and backwards to the* HAM; *in the hollow of which, againſt the lower flat end of the thigh-bone,* compreſſion may again be very ſucceſsfully made in all caſes of wounds or operations below the knee-joint. But *beyond* this part compreſſion muſt not be depended on; for, immediately below the joint, the artery divides, like that of the upper extremity, into three veſſels, which are ſituated between the bones of the leg.

You have, I doubt not, anticipated me in a remark on the goodneſs of the great CREATOR, in ordaining the ſituation of the larger blood-veſſels ſo that they

ſhould

ſhould not be expoſed to danger in the ordinary and ſocial offices of life.

SCIENCE and HUMANITY allow no diſtinction of country, but, with equal juſtice, expreſs the gratitude of mankind to the memory of the authors of uſeful inventions and diſcoveries. —— The inſtrument called TOURNIQUET, we are informed, was the invention of a *French* ſurgeon, named MORELL, at the ſiege of BESANÇON. It conſiſts of four parts: viz. 1. *e*, a yard and half of ſtrong worſted, or other kind of band, an inch broad; 2. *f*, a pad of leather, tightly ſtuffed with wool or horſe-hair, two or three inches long, and of an inch breadth and thickneſs, having a loop on one ſide for the band to ſlide through; * 3. *g*, a piece of ſtrong leather, three inches long and two broad, having two apertures, an inch aſunder, for paſſing the band, or ligature; 4. *h*, a piece of ſmooth, round, and ſtrong, wood, about four inches in length.

* It has been ſuggeſted, that, for the uſe of perſons who may not retain an accurate remembrance of the ſituation of the veſſels, it were better for this pad to be made as large again as here deſcribed.

Deſcriptions often fail even in things of great ſimplicity. This may poſſibly be the caſe in the account of the TOURNIQUET: but the ſlighteſt view will make it underſtood.* The manner of applying it is this. — Place the pad upon the proper part of the artery to be compreſſed; bring the band, paſſed through the loop of the pad, round the limb, and carry the ends through the apertures in the leather; make a double knot with the ends, leaving a ſpace between the knot and the leather that would admit three or four fingers; through this ſpace paſs the ſtick, and with it twiſt the ligature ſufficiently tight to ſtop the flow of blood through the artery into the limb. The leather, knot, and twiſting, are to be placed and made upon the upper part of the limb, nearly oppoſite to the compreſs.

It

* It is much to be regretted that this inſtrument is not generally known, and kept in every family. The price of it is too trifling to be mentioned. — The life of a valuable gentleman in Hartfordſhire would have been lately loſt for want of it, if a ſurgeon had not *accidentally* called at his ſeat in the moment of a dreadful effuſion of blood, from a wounded artery in his hand, occaſioned by the breaking of a bottle in a fall.

It is manifeſt that this proceſs, ſimple as it is, requires both hands for tying the knot; and, therefore, that you could not apply the tourniquet to your own arm without aſſiſtance. It is as plain, alſo, that it demands a conſtant application of a hand to the ſtick, as the ligature would otherwiſe inſtantly ſlacken.

To obviate the neceſſity of two hands, in regard to the arm, let the ligature be about twelve inches long, and have each end tied in a loop: proceed in its uſe exactly as already deſcribed; only, inſtead of making a knot over the leather, paſs the ſtick through the loops at the ends of the ligature, and then perform the twiſting.

To fix the ends of the ſtick, ſo as to prevent the ligature from untwiſting, or the neceſſity of a conſtant application of a hand, make a hole through each end of the ſtick, paſs a piece of tape or packthread through each of theſe holes, carry them round the limb, and tie or pin them. Many other little expedients may be contrived to anſwer this purpoſe.

Beſides the tourniquet that I have deſcribed, there is another, an excellent piece of machinery. The original was invented by M. PETIT, a Frenchman; but it

was much improved by the late Mr. FREKE, of St. Bartholomew's Hoſpital. It need only be ſeen to be underſtood. The pad *i* being placed upon the artery, and the ligature buckled at *k*, then, by turning the ſcrew, the upper moveable portion, *l*, will be raiſed from the lower, and, in conſequence, the ligature drawn tightly.

The advantages of this inſtrument are very great. — It may be applied with only one hand; and, on being fixed, will remain in that ſtate without attention or danger.

Thus the defects of the former inſtrument are ſupplied; and, for every occaſion of the uſe of a tourniquet, *where there is a want of* ASSISTANTS, nothing more uſeful was ever contrived. The ſurgeons on-board ſhips of war, in the hurry of engagement, oftentimes cannot poſſibly perform their neceſſary operations ſo ſoon as required: by this machine, the bleeding from wounds can inſtantly be reſtrained, and then the wounded may ſafely wait till the ſurgeons can calmly and properly execute their duty. —— Government have wiſely directed every ſhip to be ſupplied with many SCREW-TOURNIQUETS.

And

And now, young gentlemen, after what has been ſaid of VESSELS and TOURNIQUETS, ſuppoſe either of you were wounded by a penknife, or other thing, in the thigh, leg, or arm, and, a large artery being punctured, a violent bleeding ſhould enſue. You have no tourniquet; but you clearly underſtand what has been taught on this ſubject. How, then, would you act? — Undoubtedly you would inſtantly pull off your garter, or take the firſt piece of ſtring or cord you could find; roll up your handkerchief hardly, and lay it on the trunk of the artery above the wounded part; paſs the garter, or cord, over the handkerchief and round the limb; tie a knot, leaving a proper ſpace; and then twiſt the ligature by a piece of your ſtick or cane, or any other firm body you could procure.

It may be truly ſaid, that, in any branch of medicine, "a little learning is a dangerous thing." My ſimple deſign was, to explain to you the means of ſtopping a flow of blood from wounded limbs, and preventing fatal conſequences, *till more effectual aid from ſurgery be obtained.* It is happy for mankind, that there are profeſſors in this ſcience in almoſt every town and village,

village, as well as appointed to his majesty's navy and army.

IF this little Tract ſhould perchance be read by any good man, unacquainted with the MARITIME SCHOOL, at CHELSEA, who may be able and diſpoſed to aſſiſt in rewarding the brave defenders of his country in the perſons of their riſing offspring; in adding ſtrength and dignity to the navy; and truly ſerving the widow and orphan; let me, with my hand to my heart, direct him to this hoſpitable, this truly patriotic, ſeminary. ——————— *Thus did I invoke my countrymen to ſupport an inſtitution, whoſe fall I have now moſt ſincerely to lament. May* PUBLIC VIRTUE *and* PUBLIC PROSPERITY *raiſe it up again, to remain a monument of regard for thoſe objects that ought to be deareſt to* ENGLISHMEN!