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A

COMPENDIUM

OF THE

ANATOMY OF THE HUMAN BODY,

Intended principally for the use of Students.

BY ANDREW FYFE.

IN TWO VOLUMES.

==
VOL. I.
==

THIRD AMERICAN EDITION.

To this Edition is prefixed,
A COMPENDIOUS HISTORY OF ANATOMY,

AND THE
RUYSCHIAN ART AND METHOD
Of making Preparations to exhibit the Structure of the Human Body,

ILLUSTRATED
With a Representation of the Quicksilver Tray and its Appendages,
Which are not in the London Edition.

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1810.

A

COMPENDIOUS HISTORY

OF

ANATOMY.

FROM the works of HIPPOCRATES, the father of MEDICINE, who flourished about *four hundred years before the birth of Christ*, is to be collected all the information of antiquity on the subject of Anatomy. This great physician, whose principal attention was directed to the symptoms and cure of diseases, was, nevertheless, well aware of the importance of Anatomical knowledge to perfection in the healing art: hence we find, that his works abound with anatomical facts and observations, interspersed with the prevailing doctrines of the day. When it is considered, how many obstacles were thrown in the way of this science, from climate, prejudice, and superstition, the perseverance and acquirements of this great man, the ornament of the medical profession, cannot be sufficiently admired. He describes some parts peculiar to the human body, which could only be ascertained by actual dissection. The body he made to consist of solids, fluids, and spirits; of containing and contained parts. The elementary humours he divided into four kinds; *blood, phlegm, choler or bile*, and melancholy or occult *bile*. This was agreeable to the philosophy of the age in which he lived; as likewise the notions of all bodies being composed of earth, air, fire, and water. He never distinguished between nerves, arteries, veins, or tendons; but calls the heart and its pericardium a

powerful muscle ; he knew the aorta, vena cava, pulmonary arteries and veins, and entertained obscure notions of the uses of the valves ; but considered the auricles as a fan. He mentions the distributions of the arteries and veins by trunks and ramifications from the heart ; and asserts, that all the arteries originate from the heart. The liver was thought to be the root of the veins, the fountain of the blood ; and he supposed it to separate bile. He thought the arteries carried the spirits ; but was entirely ignorant of the circulation of the blood, and of the use of the diaphragm ; and his seating the soul in the left ventricle of the heart is a memorable example of human vanity, and of that inherent inclination in man, boldly to account for what is inexplicable. The heart and lungs, he imagined, received part of our drink. Of the organ of hearing, it is concluded, he knew little, for he only mentions the tympanum. As to the brain, which he thought a gland, (an idea which has since been erroneously supposed to belong to Malpighi) the nerves and their uses, vision and the senses, he was totally ignorant as to the causes ; yet he makes the brain the seat of wisdom. The glands he imperfectly understood. The Pythagorean doctrines of conception, generation, and pregnancy, are, in general, absurd and superstitious ; as likewise his notions of the Pythagorean numbers, which seem to have been the prevailing philosophical follies of the day. On moles, false conceptions, and the nourishment of the fœtus, a rational judgment is formed ; he comprehended the communication from the mother to the fœtus, by means of the umbilical cord ; though, in another place, he supposes that it absorbs nutriment by the mouth, and from the surrounding fluid in the ovum.

After Hippocrates, anatomy continued to be improved ; but, as opportunities were extremely limited, from the prejudices of mankind, its progress was but slow, and chiefly confined to the two schools of *Athens* and *Alexandria*. In the former, the names of Socrates, Plato, Xenophon, Aristotle, and Theophrastus, are still preserved along with many of their works ; and although we observe that their general attention was directed to philosophy, yet natural history and anatomy were far from being overlooked ; their opportunities, however,

of examining bodies were confined; and after their time, the study of natural knowledge at Athens sunk for ever. But while it decayed in Greece and Asia, it rose with increased energy, under the protection of the Ptolomies, at Alexandria. In this school, which was so long pre-eminent, ERISISTRATUS and HEROPHILUS were highly distinguished for anatomical knowledge. By the liberal patronage of the Ptolomies, they enjoyed ample opportunities of dissecting human bodies; and the consequent improvements which anatomy received were very great. They not only corrected many former errors, but wrote with great judgment upon neurology: They observed a variety of structure in nerves supplying different parts, and hence distinguished them into those which were necessary to sense, and those which were subservient to motion.

Between the times of Herophilus and Erisistratus to Galen, a period of five hundred years, ASCLEPIADES, RUFUS EPHESIUS, and the sensible and elegant writer CELSUS, flourished. The two latter have given the appellations and situations of all the parts of the human body, *in compendio*, in which many discoveries appear to have been made from the time of Hippocrates. Neither one nor the other dwelt much on the uses of the parts. Rufus writes Greek in the concise Attic style, and Celsus is the most classical writer that ever appeared in the art of medicine.

CLAUDIUS GALENUS, or GALEN, was physician to four emperors, and was, without exception, the most distinguished practitioner of the age in which he lived. He has arranged all the prior anatomical science that Herophilus and Erisistratus had obtained from the actual dissection of human subjects, and incorporated it into his voluminous treatises on all the branches of medicine. The medical principles of this great man, formed on the Peripatetic philosophy of Aristotle, are not to the present purpose; except that they reigned triumphantly in the schools and universities, disdaining and crushing all innovators or improvers, for a period of nearly fifteen hundred years. The celebrated Galen, however, was a man of uncommon erudition, and he brought into one point of view, with much labour, learning, and industry, all the medical and philosophical science of his prede-

cessors. The anatomical part was indubitably extracted from the great Herophilus and Erisistratus, and, consequently, in general contains what those *first dissectors* of human bodies had observed or written. In the works of this eminent physician, anatomy appears very conspicuous and methodical. He gives the situation and uses of all the parts of the human body, whether animal, vital, or natural. What discoveries he made, cannot be ascertained; but Galen was the first author who seems to have digested, in regular order, the human functions, the brain and the membranes, the senses, the contents of the thorax and abdomen, osteology, a complete myology and neurology, in which are the origin and insertion of the muscles, their action, &c. and the distribution of the whole nervous system. The lacteal vessels, likewise, were well known; though the extent of their effects, their passing through the thoracic duct and subclavian vein, to the blood, were not comprehended. The exhalent arteries and inhalents were mentioned, both by Hippocrates and Galen; but the principles of action were unknown. The circulation of the blood, the real uses of the liver, glands, heart, diaphragm, pancreas, kidney, ureters, bladder, universal cellular structure, the power of the nervous system over the arteries and veins, the lymphatic absorbent system, were to him unknown.

From the time of Galen to the *fifteenth century*, anatomy was rather on the decline, anatomists being considered learned or ignorant in proportion to their knowledge of his works. The destruction of Alexandria introduced learning among the *Arabians*; but they made but little progress in the knowledge of the human body. ABDOLLALIPH, however, towards the close of the twelfth century, exposed many of Galen's errors in osteology, by frequenting burial-grounds.

Among the early cultivators of the science of anatomy in the *fifteenth century*, the GREAT VESALIUS flourished; who may with propriety be styled the RESTORER of ANATOMY; being the first who dared expose the errors of Galen, in medicine and anatomy, by referring to the human body. This wonderful man, whose perseverance and genius cannot be sufficiently admired, was born at Brussel, in 1415. After having gone through

the usual studies of the age, he went to Montpellier, to study medicine. The principal professors in the university of Paris requested him to come there, where he attended their lectures. Vesalius's zeal for medicine, particularly anatomy, induced him to brave every danger to which he was exposed, by clandestinely procuring bodies for dissection. He did not, however, confine his attention to the human subject only, but opened a great number of animals. In the pursuit of his favourite science, his veneration for Galen diminished in proportion as he detected his inaccuracies; till at length he threw off all controul of this great standard of ancient medicine and anatomy, and became the advocate for actual dissection of the human body, to which he constantly referred in all his disputations.

The war, which commenced at that time in France, obliging Vesalius to leave Paris, he returned to his own country, Louvain. The knowledge he had acquired in anatomy induced him to profess it publicly in that city; but, in order to extend his anatomical researches, in 1535, he followed the army of the Emperor Charles the Fifth, against France. His reputation increased. He was chosen Professor of Anatomy in the university of Padua, by the republic of Venice, and there gave lectures on medicine, particularly anatomy, for seven years.

In 1539, Vesalius published his anatomical plates, which attracted the admiration of the learned. In this, and in his other works, all the errors of Galen are exposed. A multitude of enemies sprung up against this bold innovator of old established authority. All Europe resounded with invectives against him: Eustachius at Rome, Driander at Marburg, and Sylvius at Paris, became his public enemies, particularly the latter, who employed every species of calumny to lessen him in the esteem of his patrons: instead of Vesalius, he called him *Vesanus*, or a madman; and accused him of ignorance, arrogance, and impiety. Fallopius was the only one among his opponents who preserved any moderation. Having been a pupil of Vesalius, he never forgot how much he was indebted to his preceptor; and, although he was far more able than Sylvius to criticise, from having powerful objections to bring forward against the work, he proceeded in the most delicate and res-

pectful manner, influenced by the greatest esteem and gratitude for the assistance he had received from his venerable master. Vesalius, on the other hand, acted towards his pupil in the most gentle and honourable manner. As soon as the remarks of Fallopius on his work, had reached Spain, Vesalius prepared to answer them, and replied to him as a father would to a son. Fallopius, who has rendered his name dear to posterity by his extensive knowledge in anatomy, possessed sentiments very different from Sylvius; he was not ashamed of acknowledging his obligations to Vesalius, for the greater part of his information on anatomy: he admits that Vesalius has not shown sufficient respect to Galen, but confesses that his objections are generally correct. Notwithstanding all opposition, the reputation of Vesalius daily increased, and he established anatomy on solid and permanent principles, when the Emperor Charles the Fifth, by whom he had been already honoured, nominated him his first physician, and kept him constantly at Court. He now gained the confidence of the nobility, and frequently gave unequivocal marks of his profound knowledge in the practice of physic. But an unexpected event soon reduced this great man to distress. Upon the death of a Spanish gentleman, whom he had attended during life, Vesalius requested permission of the relatives of the deceased to open the body. The moment he exposed the cavity of the thorax, he saw the heart palpitating. This unfortunate affair came to the ears of the gentleman's relations, who prosecuted Vesalius not only as a murderer, but accused him of impiety before the Inquisition, which severe tribunal was about to punish him for the crime, when Philip the Second, of Spain, suggested the means of removing him from the decision of his judges, and caused him to make a pilgrimage to the Holy Land; in consequence of which Vesalius resolved to make the tour of Palestine. He passed over to Cyprus with James Malatesta, a Venetian general, and thence to Jerusalem. Soon after the death of the celebrated Fallopius, which happened in the year 1564, the senate of Venice recalled Vesalius to fill the chair; but on his voyage to Padua, he was shipwrecked on the coast of Zante, where this great man, reduced to the utmost extremity, perished with

hunger, on the 15th of October 1564, at the age of fifty years. It is said, that a goldsmith, who landed on that part of the island soon after the accident, caused him to be interred, and that the following epitaph is engraven on his tomb in the church of the Virgin Mary, in that island :

Tumulus
ANDREÆ VESALII BRUXELLIENSIS,
Qui obiit idibus Octobris,
Anno M. D. LXIV.
Ætatis vero suæ L.
Cum Hierosolymis rediisset.

Vesalius had scarcely attained his twenty-fifth year when he published his work, *De Structura Corporis Humani*—on the structure of the Human Body. This extraordinary production would appear incredible in so young a man, were it not attested by the best authority. “Vesalius in my opinion,” says Mons. Portal, “is one of the greatest men that ever existed. Let astronomers boast of Copernicus; natural philosophers, of Galileo, Torricelli, &c. mathematicians, of Paschal; and the geographers, of Christopher Columbus; I shall always rank Vesalius above them all.” The house of Vesalius was lately the convent of Capuchins, at Brussels. These pious men considered it an honour to date their letters *Ex Ædibus Vesalianis*. It appears, that in the year 1546, Vesalius was at Basle, to correct the press for a new edition of his works. He occupied his leisure hours, whilst he resided there, in preparing a human skeleton, which he presented to the body of physicians in that city. It was received with the greatest pleasure; and, as a proof of their gratitude, the following inscription was put under it, which remains to this day :

Andreas Vesal. Bruxell,
Caroli V. Aug. Archiaterus
Landatiss. Anatomicorum
Adminstr. Comm.
In hac Urbe Regia
Publictaturus
Virile quod cernis Sceleton,
Artis et Industriæ suæ
Specimen,

Anno Christiano
M. D. XLVI.
Exhibuit erexitque.

From the time of Vesalius, the value of human dissection was fully appreciated, though opposed by the prejudices of the vulgar. The beginning of the *seventeenth century* is remarkable for the discovery of the *circulation of the blood*, by the immortal HARVEY, in which he was assisted by the previous discoveries of FABRICIUS on the valves in the veins, and by SERVETUS, COLUMBUS, and CASALPINUS, who nearly fifty years before demonstrated the circulation of the blood through the lungs. This has been the most important discovery ever made in anatomy, and upon it depends the whole of our present physiology. Soon afterwards, ASELIUS, an Italian, discovered the lacteals, which PECQUET, in 1651, traced to the thoracic duct, and thence to the left subclavian vein. In 1653, RUDBECK BARTHOLIN discovered the lymphatics: it does not appear that there was any communication between them; both, therefore, are intitled to equal praise. The latter has, however, additional credit from his having entertained very accurate ideas of the physiology of the lymphatic system, which was afterwards more fully explained by GLISSON.

The two last centuries have nearly perfected our knowledge of the human body. Every nation in Europe has produced anatomists of the greatest reputation. The names of ALBINUS, COOPER, DIEMERBROCK, HIGHMORE, CHESELDEN, LEWENHOECK, MALPIGHI, MAYOW, RUYSCH, WILLIS, and WINSLOW, form but a small number of those who have enlightened the science of anatomy in the *seventeenth century*. In the *eighteenth*, the following are particularly distinguished: HALLER, MORGAGNI, ZINN, WALTER, SCARPA, SOEMMERING, the MONROS, the HUNTERS, CRUICKSHANK, and BAILEY.

Fortunately for mankind, anatomy is now become an indispensable branch of medical science; and throughout Europe we have every where distinguished teachers, who are daily adding to the stock of useful information.

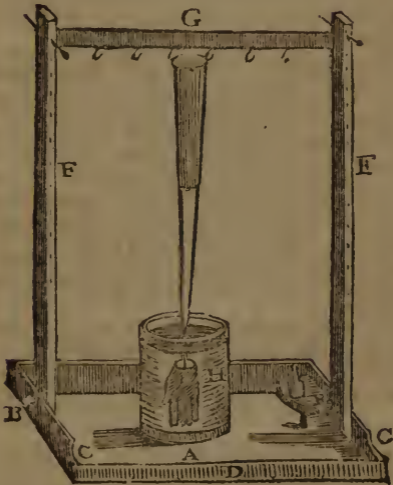
THE WUYSCHEAN ART,

AND METHOD

Of making Preparations to exhibit the Structure

OF THE

HUMAN BODY.



The Injecting Tray and its Appendages.

For the purpose of facilitating the process of Quicksilver Injections, and preventing the loss of Quicksilver, which is constantly occasioned by the old method.

EXPLANATION OF THE PLATE.

A. The Tray: This should be made of mahogany, about three-quarters of an inch in thickness, and the several parts should be joined together with screws: every joint should be made perfectly water-tight, and the inside painted black; as this is much more favourable for seeing the fine parts of white membranes laying upon it, and the quicksilver flowing through the minute ramifications of their vessels. The machine being made in this form, is intended to be occasionally filled with water, for the purpose of injecting broad and flat parts, which require to be so managed as to prevent their drying, and to which the common jar, represented in the plate is not adapted, as placentæ, large portions of mesentery and intestine, female breasts; &c.

B. An iron pipe with an ivory plug, for the purpose of drawing off the water and quicksilver remaining in the tray after the injection is finished; it is made of iron, that it may not be affected by the quicksilver.

C. C. The right and left sides of the Tray, cut down to form a rest for the arms, whilst the hands are employed upon a preparation at the bottom of it. The front D, is also made considerably lower than the sides, for the more convenient management of the preparation. The bottom of the tray, should be about twenty inches square; the front about three inches high, and the sides four and a half: the clear dimensions on the inside, are here meant.

E. A ledge in one corner, for the convenience of fixing the bottle containing the quicksilver; it has a hole sufficiently large to receive the bottle which it let through, and stands on the bottom of the tray to preserve it from any accident, which it is very liable to from its weight.

F. F. Two uprights; the foot of each fixes in two square staples, within the right and left sides of the tray, and ought to be about twenty-four inches high.

G. The cross-piece, the ends of which slide up or down in the mortise of the uprights, and are fixed to any height, by means of pins passing through them and the ends of the cross-piece to keep them steadily fixed to each other. In the lower edge of this cross-piece is

fixed several small hooks, from which may be suspended one or more injecting tubes.

H. Is a glass jar containing water, in which is immersed a hand, with the quicksilver injecting pipe fixed in the artery as in the process of filling the vessels. The hand is suspended by a string from the edge of the jar.

PREPARATIONS OF THE VISCERA.

THE various parts of the body may be preserved in a healthy state, either to exhibit their form or structure, or to compare them with morbid parts.

GENERAL OBSERVATIONS.

1. When removed from the body, and the useless parts dissected away, the part to be preserved is to be soaked in water, in order to get out the blood.
2. When it is necessary to give parts their natural form, which is lost by macerating, put them into a saturated solution of allum, retaining them by any means in the required form, until they become hardened. If it be a hollow part, as the stomach, bladder, &c. fill it with, and immerse it in, the solution.
3. When an opening is to be exhibited, as that of the ureter, the bile-duct, the lacunæ of the urethra, Stenonian duct, Fallopian tube, &c. introduce a bristle. After this manner preserve the uterus and its appendages, cutting open the vagina and cavity of the uterus, the bladder, intestine, stomach, heart in the pericardium, liver, spleen, kidney, &c. &c.
4. All preparations of the brain are best hardened in a saturated solution of corrosive sublimate.
5. The parts are to be suspended in proof spirit by raw silk, in a tie-over bottle, and covered with bladder, taking care to exclude all air. When dry, varnish the bladder with mucilage of gum arabic several times; then put a sheet of thin lead over, and varnish its edges with mucilage; and lastly, tie another bladder over, and give it a coat of common spirit varnish, in which lamp-black, or other colouring matter is mixed.

PREPARATIONS OF MORBID PARTS.

All morbid parts should, immediately after their removal from the body, be put into rectified spirit of wine for a day or two, and then preserved in proof spirit. These preparations foul a great quantity of spirit, and should therefore be kept in stopper-glasses, from which the spirit can easily be removed, and fresh put in, until the preparation ceases to foul the spirit, when it may be put into a tie-over bottle.



PREPARATIONS MADE BY MACERATING.

Preparations obtained by this process are very various.

GENERAL OBSERVATIONS.

1. Let the water be frequently changed, until it is no longer coloured with blood, but never after the blood is steeped away.

2. Let the macerating pan be placed in a warm place, to facilitate putrefaction.

3. The macerating pan should never be in a cold place, for the spermaceti-like conversion of the soft parts will be formed, and the bones spoiled.

4. The soft parts surrounding bones are a long time before they detach themselves from the bones.

5. Bones, when macerated, should be exposed to the sun's rays, and frequently wetted with clean water, or they may be bleached with the diluted oxygenated muriatic acid.

BONES.

Bones are macerated to be preserved whole, or they are sawed to expose their internal structure.

Bones of the head. Put the whole head, without disturbing the flesh or brains, into the pan. When sufficiently macerated, all the soft parts will come away with the periosteum: then detach the vertebra, and wash out the brain. Bones are separated from each other by filling the cranium with peas, and putting it into water. The same method is to be adopted with other bones.

Bones in general, for structure. Divide the femur into two halves. the os innominatum, the petious portion of the temporal bone, the parietal bones, &c. these, when macerated, will exhibit the compact, the spongy, laminated, and reticular substance of bones.

A FOETUS.

Cut carefully away the fatty substance enveloping a fœtus, but do not cut any of the cartilages. Steep out its blood, and macerate. It should be frequently looked at, and taken out when the flesh is all destroyed, before the cartilages are separated. The following preparations are obtained in this way :

1. The superior extremity to show its bones, the progress of ossification, and the cartilage to be formed into bone.
2. The lower extremity, to expose the same circumstance.
3. The spine, which forms a beautiful preparation.
4. The pelvis, not less elegant.

Preservation. The above all to be preserved in proof spirit.

CUTICLE.

The cuticle of the hand and foot may be separated by maceration; the former is called *corotheca*, the latter *podatheca*. The arm and foot of a large fœtus are to be preferred; they are first to be well washed with a soft sponge in soap and water.

Preservation. Suspend them in proof spirit; first tie the part by which they are to be suspended, then put them into the bottle with the spirit, and gently pour some spirit into the cuticle, to distend it like a glove or stocking.



INJECTING INSTRUMENTS.

The celebrated Dutch Anatomist, *Ruysch*, first invented the art of injecting animal bodies.

There are three kinds of apparatus used in making injected preparations. The one for the coarse and fine injections, and the minute injection; the other for injecting with quicksilver; and the third, called the oys-

ter syringe, for injecting minute preparations with the minute injection only.

The first consists of a brass syringe made for the purpose, of various sizes, from one carrying six ounces to one sufficiently large to hold two pounds. The point of these syringes is adapted to the pipes into which it is to be affixed. To this syringe belong a stop-cock, and a great variety of pipes.

The instrument for injecting quicksilver consists of a long glass tube, at whose end is fixed, by screwing in, a steel pipe, the end of which is extremely fine.

The oyster syringe is similar to the large syringe, except in size. It is so small, that when the syringe is in the hand, and full, its piston may be commanded by the thumb of that hand to throw its contents into any preparation in the other hand. The pipe affixed by being screwed to the end of this syringe is nearly as small as that belonging to the quicksilver tube.

These instrument are always to be had at the surgical instrument makers.



INJECTIONS.

The injections employed for anatomical purposes are of four different kinds: coarse, fine, minute and mercurial.

COARSE INJECTIONS.

Red. Yellow bees' wax, sixteen ounces—the palest resin, eight ounces—turpentine varnish, six ounces, by measure—finely levigated vermilion, three ounces.

Yellow. Yellow bees' wax, sixteen ounces—pale resin, eight ounces—turpentine varnish, six ounces—king's yellow, two ounces and a half.

White. Fine virgins' wax, sixteen ounces—pale resin, eight ounces—turpentine varnish, six ounces—best flake white, five ounces and a half.

Pale blue. Fine virgins' wax, sixteen ounces—pale resin, eight ounces—turpentine varnish, six ounces—best flake white, three ounces and a half—fine blue smalt, three ounces and a half.

Dark blue. Fine virgins' wax, sixteen ounces—pale

resin, eight ounces—turpentine varnish, six ounces—blue verditer, ten ounces and a half.

Black. Yellow bees' wax, sixteen ounces—pale resin, eight ounces—turpentine varnish, six ounces—pure lamp black, one ounce.

Green. Yellow bees' wax, sixteen ounces—pale resin, eight ounces—turpentine varnish, six ounces—levigated crystalized verdigrise, four ounces and a half—best flake white, one ounce—levigated gamboge, one ounce.

Liquefy the wax, resin, and turpentine varnish over a slow fire, in an earthen pipkin; then add the colouring matter, having previously mixed it in another pipkin, with a very small quantity of the melted composition. Stir the whole well together with a wooden pestle, so that the colouring ingredients may be intimately and smoothly blended: place the whole again over the fire, and, when they have acquired a due heat, the injection will be fit for use.

FINE INJECTIONS.

Brown spirit varnish, white spirit varnish, of each four ounces—turpentine varnish, one ounce.

These are to be put together in an earthen pipkin, over a slow fire, until they have acquired the necessary degree of heat. To make it of a red colour, put one ounce of finely levigated vermilion into another pipkin, and gradually add the heated materials, stirring the whole with a wooden pestle, that the colour may be equally diffused.

One ounce and a quarter of king's yellow—two ounces of best flake white—one ounce and a half of fine blue smalt, with one ounce and a quarter of best flake white—four ounces of blue verditer—half an ounce of pure lampblack—are the proportions for the various colours to the quantity of ingredients ordered above.

MINUTE INJECTIONS.

The size, which forms the vehicle to the colouring matter in these injections, is made in the following manner:

Take, of the finest and most transparent glue, one pound, break it into small pieces, put it into an earthen pot, and pour on it three pints of cold water, let it stand

twenty-four hours, stirring it now and then with a stick : then set it over a slow fire for half an hour, or until all the pieces are perfectly dissolved ; skim off the froth from the surface, and strain it through a flannel for use.

Isinglass and the cuttings of parchment make an elegant size for very particular injections ; and those who are not very nice may use the best double size of the shops.

Red Size, one pint—Chinese vermilion, two ounces.

Yellow. Size, one pint—king's yellow, two ounces and an half.

White. Size, one pint—best flake white, three ounces and an half.

Blue. Size, one pint—fine blue smalt, six ounces.

Green. Size, one pint—levigated crystalized verdigrise, two ounces—best flake white, levigated gamboge, of each eight scruples.

Black. Size, one pint—lamp-black, one ounce.

GENERAL OBSERVATIONS.

1. All injections are to be heated to such a degree as not to destroy the texture of the vessels they are intended to fill ; the best criterion of this degree of heat is dipping the finger into the injection. If the finger can bear the heat, the texture of the vessels will not be hurt.

2. All the coloured materials should be as finely levigated as possible, before they are mixed with the injection.

3. Great care should be taken lest the oily ones boil over, or bubble ; and that the heat be gentle, otherwise the colour will be altered.

4. They should be constantly stirred, lest the colouring material, which is much heavier than the vehicle, fall to the bottom.

5. The instrument to stir them with should be a wooden pestle, and there should be one for each colour.

6. A large tin pan to contain water, with two or three lesser ones fixed in it for the injections, will be found very useful, and prevent all accidents, and the colour from spoiling, when on the fire.

Preparation made with Coarse Injection.

The blood-vessels are mostly filled with coarse injection, and the parts dissected to shew their course; and when the anatomist wishes to exhibit the minuter branches, the fine injection is to be thrown in first, and followed by the coarse.

GENERAL OBSERVATIONS.

There are several circumstances to be observed in injecting with the fine and coarse injections, which are applicable to every part into which they are thrown; these are—

1. The part to be injected should be freed from its blood as much as possible, by steeping it for several hours in warm water, and repeatedly changing it.

2. Having emptied the part of its blood, the pipes are to be fixed in their proper vessels, and all other vessels to be tied with a ligature.

3. The heat of the water is then to be gradually increased to the same temperature with the injection to be thrown in.

4. The injecting syringe should be steeped in the water with the part to be injected, until wanted.

5. The injection being finished, and the subject cold, remove the pipes, and tie up the parts they were in. Whenever a vessel is open, by accident or otherwise, be sure to secure it by a ligature, or cover it with a piece of thin and moist bladder, or the injection will always be oozing out.

6. The parts dissected and dried are to be varnished twice with copal or hard varnish, first washing them free from grease with some soap lees, and well drying them again.



BLOOD-VESSEL SUBJECT.

Select an emaciated subject, between the age of two and fourteen years.

Preparation. Make an incision through the integuments the whole length of the sternum; then, with a saw, divide the sternum longitudinally into two equal

parts; introduce a dissecting knife under the divided bone on each side, separate it from the mediastinum, and lay open the thorax, by bending back the two portions of the sternum and the cartilages of the ribs: an incision is then to be made into the pericardium, and the left ventricle of the heart, and a large pipe introduced into the aorta, and secured by a ligature. The subject is next to be put into warm water, and gradually heated. The time generally required to heat the whole subject is four hours, in a large body of water.

If the veins are to be injected, three more pipes are required: one to be put into the angular vein, at the corner of the orbit; another into a vein as near the fingers as possible; and the third into a vein as near the toes as possible.

Injection. The subject and injection being properly heated, throw the coarse red injection into the heart pipe, which will fill the arterial system; and then the coarse yellow injection into the head pipe first, the next into the pipes of the extremities. The subject, when injected, should be put into cold water, with its face downwards.

Dissection. Open the abdomen by an incision from the sternum to the umbilicus and from thence to each ilium. Cut away the abdominal viscera, the stomach, spleen, and intestines; leaving the mesenteric vessels as long as possible: dissect away the liver, leaving the vena portæ and hepatic artery as long as possible. This done, dissect away the fat and cellular membrane from the vessels; secure the mesenteric vessels in an arborescent form on a piece of pasteboard. The kidneys, urinary bladder, uterus, and its appendages, are to be preserved and dried in their situations. From the thorax are to be removed, the lungs and heart, or the latter may remain. The integuments being carefully dissected from the sternum, it is to be bent back, and kept in that situation, to expose the internal mammary arteries. The dissecting away the skin is next, in order to exhibit the muscles, and expose the arteries and veins. The skin should only be removed from time to time to carry on the dissection, and never more than that covering the part to be dissected; otherwise the parts from which the skin is removed will become dry, and

the dissection be spoiled. In dissecting the arteries and veins, the dissector will find no difficulty, if he proceeds cautiously from the larger trunk towards their extremities. The brain is to be removed by sawing away a large portion of the bone on each side of the longitudinal sinus of the dura mater. The cheeks should be pushed out by introducing horse hair into the mouth.

Drying. When dissected, or before, the subject should be hung up by the head in a frame: one arm is to be placed at a little distance from the side, and the other turned up over the head, with the palm of the hand in front: the legs at a little distance from each other, and kept in these postures by packthread. Should any muscles obstruct the sight of the arteries, they are to be separated to a proper distance by pieces of wood. This done, expose it to a current of air in a place where it cannot get wet; and if the weather be moist, remove, from time to time, all moisture, by a soft sponge.

Preservation. Varnish it several times, and keep it in a dry place, and in a proper case, with a glass front and back.

A HEAD, FOR ARTERIES AND VEINS.

Choose an emaciated head of an adult, separated from the body, by a transverse section, about the sixth or seventh vertebra.

Preparation. Put a pipe into each carotid, or what is better, one pipe with a bifurcation; remove a portion of bone over the longitudinal sinus of the dura mater, about the middle of the parietal bones, and secure a pipe in the longitudinal sinus, pointed towards the occiput. Put the head into warm water, to soak, pressing the blood occasionally out of the external and internal jugulars. Then tie up the jugular veins and vertebral arteries, and all the small vessels.

Injection. Into the carotids throw the red injection, and the yellow, or dark blue, into the pipe in the sinus of the dura mater. The former will fill the arteries, the latter the veins.

Dissection. Follow the course of the larger trunks, dissect out the globes of the eyes, and remove, with a fine saw, the portion of the jaw-bone behind the last

molaris, to show the course of the internal carotids. To prepare the whole head, a portion of the cranium must be removed, by sawing on one side of the longitudinal sinus of the dura mater from the frontal sinus to the horizontal spine of the occipital bone, and then sawing horizontally above the ear, from one extremity of the former incision to the other. The dura mater should be removed with a pair of scissars, the brain carefully washed out, and the tentorium and falx preserved. It is better to make a perpendicular section of the head, a little to one side of the sagittal suture, through the nose, foramen magnum, and vertebræ; and thus prepare each side. The course of the cervical artery is to be shown by dissecting away the muscles, &c. from between the transverse processes.

Preservation. Varnish it several times, and keep it in glass case, suspended; or fix it by the neck, and cover it with a glass bell.

AN ARM, FOR ARTERIES AND VEINS.

Remove the superior extremity from the trunk, by separating the clavicle from the sternum, raising it, and passing the knife under it to the articulation, including the greater part of the pectoral muscle. Then cut under the scapula, so as to remove with the arm the clavicle, scapula, and subscapularis muscle.

Preparation. After soaking it in warm water, force out the blood from the veins, by pressing the extremity from the fingers toward the shoulder. Fix a pipe in the axillary artery, and another in the largest vein on the back of the hand; some warm water may be injected into the vein, so as to wash out the blood; and, when pressed out, the axillary vein should be tied. Tie any muscular branches that may be gaping.

Injection. Red injection may be thrown into the artery, and yellow, or dark blue, into the vein.

Dissection. This is very simple; it requires only the removal of all the cellular and fatty membrane, and exposing the course of the vessels. Tie up the limb by the clavicle.

Preservation. When varnished, keep it in a cool and dry place.

A Lower Extremity, for Arteries and Veins.

Having removed the contents of the abdomen, make a section through the symphysis of the pubis, and the ligaments connecting the ilium and sacrum, so as to remove one side of the pelvis.

Preparation. Fix a pipe in a vein as near the toes as possible, and another in the iliac artery. When the limb has been well soaked in warm water, press out the blood from the veins, or throw in some warm water at the venal pipe; but carefully press it out again, and tie up the iliac vein. Secure all divided vessels.

Injection. Blue injection, or yellow, may be put into the vein, and red into the artery.

Dissection. Expose the course of the artery and veins, particularly the profunda of the thigh.

The Gravid Uterus, for Arteries and Veins.

The gravid uterus, or the uterus soon after it has expelled the fœtus, may be injected, to show its large and tortuous vessels. It may be injected whilst in the body; but this is always attended with much difficulty, and never succeeds so well as when removed from the body. Therefore separate the spermatic and hypogastric vessels as far from the uterus as possible, and cut out the uterus with the bladder, vagina, and external parts of generation.

Preparation. Put a pipe in each spermatic artery, and each hypogastric, and also one in each spermatic and hypogastric vein; so that, at least, there will be four pipes for arteries, and four for veins, necessary. Be very careful that all the divided vessels be secured by ligation, which only can ensure success.

Injection. Red and yellow are mostly preferred; the former for the arteries, the latter for the veins. Be careful that the red be thrown into all the arterial pipes, and the yellow into the venal; and, to prevent mistakes, it will be better to have the pipes of the veins different from those of the arteries.

Dissection. Distend the vagina and uterus with horse hair, either by introducing it through the vagina, or, if the fœtus be in it, by a perpendicular section through the anterior parietes, which is to be sewed up

again. Then dissect away all loose cellular structure and fat, preserving the round and broad ligaments, and Fallopian tubes. Should the fœtus be in the uterus, an incision should be made, as above directed, except the placenta be adhering there, which is known by the great number of vessels, and then on the opposite side, and through the membranes, to remove the child; cut the umbilical cord close to the fœtus, and fix a pipe in one umbilical artery, and another in the umbilical vein, the latter carrying arterial blood, should be filled with red injection, and the artery with yellow; the cord is to be laid round the placenta.

Preservation. When well varnished, suspend it in a case, with a glass front and back.

A Placenta, for Arteries and Veins.

This is perhaps the easiest preparation to make with coarse injection, and should, therefore, be the first attempt of the student.

Preparation. Fix a large pipe in the vein, and a small one in one of the arteries. The difficulty usually attendant on getting the pipe into the artery is obviated in a great measure by introducing the point of the scissors into these vessels, and slitting them down for about half an inch, then spreading the artery open upon the fore-finger, and keeping it so by pressure with the thumb, by which the pipe may be carried in without difficulty. A ligature should be passed round each pipe with a needle, taking care not to puncture any of the vessels.

Injection. The usual colours are to be selected; but instead of throwing the yellow into the vein, it should be pushed into the artery, for the artery here performs the function of a vein, and *vice versa*. When there are two placenta there should be different colours used.

Dissection. The spongy substance is to be carefully dissected away from the injected vessels, the placenta soaked in cold water, to get rid of its blood, and then dried, curling the cord around it; and should the membranes not be much torn they may be distended with curled hair over it.

Preservation. Varnish it well; fix its bottom in a case with a glass top.

The Heart, in Situ ; with the Head and Adjacent Vessels.

For this purpose choose the head of a young subject, or an adult whose heart is free from fat. The liver, stomach, spleen, &c are to be removed from the abdomen, and the aorta divided just as it gives off the celiac artery. The incision into the chest should be carried through the integuments, from the trachea to the ensiform cartilage, the sternum sawed through, and bent one half on each side, from the extremity of the cartilages nearest the ribs ; then divide one of the pulmonary veins as near as possible to the lungs, and remove a portion of bone over the longitudinal sinus of the dura mater.

Preparation. Having well soaked the parts in warm water, and squeezed the blood from the heart and vessels, by the inferior cava and pulmonary vein, put a pipe into the longitudinal sinus of the dura mater, pointed towards the occipital bone, another into the pulmonary vein, a third into the vena azygos, and one into the receptaculum chyli, or thoracic duct. Tie up carefully the aorta and the vena cava inferior, and put a strong ligature around the middle of each arm.

Injection. Three colours are required ;—one for the arteries, which should be red ; another for the veins, which may be yellow or blue ; and the third for the thoracic duct, which should be white, to imitate chyle. Throw the red injection into the pipe in the pulmonary vein, which will fill the left auricle, ventricle, aorta, and all the arteries. The pipe in the head is for the yellow injection ; by this will be filled the veins of the head, face, neck, and chest, the right auricle of the heart, the right ventricle, and the pulmonary arteries. Should the vena azygos not be injected, the yellow injection is to be thrown into it. A small quantity of white injection is sufficient for the thoracic duct.

Dissection. Remove the body by a transverse section at the last dorsal vertebra, then amputate the arms at their middle, saw away one side of the bones of the skull, and wash away the brain : then dissect away all the loose cellular membrane and fat, and expose the various parts in the best manner ; dissect away the

lungs, leaving the pulmonary arteries as long as possible.

Preservation. This is, when well done, a valuable preparation, and deserving of great care. Varnish it well, and preserve it in a square glass case.

A Fœtus, to exhibit the Peculiarities of its Circulation.

For this purpose select a still-born fœtus; and, if possible, one that died from a flooding of the mother.

Preparation. Dissect the umbilical vein from the arteries, about four inches from the umbilicus, and fix a pipe in it, taking care not to include the arteries.—Throw warm water into this pipe, and wash out the blood, which will flow out by the umbilical arteries. Having drained away as much of the water as possible, tie a ligature very loose on the umbilical arteries.

Injection. The fœtus being heated, throw in gently any coloured injection. The water will come away first through the umbilical arteries; and, when the injection appears, make the ligature firm, to prevent its further egress.

Dissection. The peculiarities in the fœtal circulation are the umbilical cord, the ductus venosus, the ductus arteriosus, and foramen ovale. When the body is cold, proceed to the dissection; remove the head from the cervical vertebræ, the arms, with the scapulæ, and pectoral muscles; the inferior extremity at the articulation with the pelvis, the whole of the parietes of the abdomen, leaving the arteries running to the cord by the sides of the bladder; the anterior part of the thorax, with the sternum, cartilages, and part of the ribs, the integuments and muscles of the back. Next cut away the lungs, and remove the pericardium; keep the diaphragm in its place, and turn up the liver, so as to expose the ductus venosus. Some dissection and care is here necessary. Dissect away the stomach and intestines, and lay out the mesentric vessels, distend the bladder with air, and cut away any thing that may obstruct the view of the vessels. The foramen ovale cannot be exhibited.

Preservation. After having varnished it hang it in a glass bell, with a hook at its top.

PENIS.

The penis may be injected, to show the two corpora cavernosa, the corpus spongiosum, and glans, with the arteries and veins. For this purpose any healthy penis will do, but large ones are generally preferred. Having cut through the integuments and soft parts in the pelvis, in the direction the saw is to be passed, saw through the middle of each crista of the pubis, straight down, and through the ascending ramus of each ischium, close to their commencement, and thus remove the pubis, with the bladder and external parts of generation.

Preparation. Make an incision into either of the crura of the corpora cavernosa, and into the bulbous part of the urethra, as near to the prostrate gland as possible; soak it in hot water, and carefully press out the blood from every part. Introduce a probe along the vena magna ipsius penis, by an incision at its root, to break down its valves; fix a pipe in each of these incisions, and another in each vas deferens, at its entrance into the vesiculæ seminales, and secure all the divided vessels.

Injection. Four colours are necessary; those generally preferred are red, yellow, blue and white. Throw the red into the corpus spongiosum, which will distend the glans: the yellow into the corpus cavernosum pipe; the blue into the vena magna ipsius penis; and the white into the vasa deferentia.

Dissection. Inflate the bladder, dissect away all the soft parts, and keep the penis erect against the symphysis pubis.

Preservation. In a covered box.

TESTICLE.

A testicle of an adult should be chosen free from disease, and great care is requisite in removing it from the body. First, enlarge the ring of the oblique muscle, push the testicle through from the scrotum, and separate its cellular connecting substance; then cut the spermatic artery and painuniform plexus as high as possible, and then the vas deferens.

Preparation. When well soaked, press out the blood from the veins; put a pipe into the spermatic artery,

and another into a vein; and secure all other open mouths.

Injection. Red is to be sent into the artery, and yellow or blue into the vein, which is without valves. Then fix the quicksilver tube in the vas deferens, and suspend it in water; this done fill it with mercury, and in twenty-four hours it may be removed to be dissected.

Dissection. Cut away the tunica vaginalis, and the tunica albuginea, which requires great care: then remove all the cellular and adipose membrane, and dry it on a board previously waxed.

Preservation. In a common preparation glass, on a blue or green paper ground.

The System of the Vena Portæ.

Remove the liver, spleen, stomach, and intestines altogether, of a person whose mesentery is free from fat, cutting away at the root of the mesentery, behind the peritoneum.

Preparation. Cut into a mesenteric vein, as near to the intestine as possible, and secure it with a ligature passed around it with a needle, taking care not to wound any other vein. Inject warm water, and let it again run out by the divided vessels. Drain its waters off, and secure all the veins, the hæmorrhoidal especially.

Injection. Throw any colour into the pipe, which will pass into the splenic, mesenteric, and internal hæmorrhoidal vein, and into the vena portæ.

Dissection. Remove all the soft parts; the stomach, spleen, and intestines; cutting the vessels as long as possible, and dry them in the best manner, either attached to the liver, or dissect away the liver from the vena portæ, taking care to preserve some of its ramifications.

Preservation. In a covered box

HEART.

The heart is mostly injected out of the body, to show its common and proper vessels. For this purpose, choose a lean heart. Cut through the thoracic viscera immediately at the top of the thorax; divide the intercostal arterics by drawing the knife down the pleura, over the ribs beyond their origin, separate the vena cava inferi-

or and aorta, in the abdomen, with the *cavæ hepaticæ*; and remove the thoracic viscera, with the portion of the diaphragm surrounding the vessels.

Preparation. Soak the blood and coagula out of the cavities of the heart, and press the blood from the coronaries. Put a pipe into the vena cava superior, and another into one of the pulmonary veins. Then tie the lungs at their root, the vena cava inferior, the arteria innominata, the left carotid and subclavian; and pass a ligature, with a slip knot round the sinus of the aorta, and secure all other open vessels.

Injection. The common coloured injections, red and yellow, only are wanted. Throw the former into the pulmonary vein, which will fill the left auricle, ventricle, aorta, and coronary arteries. The yellow, being sent into the superior cava, will distend the right auricle, coronary veins, right ventricle, and pulmonary artery. In order to fill the coronaries well, the injector must stop two or threetimes in the course of the process, to squeeze on the injection in them with his nail; then beat the whole again, and throw in more injection. The preparation having cooled, a pipe is to be fixed at the bottom of the aorta, and some red injection just hot enough to run through the syringe, is to be pushed along the aorta, an assistant throwing cold water on the intercostals, if the injection runs through them.

Dissection. Cut away the lungs, pericardium, and all the soft parts.

Preservation. Either in a covered box, or under a glass bell.

STOMACH. INTESTINES. BLADDER.

These are best injected with the whole subject, but may be removed and injected separately.

GENERAL OBSERVATIONS.

1. The anatomist can only succeed by having the preparation constantly heated as he is throwing in the injection.
2. The injection should be thrown in very gradually.
3. When injected, the part should be immediately immersed in cold water.

Preparations with Minute Injection.

BONES.

The vascularity of bones is to be demonstrated, by throwing fine injection into an extremity, cutting out the bone when cold, separating it from all the soft parts, immersing it in water for a few days, to soak out the blood, and then putting it into a mixture of muratic acid and water in the proportion of one ounce to a quart for three or four months, adding about every month a drachm of acid. The limb of a ricketty child is to be chosen.

Injection. Put a pipe into the largest artery of the extremity, and throw gradually the red injection into it, fixing the stop-cock in the pipe.

A FOETUS.

Still-born children, when injected with minute injection, afford a number of beautiful preparations.

Preparation. No water should be thrown into the vessels. Fix a pipe with a stop-cock into the umbilical vein and tie the arteries in the ligature.

Injection. Red injection is always chosen for this purpose; and throw it in with great care, until the abdomen and skin all over become very tumid. First mucus comes from the nose and mouth, then the meconium from the anus, and often pure size.

Dissection. Cut off the head from the shoulders, the arms below the shoulder joint, and the legs below the acetabulum: then preserve a small quantity of the integuments around the navel, and remove all the interior parietes of the abdomen and chest, so as to exhibit the thoracic and abdominal viscera. Cut away the integuments and posterior part of the theca vertebralis, to exhibit the medulla spinalis.

Preservation. Soak out the blood, and preserve it in proof spirit, to shew the viscera and their vascularity.

From a well-injected fœtus may be obtained the following preparations.

1. If the fœtus be about seven months old, the *membrana pupillaris*.
2. If it be male of this age, the *testicle* in the abdomen, with the *gubernaculum*.

3. The *vascular* and radiated fibres of the *parietal bones*.

4. The *vascular membrane*, including the *teeth*.

5. The *viscera of the chest* separate, if better injected than those of the abdomen, showing the vascularity of the lungs thymas gland, and heart.

6. The *stomach*, which is to be inverted, to show its vascular *villious coat*.

7. The *intestines*, which are to be separated from the mesentery, and inverted, to show their *villous coat*.

8. The *glandule renales* and *kidnies* together, to exhibit their relative size, and the lobulated structure of the kidney.

9. The *uterus and its appendages*, to show the long ovaria and plicæ of the neck of the uterus and vagina.

10. The external parts of the female organs of generation, to show the *hymen*.

11. A red portion of the *skin*, to exhibit its vascularity.

12. The *medulla spinalis*, to show its vessels, and the *cauda equina*.

13. The *membrana tympani*, to exhibit its vascularity.

14. The *cavity of the tympanum*, to show its vascularity, and that of the periosteum of its bones.

15. The *vestibulum and cochlea*, to show the membranous semicircular canals of the former, with their ampullæ injected, and the vascularity of the *zona mollis*.

16. The *head*, to show the natural appearance of the face, the papillæ of the lips, tongue, &c

17. The *hand*, to show its natural colour.

Preservation. The above preparations are all to be well soaked from their blood, and preserved in proof spirit of wine.

18. A Portion of *skin*, freed of its adeps, to show its vascularity.

19. The *membrana tympani*, to show its vessels.

20. The *heart*, to show the foramen ovale, by distending the cavities with air; and, when dry, cutting away the outermost sides of the auricles, and introducing a bristle.

21. Any large muscle, freed from its cellular membrane and fat, and dried, to show the *vascularity of the muscle*.

Preservation. These are all to be dried, well varnished, and preserved in bottles. Some prefer putting them into spirit of turpentine; but this should be avoided as much as possible, for the turpentine is always oozing in warm water, and dirtying the glass.

UTERUS.

The object of injecting an uterus with fine injection, is to exhibit the vascularity of its internal membrane, which furnishes the catamenia. For this purpose the uterus of a person whose menstruation has not been stopped by age or disease is to be selected.

Preparation. Remove the uterus, by dividing the vessels as long as possible, the round and broad ligaments, and as much as possible of the vagina. Tie a pipe in each hypogastric artery, and secure all the divided vessels.

Injection. Any coloured injection may be chosen, but red looks best.

Dissection. Cut away all the loose cellular membrane, bladder, and rectum, if there be any, from around the vagina, and cut it open along the middle of its superior part; continue this incision on each side of the anterior part of the uterus, so as to exhibit the posterior surface of its cavity.

Preservation. If the injection be successful, which it seldom is more than one time in ten, suspend it by the ligaments, and preserve it in the proof spirit.

AN ADULT HEAD.

Separate the head as low at the last cervical vertebra from the shoulders.

Preparation. Put a bifurcated pipe into the carotids. Secure the vertebral arteries and jugular veins, and all the divided parts.

Injection. The red injection is always preferred.

From an adult head injected in this way may be made the following preparations.

1. The upper eyelid, to show the vascularity of *Meibomius's glands*.
2. The *choroid membrane*, exhibiting its vascularity.
3. The *retina*, suspended by the optic nerve, exhibiting its vascularity.

4. A section of the optic nerve, to exhibit the *central artery*.

5. The whole of the *cerebrum, cerebellum, and medulla oblongata*, with the pia mater; or,

6. The pia mater separated from the convolutions of the brain, to exhibit the *intergyral processes* and the *to-mentum cerebri*.

7. One half of the nostrils, to exhibit the vascularity of *Schneider's membrane*, and that of the membrane lining the antrum of Highmore.

1. The *tongue*, lying in the jaw, and suspended by the *palatum molle*, with the posterior fauces cut away, to show the *epiglottis* and *glottis*, the *uvula* and *velum pendulum palati*, the tongue, its papillæ and excretory ducts, and the vascularity of the gums and *sublingual glands*.

Preservation. The above preparations are to be soaked well in cold water, to get out all the blood, and then preserved in proof spirit.



Preparations with Quicksilver.

Mercury cannot be coloured by any substances; it must, therefore, always present the same silver colour.

GENERAL OBSERVATIONS.

1. The part should always be injected in a proper tray, that the mercury may be easily collected.

2. A lancet, with a curved needle ready threaded, should be always at hand.

3. A bottle, whose neck is not so wide as to permit the quicksilver tube going to the bottom, when put into it.

4. When injecting, if any circumstance renders it necessary for the injector to put aside the tube with the mercury, it should be placed in the bottle, the mercury remaining in it, to be handy and prevent delay.

5. Injecting with mercury is always tedious, and frequently unsuccessful. The parts exposed must be kept moist, by sprinkling them with cold water.

A Superior Extremity.

To inject the lymphatics of an arm, choose one from a dropsical subject, without fat; make an incision into the skin around the wrist, and seek diligently, with a magnifying glass, for an absorbent, into which the pipe is to be put, when the quicksilver will immediately run. The shoulder should now be placed considerable lower than the hand; and, when the mercury runs out at the divided vessels in the axilla, tie them up, and also the lymphatic, into which the pipe was introduced. Then seek for another absorbent. When the mercury ceases to run in a lymphatic tie the vessel, and seek for another.

Dissection. Begin at the lymphatics, where the mercury entered, and trace them; removing every thing that obstructs their view, but preserve the glands.

An Inferior Extremity.

The limb for this purpose should also be taken from a dropsical person, and the same method adopted as with the superior extremity, seeking as near to the toes as possible for the lymphatics.

A PAROTID GLAND.

Cut down upon the masseter muscle, and seek for the Stenonian duct, which is the excretory duct of the parotid. Tie the quicksilver pipe in it, then fix the tube, and pour into it the quicksilver; and when it ceases to run, remove the tube and pipe, and tie the duct. Be particularly careful, in dissecting away the gland, not to cut it.

Preservation. Dry it on a waxed board, and preserve it on a blue paper and pasteboard, in spirit of turpentine.

LIVER.

The lymphatics running on the peritoneal coat of the liver, and over the gall-bladder, make a beautiful preparation. The liver should be well soaked for several days, and the pipe put into the lymphatics of the suspensory and coronary ligaments, and the mercury forced along them, breaking down the valves with the nail,

by pressing on the mercury. Secure the vessels at the portæ of the liver, when the mercury gets there, and tie the lymphatics when filled. Should the anatomist's attempt to force the quicksilver beyond the valves be unsuccessful, he must fix upon the minute obvious branch, and let it run in its proper course.

Preservation. Throw some coarse injection into the cavæ hepaticæ and vena portæ, without heating the liver thoroughly; inflate the gall-bladder, and dry the whole. Varnish it, and preserve it in the best manner under a glass bell, or preserve the injected part in proof spirit, without any wax injection.

LUNGS.

The superficial lymphatics of the lungs are to be filled from the part most remote from the root of the lungs.

Preservation. Cut away the part on which the lymphatics are filled. Dry it on a waxed board, varnish it, and preserve it in a bottle, on a green or blue piece of paper; or preserve it in proof spirit, without drying it.

HAND.

Select the hand of an aged female (separated from the arm by a transverse section, three inches above the wrist) that has died of a lingering disease. Soak out the blood in warm water; fix the pipe in the radial artery, then add the tube, and pour into it the mercury. As the mercury appears in the other arteries and veins, take them up and secure them with ligatures. Should the mercury still escape from small branches, put a cord round the arm, and with a piece of wood tighten it, by twisting the wood, taking care not to prevent the mercury passing into the hand. Then suspend the hand in a glass filled with water, and suspend also the tube and quicksilver in the manner represented in the annexed plate, for a day or two, that the mercury may get into the small vessels. When injected remove the pipe, and tie, by a strong string, the fore-arm; put the hand into water, until putrefaction separates the cuticle.

Preservation. Dry it carefully, and varnish it; then fix the fore-arm in a pedestal of plaister of Paris, and keep this beautiful preparation under a glass bell.

LACTEALS.

Remove the mesentery and intestines, if the former be perfectly free from fat, and let them remain several days in water, which should be frequently changed. Search for an absorbent, on the intestine, into which introduce the quicksilver, which will run on to the glands in the mesentery, where it will stop. When the lacteals are filled, the preparation will be more elegant if red and yellow coarse injection be thrown into the mesenteric arteries and veins.

Preservation. Spread the mesentery on a waxed board, inflate a portion of the intestine, clear away all that is useless; dry and varnish, and preserve it in a glass frame.



CORRODED PREPARATIONS.

These preparations are made by filling the vessels with coarse injection, and corroding the soft parts so as to exhibit those vessels.

GENERAL OBSERVATIONS.

1. The liquor for corrosion is to consist of three parts of muriatic acid, and one of water.

2. The liquor should be kept in a well glazed earthen vessel, with a top to it, also well glazed.

3. The part to be corroded should be carefully moved in and out of this liquor, as the slightest force may break the vessels.

4. When corroded, the pulpy flesh is to be carefully washed away, by placing it under a cock of water, the water flowing very slowly; or, in some instances, by squirting it away.

5. When the preparation is freed of its flesh, it should be fixed in a situation it is to remain in, either in a plaister of Paris pedestal, or on a flat surface.

6. If the flesh be not perfectly destroyed, the preparation is to be returned to the corroding liquor for a fortnight or month longer, or until it becomes pulpy.

HEART AND LUNGS.

These viscera, occupying less space in children than adults, are to be preferred. It is of no consequence whether they are fat or lean. The integuments should be cut from the fore part of the neck; and the trachea, jugular veins, and carotid arteries removed, and, with them, the viscera of the thorax, carefully separating the subclavian vessels from the clavicle, without injuring them, and dividing the axillary vessels and the cava inferior and aorta, just below the diaphragm.

Preparation. Soak the whole well, to free it of its blood, and press out all the fluids: fix a pipe in the inferior cava, and another in one of the pulmonary veins, taking care not to injure the others by tying it. Then secure the carotids, the jugulars, the axillary vessels, the vertebral artery, the intercostals, the aorta, after it has formed its arch, the internal mammaries, and every vessel that can be found.

Injection. Red and yellow are generally preferred, but red and blue are more proper and more elegant. Throw the blue into the vena cava inferior, which will distend the right auricle, the superior cava, the jugular veins, and great coronary vein, the right ventricle, and pulmonary arteries. The red injection will fill the left auricle and pulmonary veins, the aorta, subclavians, carotids, &c.

Preservation. Great care is requisite in freeing the injection from the pulpy flesh. When done, let the apex of the heart be placed immediately in a plaister of Paris pedestal, and cover it with a glass. If the pulmonary vessels are well preserved, it forms a valuable preparation. If one good preparation be obtained in ten trials, it will amply repay the anatomist.

HEART.

A fat heart will do for this purpose. Inject it as directed in page 29, and put it into the corroding liquor.

Preservation. Lay it on some cotton, on a pedestal, and cover it with a glass.

LIVER.

The liver of a child is to be preferred to that of an adult, it occupying much less room: its vessels should be cut long, and with it the portion of the duodenum, perforated by the bile duct.

Preparation. Fix a pipe into the hepatic artery, another into the vena portæ, a third into the ductus communis choledochus, and a fourth in the vena cava hepatica.

Injection. The four injections are to be red, yellow, dark blue, and light blue. First, throw the red injection into the hepatic artery, next the dark blue into the vena portæ, then the light blue into the cavæ hepaticæ, and lastly, the yellow into the ductus communis choledochus.

Preservation. Remove the pipes as soon as the injection will permit; and, when corroded, fix the trunks in the best manner possible, upon a proper pedestal: then wash away the flesh, dry it, and cover it with a glass.

KIDNEY.

Choose the kidney of an old drunkard. Cut the emulgent vessels close to the aorta and cava, and the ureter, very low; then remove the kidney, with its surrounding adeps.

Preparation. Soak out the blood, and press out all the fluid. Fix a pipe in the emulgent artery, another in the vein, and a third in the ureter; and tie up all the open mouthed vessels.

Injection. Red, blue, and yellow. First throw the yellow into the vein, then the red into the artery, and lastly, the blue into the ureter.

Preservation. Under a glass bell.

The kidneys of different animals form a beautiful exhibition.

PART I.

OF THE

BONES IN GENERAL,

WHICH ARE THE FIRMEST PARTS OF THE BODY,

AND SERVE FOR THE

SUPPORT OF THE OTHER ORGANS.

The following parts are to be attended to.

THE *Radiated* appearance of the Fibres on broad Bones in Children.

The *Longitudinal Fibres*, forming the long Bones of Children.

The *Lamellæ*, in the long Bones of Adults.

The *Sides* of the long Bones in Adults, thick at the middle, and *thin* towards the extremities.

The *Reticular Substance* in the middle of long Bones:

The *Cancelli* in the extremities of long Bones.

The *Little Cavities* for containing Marrow and Vessels in the most solid parts of the Bones.

The *Cancelli* between the plates of the broad Bones.

The *Serosteum* which covers Bones in general, and conveys Nutritious Vessels into their Substance.

The *Periosteum Internum*, or *Membrana Mellullaris*, which lines the Reticulæ and Cancelli of Bones, and contains the Marrow.

The *Passages* of the principal Vessels of Bones.

The *Holes* for the transmission of Nerves which can be seen only in certain Bones

The *Globules of Fat* which compose the Marrow.

The *Connection* of Bones by *Suture*, where no motion is allowed.

The *Connection* of Bones by *Cartilage*, where some motion is necessary.

The *Connection* of Bones by *Ligament*, where extensive motion is required.

The *Cartilages* upon the ends of Bones, for the safe and easy motion of the Joints.

The *Perichondrium*, or *Membrane* covering the Cartilages, which in moveable Joints gives these Cartilages a great degree of smoothness.

The *Substances*, called *Glands* of the Joints, for the secretion of Synovia.

The *Epiphyses* upon the ends of moveable Bones in Children, for facilitating and hastening their ossification.

The *Epiphyses* changed into *Apophyses*, or *Processes*, upon certain parts of Bones of Adults, for the attachment of Muscles, &c. and which obtain particular names according to their appearances; as Coronoid, Condyloid, &c.

The numerous *Cavities* of Bones, as *Glenoid*, *Cotyloid*, &c. the names varying according to their appearances.



Of the Skeleton in General.

THE Assemblage of Bones Joined together to form a *Skeleton*,

A *Natural Skeleton*, or one joined together by its own Ligaments.

An *Artificial Skeleton*, or one joined together by Wire, &c. &c.

The *Division* of the Skeleton into *Head*, *Trunk*, *Superior Extremities*, and *Inferior Extremities*.



Of the Skull in General.

The *Skull* divided into the *Cranium*, and *Bones of the Face*.

The *General Figure* of the upper part of the *Cranium*, compared to that of an Egg.

The flat form of the Cranium, *laterally*.

The *Smooth Surface* of the upper part of the Cranium, where it is little affected by Muscular Fibres.

The *Periosteum of the head*, called *Pericranium*.

The *under and outer Surface* of the Cranium, *irregular* where it gives attachment to Muscles, &c. and passages to Vessels and Nerves.

The *anterior and under part* of the Cranium, *hollow*, to make part of the Orbits.

The *posterior part* of the Cranium, *marked* by Muscles of the Trunk.

The *upper and inner Surface* of the Cranium, *hollow*, for lodging the Brain.

The *under and inner Surface* of the Cranium, with *unequal Cavities*, for lodging the Lobes of the Brain and Cerebellum.

The *Furrows* along the inner side of the Cranium, for the reception of the Blood-vessels of the Dura Mater.

The *Sinuositities* upon the inner Surface of certain Crania, for lodging Luxuriations of the brain.

The *Pits* seen in some Crania, for lodging *Granulous Bodies* on the Dura Mater.

The *External Table* of the Cranium.

The *Internal table* of the Cranium, called *Vitrea*, somewhat thinner than the external.

The *Diploe*, or *Cancelli*, between the tables of the Cranium.

The *Diploe* wanting in certain parts of the Cranium.

The Cranium in general composed of *eight bones*, *six* of which are said to be proper to the Cranium, the *two* last common to it and to the Face.

The *six* proper to the Cranium, are

The *Os Frontis*, placed in the fore-part of the Cranium.

The *two Ossa Parietalia*, placed in the upper and lateral parts of the Cranium.

The *two Ossa Temporum*, placed in the under and lateral parts.

The *Os Occipitis*, which forms the back and some of the lower part of the Cranium.

The two Bones common to the Cranium and Face are,

The *Os Ethmoides*, placed in the fore-part of the Base of the Cranium

The *Os Sphenoides*, situated in the middle of the Base.

The *Sutures*, placed between the bones of the Cranium, for allowing the Ossification to begin originally in different points, are, the *three True Sutures*, and *two False or Squamous Sutures*.

The *three True Sutures* are,

The *Coronal Suture*, placed between the Frontal and Parietal Bones, losing its serrated appearance near its terminations.

The *Lambdoid Suture*, lying between the Parietal, Temporal, and Occipital Bones.

The parts of the Lambdoid Suture, placed between the Occipital and Temporal Bones, called *Additamenta* of the Lambdoid Suture.

The *Sagittal Suture*, situated between the Parietal Bones.

The Sagittal Suture, sometimes *continued to the Nose*.

The *Serrated Appearance* of the True Sutures, seen distinctly on the *outside* of the Cranium only.

The *True Sutures*, having little of the serrated appearance on the *inside* of the Cranium.

The *two False Sutures*, placed between the upper edge of the temporal, and under Edge of the Parietal Bones.

The Portion of the two False Sutures, situated between the under and back part of the Parietal and the Temporal Bones called by some *Additamenta of the Squamous Sutures*, and which have in that part the true serrated appearance.

Additional Bones, called *Ossa Triquetra*, or *Wormiana*, sometimes found in the different Sutures, though most frequently in the middle of the Lambdoid Suture.

The *Sutures* said to be *common* to the Bones of the Cranium and Face, are,

The *Ethmoid Suture*, which surrounds the Ethmoid Bone.

The *Sphenoid Suture*, which surrounds the Sphenoid Bone.

The *Transverse Suture*, which runs across the orbits and root of the Nose, between the Frontal, Malar, Sphenoid, Ethmoid, superior Maxillary, and Nasal Bones.

The *Zygomatic Sutures*, placed between the Temporal and Cheek Bones.

OS FRONTIS.

The *Situation* of the Os Frontis, in the fore-part of the Cranium.

Its *Shape*, which has been compared to that of a Clam shell

Its *External Surface*, smooth and convex.

The external and internal *Angular*, or *Orbital Processes*.

The *Superciliary Ridges*, on which the Eye-brows are placed.

Projections over the Frontal Sinuses.

The *Nasal Process*, forming part of the Nose.

Part of the *Temporal Process*, or *Ridge* which forms the boundary between the temporal and Frontal Muscles.

The hollow *Orbital Processes*, or *Plates*, which form the upper part of the Orbits.

The *Sinuosity* behind the upper end of the Superciliary Ridge, for lodging the Lacrymal Gland.

Behind each Internal Angular Process, a *small Pit*, to which the Cartilaginous Pulley of the Superior oblique Muscle is fixed.

The *Temporal Fossa*, for lodging part of the Muscle of that name.

The *Opening* between the Orbital Plates, for receiving the Cribriform Plate of the Ethmoid Bone.

The *Foramen Supra Orbitarium*, through which a branch of the Ocular Artery, and part of the Ophthalmic Branch of the Fifth Pair of Nerves pass to the soft parts of the Foreheads.

The *Foramen Orbitarium Internum*, *Anterior et Posterior*, through which small twigs of Nerves pass from the first part of the Fifth Pair, and of Arteries from the Ocular Artery into the Nose.

Small Perforations found upon the under and fore-part of the Frontal Bone, for the transmission of very minute Arteries or Nerves.

The *concave*, inner, and fore-part of the Os Frontis, for lodging the Anterior Lobes of the brain.

The *convex* under parts, for supporting these Lobes, and covering the Eyes.

The *Ridges* and *Depressions* of the Orbital Processes, marked by the Convolutions of the Brain.

Small *Furrows* on the inside of the Bone, for lodging the Blood vessels of the Dura Mater.

Slight *Sinuosities*, more evident on the under than on the upper part of the Bone, occasioned by the Convolutions of the anterior part of the Brain.

The *Frontal Spine*, for the attachment of the Falx.

The *Frontal Furrow*, extending upwards from the Spine, for lodging the upper part of the superior Longitudinal Sinus.

The *Foramen Cæcum* at the under part of the Spine, for a process of the Falx of the Dura Mater, and small Blood vessels.

The *Frontal Sinuses*, placed behind the inner ends of the Superciliary Ridges, and, in some Skulls, forming Prominences near the root of the Nose.

The *Walls* of the Sinuses, formed by a separation of the Tables of the Bone.

Their *Partition*, by which they are prevented from communicating with each other.

A *Communication* which they sometimes have with each other.

A *Passage* from each, leading into the Cavity of the anterior Ethmoid Cells, and from thence to the Nose.—The Sinuses add to the strength and melody of the voice.

In a Fœtus of nine months, the Os Frontis is composed of two Pieces—The Superciliary Holes and Frontal Sinuses are not yet formed.



OSSA PARIETALIA.

THE *Situation* of the Parietal Bones in the upper and lateral parts of the Cranium.

The *figure* of each Parietal Bone a Trapezium, or approaching that of a Square.

The *upper* edge longest.

The *anterior* Edge, next in length.

The *posterior* Edge, Shorter.

The *inferior*, shortest, and in form of a ragged arch, to be connected to the upper edge of the Squamous part of the Temporal Bone.

The *three first Edges* of the Bone ragged, where they assist in forming the True Sutures.

The *corners* of the Bone *obtuse*, excepting the under and anterior, which forms a kind of process.

The external *convex* smooth surface of the Bone.

The transverse arched *Ridge*, or *Line*, placed externally, a little below the middle height of the Bone, for the origin of the Temporal Muscle.

The *radiated Furrows* at the under part of the Bone, formed by the Fibres of the temporal Muscle.

The *Foramen Parietale*, for the passage of a Vein from the Integuments of the Head to the superior longitudinal Sinus; and sometimes for the transmission of a small Artery to the Falx of the Dura Mater.

The internal *concave* Surface of the Bone.

The *Furrows* made by the blood-vessels of the Dura Mater, the principal of which begin by a Trunk at the under and fore-part of the Bone.

The *Depression* at the upper Edge of the Bone, which is most distinctly seen when the Bones are conjoined, for the attachment of the Falx, and lodgment of the superior longitudinal Sinus.

The *Fossa* at the under and back part of the Bone, for lodging a small part of the lateral Sinus.

Numerous *Depressions* found on the inside of the Bone, occasioned by the prominences of the Brain.

The *Connection* of the Parietal Bones to the Frontal one, by the Coronal Suture,—to each other by the Sagittal Suture.

In the Fœtus the sides of the Parietal Bones are incomplete, and there is no Parietal Hole.

Between the Parietal Bones and the middle of the Os Frontis, there is a *Membranous Substance* filling the interstice, and getting the name of *Bregma*, *Fons*, or *Fontanella*, from its having been supposed by the Ancients

that the superfluous humours of the Brain are evacuated through it.

OS OCCIPITIS.

The *Situation* of the Occipital Bone in the back and under part of the Cranium.

Its *rhomboid* figure.

The two lateral *Angles*.

The external Surface, *convex* and *smooth* at the upper part.

The *large arched Ridge*, near the middle of the convex Surface to the centre of which the Trapezii Muscles are fixed, the outer parts giving origin to the Occipito Frontalis.

The *smaller Arch*, under the former.

The *Depressions* between the large and small Arches, for the connection of the Complexi.

The *Impressions* between the Arches and the Temporal Bones, for the attachment of the Splenii.

Cavities between the smaller Arch and the Foramen Magnum, for the reception of the Recti Minores.

The *perpendicular Spine*, between the Muscles of the opposite Sides.

The *unequal Edges* of the Foramen Magnum, for the insertion of Ligaments, by which the Head is fixed to the Vertebrae of the neck.

The *inferior Angle*, called Cuneiform or Basilar Process.

The *unequal Surface* of the Cuneiform Process, for the attachment of the Recti Anteriores Muscles.

The *Condyles* placed at the Base of the Cuneiform Process, and sides of the Foramen Magnum, for the articulation with the first Vertebra of the Neck.

The *oval Form* and smooth Cartilaginous Surface of the Condyles, corresponding with the superior articulating Processes of the first Vertebra.

The *rough Edges* of the Condyles, for the attachment of their Capsular Ligaments.

The *rough Surface* between the Condyles and Mastoid Processes of the Temporal Bones, for the insertion of the Recti Capitis Laterales Muscles.

The *Internal Surface* of the Bone, *hollow*, for containing the back part of the Brain and Cerebellum.

The *Cruciform Spine* of the inner side.

The *upper Limb* of the perpendicular Spine, *hollow* in the middle, or frequently at one side, for the reception of the superior longitudinal Sinus, and the attachment of the Falx.

The *lateral Limbs* placed opposite to the great external arched Spine, and hollow in the middle, for containing the lateral Sinuses, and giving attachment to the Tentorium of the Dura Mater.

The *lower Limb* of the perpendicular Spine, for the attachment of the Falx Minor.

The *Fossæ* at the sides of the upper Limb, for containing the posterior Lobes of the Brain.

The *Fossæ* at the sides of the lower Limb, for containing the Cerebellum.

The *concave Surface* of the Cuneiform Process for receiving the Medulla Oblongata, and Basilar Artery.

The *Depressions* at each side of the Cuneiform Process where the inferior Petrosal Sinuses are placed.

The *Foramen Magnum*, behind the Basilar Process, and at the sides of the Condyles, for the passage of the Medulla Oblongata, Vertebral Vessels, and Accessory Nerves.

The *superior or anterior Condylloid Foramina*, for the passage of the Ninth pair of Nerves.

The *posterior Condylloid Foramina*, for the passage of Veins into the Lateral Sinuses.

The *Connection* of the Bone to the Ossa Parietalia, by the Lambdoid Suture.

In the Fœtus the Occipital Bone is divided into *four pieces*; the first reaching from the middle of the Lambdoid Suture to the Foramen Magnum, the second and third are placed at the sides of that Foramen, and the fourth forms the Cuneiform Process.



OSSA TEMPORUM.

The *Situation* of each Temporal Bone in the under part of the side of the Cranium.

The *Squamous Plate*, which forms a part of the Temple, and gives origin to a portion of the Temporal Muscle.

The *Mastoid Process*, at the under and back part of the Bone, giving insertion to strong Muscles, and containing cells which communicate with each other, and with the Cavity of the Tympanum.

The *Pars Petrosa* hard like a rock, and placed at the base of the Bone, from which it runs obliquely forwards and inwards, and contains the internal Organ of hearing; to be afterwards described.

The *Zygomatic Process*, running from the under and fore-part of the Squamous Plate, to join the Os Malæ, and form an Arch, under which the Temporal Muscle passes to the Lower Jaw.

A *Tubercle* at the root of this Process, covered with Cartilage, and making part of the Articulation of the Lower Jaw.

The *Styloid Process*, placed at the root of the Pars Petrosa, and going obliquely downwards and forwards, to give origin to Muscles which belong to the Tongue and Throat.

The *Vaginal Process*, of an inconsiderable size, surrounding the root of the Styloid Process.

The *Rough Margin* at the under part of the external Meatus, sometimes also considered as a Process, and called *Auditory*.

A *Groove*, at the under part of the root of the Mastoid Process, giving origin to the Digastric Muscle.

The *Glenoid Cavity*, lined with Cartilage at the root of the Zygoma, for the articulation of the Lower Jaw.

The *Glenoid Fissure*, at the back-part of this Cavity, for the attachment of the Capsular Ligament of the articulation of the Jaw.

A *Depression* between the articular Cavity and Styloid Process, for lodging a portion of the Parotid Gland.

The *Thimble-like Cavity*, or the *Jugular Fossa*, at the inner side of the root of the Styloid Process, for lodging the top of the internal Jugular Vein.

Meatus Auditorius Externus, between the Mastoid and Zygomatic Processes, leading inwards and forwards to the Organ of hearing.

Foramen Stylo-Mastoideum, or *Aqueduct of Fallopius*,

between the Styloid and Mastoid Processes, for the transmission of the Portio Dura of the Seventh Pair of Nerves.

The *Foramen Caroticum*, at the inner and fore-part of the Jugular Fossa, leading upwards, then forwards through the point of the Pars Petrosa, for the transmission of the internal Carotid Artery to the Brain.

Iter a Palato ad Aurem, or *Eustachian Tube*, between the Fissure for the Capsular Ligament of the Lower Jaw, and the Passage of the internal Carotid Artery; and, in the Subject, by the addition of a Cartilage, formed into a trumpet-like Tube, which conveys air from the Nose to the Tympanum of the Ear.

Foramen Mastoideum, occasionally found at the back part of the Mastoid Process, or in the Lambdoid Suture. When present, it sometimes transmits an Artery to the Dura Mater, but more commonly a Vein from the Integuments of the Head to the lateral Sinus.

The *upper* and *inner Edge* of the Squamous Plate, formed into *ridges* and *furrows*, where it is connected with the Parietal Bone.

The *inner Surface* of the Squamous Plate, *unequal* where it is marked by the Convolutions of the Brain, and by the Arteries of the Dura Mater.

The *anterior* and *outer Surface* of the Pars Petrosa, opposed to the lateral Lobes of the Brain.

The *posterior* and *inner Surface* of the Pars Petrosa, opposed to the Cerebellum.

A *Ridge* between the two Surfaces of the Pars Petrosa, for the attachment of the Tentorium.

A *Groove* upon the ridge of the Pars Petrosa, for lodging the superior Petrosal Sinus.

Fossa, at the root of the posterior Surface of the Pars Petrosa, and opposite to the Mastoid Process. for lodging the lateral Sinus, where it turns downwards to go out of the Cranium.

Meatus Auditorius Internus, or *Foramen Auditivum*, in the posterior Surface of the Pars Petrosa, for the passage of the Seventh Pair of Nerves.

Foramen Innominatum, in the anterior Surface of the Pars Petrosa, for the passage of a reflected Nerve from the Fifth to the Seventh Pair.

Foramen Lacerum Posterius, or *Hole* common to the

Pars Petrosa and Cuneiform Process of the Occipital Bone, for the passage of the lateral Sinus, Eighth Pair, and accessory Nerves. The Nerves pass through the fore-part of the Hole, and are separated from the Sinus by a Process of the Dura Mater.

The *Connection* of the Bone, by its upper curved Edge, to the Parietal Bone by the Squamous Suture.

To the under and back part of the Parietal Bone, by the Aditamentum of the Squamous Suture.

To the Occipital Bone, by the Additamentum of the Lambdoid Suture.

In a Fœtus, the Squamous is separated from the Petrous part by a Fissure. There is no appearance of Mastoid or Styloid Process, and instead of a Meatus Externus, there is only a Ring of Bone, in which the Membrana Tympani is fixed.



OS ETHMOIDES.

The *Situation* of the Ethmoid or Cribriform Bone in the fore part of the Base of the Cranium.

Its *Cuboid Figure*.

The *Cribriform Plate*, perforated with many holes, for the transmission of the First, or Olfactory Pair of Nerves.

The *Crista Galli* arising from the middle of the Cribriform Plate, to give attachment to the Falx of the Dura Mater.

A *Notch* at the fore-part of the root of the Crista Galli, contributing, in a very small degree, to the formation of the Foramen Cæcum of the Frontal Bone.

The *Nasal Plate*, extending downwards from the base of the Crista Galli, to form the upper and back part of the Septum, or Partition of the Nostrils.

The *Ethmoid Cells* placed under the Cribriform Plate, a little to the outside of the Nasal Lamella, separated from each other by thin Plates, and serving the same purposes as the Frontal Sinuses.

Their *Communications* with each other, with the Frontal Sinus, and also with the Cavity of the Nose.

The *Os Spongiosum*, or *Turbinatum Superius*, hanging

down from the æthmoid Cells at the side of the Nasal Lamella, for enlarging the Organ of Smell.

Its *Triangular form* and *Spongy Texture*.

Its *Convexity* towards the Septum, and *Concavity* outwards.

The *Os Planum*, or *Orbital Plate*, for covering a large share of the æthmoid Cells, and forming the greater part of the inner side of the Orbit.

The *Connection* of the Cribiform Plate to the Orbital Plates of the Frontal Bone, by the æthmoid Suture; and to the Sphenoid Bone, by a Suture common to the two Bones, but generally considered as belonging to the latter.

The *Connection* of the Os Planum to the Orbital Plate of the Frontal Bone by part of the Transverse Suture.

The *posterior Edge* of the Nasal Plate, joined to the Processus Azygos of the Sphenoid Bone.

Its *upper Edge* joined to the Nasal Process of the Frontal and Nasal Bones.

Its *anterior Edge*, joined to the middle Cartilage of the Nose.

In the Fœtus, the æthmoid Bone is divided into two by a Cartilaginous partition, which afterwards forms the Nasal Plate and Crista Galli.



OS SPHENOIDES.

The *Situation* of the Sphenoid, Cuneiform, or Wedge-like Bone, in the middle of the Cranium.

Its *Irregular Figure*, compared to that of a Bat with extended wings.

The *Temporal Plate*, *hollow*, for lodging a share of the Temporal Muscle.

The *Orbital Plate*, which forms a portion of the Orbit.

The *Spinous Process*, at the under and back part of the Temporal Process.

The *Styloid Process*, at the point of the Spinous Process.

The *Pterygoid*, or *Aliform Process*, composed of two Plates, which are compared to the wings, though more properly resembling the feet of the Bat.

The *external Plate*, broad and hollow without, where the external Pterygoid Muscle has its origin.

The *internal Plate*, narrower and longer than the external, and, with its fellow, forming the back part of the Nose.

A *Hook-like Process* upon the internal Plate, over which the Circumflex Muscle of the Palate moves.

The *Fossa Pterygoidea*, between the Pterygoid Plates, giving rise to the internal Pterygoid Muscle.

A *Groove* between the root of the Styloid Process, and that of the internal Pterygoid Plate, assisting in the formation of the Eustachian Tube.

The *Triangular Process*, which adheres to the body of the Sphenoid, and the æthmoid Bone, and which is considered as one of the Bones of the Face.

The *Processus Azygos*, standing single and projecting from under the middle of the fore part of the Bone.

The *Clinoid Processus*, compared to the supporters of a Bed, of which there are

Two Anterior, terminating each in a point, which obtains the name of *Transverse Spinous Process*. The *third is*

The *Posterior Clinoid Process*, situated transversely, someway behind the anterior Processes, and frequently ending in two knobs, which incline obliquely forwards.

Processus Olivaris, considered by some as a fourth Clinoid Process, lying between the posterior points of the anterior Clinoid Processes.

Between the anterior Clinoid Processes, a *small-pointed Process* frequently juts forwards, to join the Cribriform Plate of the æthmoid Bone.

The *Temporal Fossa* of this Bone, which lodges a share of the lateral Lobe of the Brain.

A *Fossa* between the anterior Clinoid Processes, where part of the anterior Lobes of the Brain rests.

A *Depression* before the Processus Olivaris, where the conjoined Optic Nerves lie.

The *Sella Turcica*, *Ephippium*, or *Turkish Saddle*, between the Processus Olivaris and posterior Clinoid Process, for lodging the Glandula Pituitaria.

A *Depression* upon the side of the posterior Clinoid Process and Sella Turcica, formed by the internal Carotid Artery.

The *Foramen Opticum*, under the anterior Clinoid Process, for the transmission of the Optic Nerve and Ocular Artery.

The *Foramen Lacerum Superius*, or *superior Orbital Fissure*, under the anterior Clinoid Process, and its transverse spinous part, for the passage of the Third, Fourth, first part of the Fifth, and the Sixth Pair of Nerves, and the Ocular Vein.

The *Foramen Rotundum*, a little behind the Foramen Lacerum, for the passage of the second part of the Fifth Pair of Nerves.

The *Foramen Ovale*, farther back, and more external than the Rotundum, for the passage of the third part of the Fifth Pair of Nerves, and commonly for the passage of the Veins which accompany the principal Artery of the Dura Mater.

The *Foramen Spinale*, in the point of the Spinous Process, for the transmission of the principal Artery of the Dura Mater.

The *Foramen Pterygoideum*, at the root of the inner Plate of the Pterygoid Process, for the passage of a reflected branch of the second part of the Fifth pair of Nerves.

Sometimes one or more small passages are observed in or near the Sella Turcica, for the transmission of Blood-vessels into the Sphenoid Sinus, or to the substance of the Bone.

The *Foramen Lacerum Anterius*, common to the point of the Pars Petrosa, and to the Sphenoid and Occipital Bones.

In a recent Skull, this hole is filled with a Cartilaginous Ligament, which drops out by maceration.

The *Sphenoid Sinus*, in the body of the Bone, at the under and fore-part of the Sella Turcica.

A *complete Partition* between the right and left Sphenoid Sinuses.

The *Passage* from the upper and fore-part of the Sphenoid Sinus, into the upper and back-part of the Nose.

The *Substance* of the Bone, the most unequal of any in the Body, some parts being extremely thin, while others are thicker than most parts of the Cranium.

The *Connection* of the Bone to all the other Bones of the Cranium, by the Sphenoid Suture.

In the Fœtus, the Temporal Wings are separated from the Body of the Bone by Maceration, and there are no Sphenoid Sinuses.

THE BONES OF THE FACE.

They are *divided* into the *Upper* and *Under Jaws*.

The *Upper Jaw* is composed of *seven Pairs of Bones*, and *one without a fellow*, viz.

Two Ossa Nasi; *Two Ossa Unguis*; *Two Ossa Malarum*; *Two Ossa Maxillaria Superiora*; *Two Ossa Palati*; *Two Ossa Spongiosa Inferiora*; *Two Triangular Bones*, placed at the sides of the Sphenoid Sinuses; and the *Vomer*.

The *Lower Jaw* consists of *a single Bone*.

THE OS NASI.

Its *Situation* in the upper and fore-part of the Nose.

Its *Oblong Form*.

The *thick, ragged*, upper end.

The *thin* inferior extremity.

Its *external Convexity*.

Its *internal Concavity*, where it forms part of the *Cavity* of the Nose.

The *Spinous Process*, which forms part of the *Partition* of the Nose.

One or more *Holes* externally, for transmitting *Vessels* into the Bone.

Its *Connection* to the *Frontal Bone* by the *Transverse Suture*.

Connection to its fellow by the *anterior Nasal Suture*.

OS UNGUIS, OR LACRYMALE.

Its *Situation* at the inner and fore-part of the Orbit.

The *Division*, externally, into *two depressed Surfaces* and a *middle Ridge*.

The *posterior Depression*, forming part of the Orbit.

The *anterior Depression*, lodging part of the *Lacrymal Sac and Duct*, and perforated by small *Holes*,

through which Fibres pass, to make a firm connection between the Bone and its investing Membrane.

The *inner Surface*, composed of a *Furrow* and *two irregular convex Surfaces*, corresponding with the anterior Ethmoid Cells.

The *Substance* of the bone is the *thinnest* and *most brittle* of any in the body.

It is *connected* to the Frontal Bone, by the Transverse Suture, and to the Os Planum by the Ethmoid Suture. *Internally*, it is connected with the Ethmoid Cells.

OS MALÆ

Its *Situation* in the outer part of the Cheek.

The *external, convex, smooth Surface*.

The *posterior hollow Surface*, for lodging part of the Temporal Muscle.

The *superior Orbital Process*, forming part of the outside of the Orbit

The *inferior Orbital Process*, forming part of the lower Edge of the Orbit

The *Maxillary Process*, forming the under part of the Prominence of the Cheek.

The *Arch* between the Orbital Processes, which forms near a third part of the anterior circumference of the Orbit.

The *Zygomatic Process*, forming part of the Arch over the Temporal Muscle.

The *Internal Orbital Plate*, forming the outer and fore-part of the Orbit.

A *Passage* through the Bone, for the transmission of small Vessels or Nerves from the Orbit to the Face.

The *Connection* of the superior Orbital Process and internal Orbital Plate, to the frontal and Sphenoid Bones, by the transverse Suture.

The *Connection* of the Zygomatic Process to the Temporal Bone, by the Zygomatic Suture.

OS MAXILLARE SUPERIUS.

The *Situation* in the fore-part of the Upper Jaw, and side of the Nose.

Its *Size*, the largest of the Bones of the Upper Jaw.

The *Naval, or angular Process*, forming part of the side of the Nose, and of the inner part of the Orbit.

A *Ridge* at the under and inner part of the Nasal Process, for supporting part of the *Os Sphenoidale inferius*.

The *Orbital Plate*, forming a large share of the under side of the Orbit.

The *Malar Process*, unequal and ragged, where it contributes, with the *Os Male*, to form the Prominence of the Cheek.

The *Tuberosity*, or *bulge* at the back part of the Bone.

The *Alveolar Arch*, of a spongy nature, where the Sockets of the Teeth are placed.

The *Palate Process*, forming part of the Roof of the Mouth, and of the bottom of the Nose.

The *Nasal Spine*, contributing, in a small degree, to the formation of the Septum of the Nose.

A *Depression* behind the Malar Process, where the under end of the Temporal muscle plays.

A *Depression* at the under and fore-part of the Malar Process, where the Muscles which raise the upper lip, and corner of the mouth, originate.

A *Cavity* formed by the Palate Plate.

A *Notch* forming the under and fore-part of the Nostril.

The *Alveoli*, or *Sockets* for the teeth, the number of Sockets corresponding to the Fangs of the Teeth.

The *Lacrimal Groove*, which, with that of the *Os Unguis*, forms a passage for the Lacrymal Duct into the Nose.

A *Canal* in the Orbital Plate, terminating anteriorly by the *Foramen Infra Orbitarium*, through which the Infra-Orbital branch of the second part of the Fifth Pair of Nerves, with a branch of the internal Maxillary Artery, pass to the Face.

The *Foramen Incisivum*, or *Palatinum Anterius* behind the fore-teeth, common to both bones below, but proper to each above, and filled with a Process of the soft Palate, and with small Vessels and Nerves, which run between the Membranes of the Mouth and Nose.

In some Subjects, there is a distinct *Ductus Incisivus* leading from one or from each Nostril into the cavity of the Mouth, similar to that which is always found in the large Quadrupeds.

A small *Hole* commonly found in the Nasal Process, and some minute *Pores* at the back-part of the Tu-

berosity, for the transmission of Blood-vessels and Nerves into the Substance of the Bone, or Antrum Maxillare.

Sinus Maxillaris, Antrum Maxillare, or Highmorianum, situated under the Orbital Plate, and above the large Dentes Molares, for the same purposes as the other Sinuses of the head.

The *Opening* of the Sinus, large in the separate Maxillary Bone, but, in the connected state, so covered by the inferior spongy and Palate-Bones and membranes, as to leave only a small Aperture between the Ossa Spongiosa superius and inferius, into the cavity of the Nose.

The *Connection* of the Os Maxillare superius, to the Frontal Bone, by the transverse Suture;—to the Os Unguis, by the Lacrymal Suture;—to the Os Nasi, by the lateral Nasal Suture;—to the Cheek bone by the external Orbital Suture; to the Os Planum, by the Ethmoid Suture;—to its fellow, by the longitudinal Palate Suture.

Anteriorly, between the Mouth and Nose, the Bones are joined together by the Mystachial Suture.

In the Fœtus, there are Six Sockets for the Teeth. There is no Tubercosity, and the Maxillary Sinus is only beginning to form.

OS PALATI.

Its *Situation* in the back-part of the Palate.

The *Oblong form* of the Palate-Plate, which forms the back part of the Osseous Palate.

Its *posterior curved Edge*, where it is connected with the Velum Palati; also the *Point* at the inner extremity of the curve, for the origin of the Muscle of the Uvula.

Its *thick, strong substance*, where it joins its fellow.

Its *Spinous Process* at the inner Edge of the Palate-Plate, joining the under Edge of the Vomer.

The *Pterygoid Process* of a *Triangular form*, with *Fosse* corresponding to the Pterygoid Plates of the Sphenoid Bone.

The *Nasal Plate*, forming a portion of the side of the Nose, and Antrum Maxillare

A *Ridge* on the inside of this Plate, upon which the back-part of the inferior spongy Bone rests.

The *Orbital Processes* at the upper and back-part of of the Nasal Plate, contributing a little in the formation of the Orbit, and of the Ethmoid and Sphenoid Sinuses.

A *Notch* between the Orbital Processes, forming part of the *Foramen Palatinum posterius*, for the passage of the lateral Nasal Vessels and Nerve.

Foramen Palatinum posterius, at the outer end of the Palate-Plate of this Bone, but common to it and the Maxillary Bone, for the transmission of the Palatine Vessels and Nerves.

A *small Hole* frequently observed behind the former, and communicating with it, for the passage of a branch of the Palatine Nerve.

Foramen Spheno-Maxillare, Lacerum Inferius, or Inferior Orbital Fissure, at the under and outer part of the Orbit, and common to the Cuneiform, Maxillare, Malar, and Palate Bones, for lodging fat, and transmitting small twigs of Vessels and Nerves into the Orbit.

The *Connexion* of the Os Palati to the Palate-Plate of the Maxillary Bone, by the transverse of the Palate Suture;—to the Maxillary Bone, at the side of the Nose and bottom of the Orbit, by the Palato-Maxillary Suture;—to the Pterygoid Process of the Sphenoid Bone, by the Sphenoid Suture;—to the Os Planum and Ethmoid Cells, by the Ethmoid Suture;—to its fellow, by the longitudinal Palate Suture.

OS SPONGIOSUM, OR TURBINATUM INFERIUS.

Its *Situation* in the under part of the side of the Nose. Its *Triangular form* and *spongy appearance*.

Its *Convexity* towards the Septum Nasi, and *Concavity* outwards.

The *two processes* at the upper part of the Bone, the anterior forming part of the Lacrymal Groove, and the posterior part of the Wall of the Maxillary Sinus.

This bone is *connected* to the Os Maxillare, Os Palati, and Os Unguis, by a distinct Suture in a young subject, but in an old person, it grows firmly to these Bone by an union of substance.

SPHENOIDAL CORNU, OR OS TRIANGULARE.

The *Situation* of the triangular Bone between the body of the Sphenoid Bone and root of its internal Ptery-

goid Process, covering the under part of the Sphenoid Sinus

The *Connection* to the back part of the Ethmoid Bone. — In an old person this Bone grows so firmly to the Sphenoid Bone, as to be considered by some authors as one of its Processes.

VOMER.

Its *Situation* in the under part of the Septum Nasi, where it separates the Nostrils from each other.

It is frequently bent to one side, in which case the one Nostril is rendered larger than the other.

Its *Form*, compared to that of the Plough-share.

The *Superior* and *Posterior* part, *thick* and *strong*, with a *Furrow* to receive the Processus Azygos of the Sphenoid Bone.

The *Superior Part*, with a *Furrow* to receive the Nasal-Plate of the Ethmoid Bone and Cartilage of the Nose.

The *Inferior Edge* connected with the spinous Processes of the Palate and Maxillary Bones.

The *Posterior Edge*, unconnected with any other Bone, and turned to the Cavity of the Fauces.



MAXILLA INFERIOR,

THE *Figure* of the Maxilla Inferior, or Lower Jaw, compared to that of the Greek ν .

Its *Division* into *Chin*, *Sides*, and *Processes*.

The *Chin*, extending between the Mental Foramina.

The *Side* reaching from the Mental Foramen to the back-part of the Bone.

A *transverse Ridge* on the fore-part of the Chin, with depressions on each side, for the origin of the Muscles of the Under Lip.

Small Prominences and *Depressions* on the under and back-part of the Chin, for the attachment of the Frænum Linguae, and several Muscles which belong to the Throat.

The *Base*, or *lowest Part*, forming under boundary of the Face.

The *Angle* of the Jaw at the back-part of the Base.

Impressions made by the Masseter Muscle, upon the Plate which arises from the angle of the Jaw.

The *Condylod* or *Articular Process*, with an oblong smooth cartilaginous Surface, placed upon a Cervix at the upper and back-part of the Bone.

The *Coronoid Process*, situated a little before the Condylod, for the insertion of the Temporal Muscle.

The *Situation* of the Coronoid Process behind the Zygoma.

A *Semilunar Notch* between the Processes.

The *Alveolar Process*, at the upper edge of the Bone, and the Alveoli similar to those of the Upper Jaw.

The *Sockets* worn down by old age, in consequence of which the Jaw becomes narrower and more prominent.

The *posterior Maxillary Foramen* at the root of the Condylod and Coronoid Processes, upon the inner side of the Jaw, for the passage of the third, or inferior Maxillary Branch of the Fifth Pair of Nerves, with corresponding Blood-vessels.

A *small pointed Process* at the inner edge of this Hole, where a Ligament goes off to be fixed to the Temporal Bone.

Above the Hole, the Bone is *marked* by the passage of the Nerve and vessels, and below it, there is commonly a *small Furrow* pointing out the course of a Nerve which goes to a Muscle and Gland under the Tongue.

Between the posterior Maxillary Foramen and the angle, the Bone is *marked* by the insertion of the Internal Pterygoid Muscle.

The *Anterior Maxillary Foramen*, or *Mental Hole*, at the side of the Chin, where the remains of the Inferior Maxillary Nerve and Vessels come out.

Between the Posterior and Anterior Foramina, the *Inferior Maxillary Canal* runs in the substance of the Bone, a little below the roots of the Teeth, and has many perforations, for the passage of small branches of Vessels and Nerves which supply the Jaw and Teeth.

The *Surface* of the Jaw is remarkably *hard*, and within it has *numerous Cells*, which surround the Maxillary Canals, and communicate with each other at the fore-part of the Bone.

The *Articulation* of the Jaw by its Condylod Proces-

ses, with the Glenoid Cavity of the Temporal Bone, and also with the Tubercle at the root of its Zygomatic Process.

An *intermediate moveable Cartilage*, placed in the Articulation of the Lower Jaw, allowing the Condyle to remain in the Glenoid Cavity, in the gentler motions of the Jaw, but admitting it to advance upon the Tubercle, or root of the Zygoma, when the mouth is widely opened.

In a Fœtus, the Lower Jaw is composed of two pieces joined together in the middle of the Chin, by the intervention of a Cartilage, which gradually ossifies, and leaves no mark of division.—The Cavities for the Teeth are the same as in the Upper Jaw.

THE TEETH.

THE *Situation* of the Teeth in the Alveoli of the Jaws.

The *Number* of the Teeth, *Sixteen* in each Jaw.

The *Base*, or *Body* of each Tooth, which appears without the Sockets.

The *Roots* or *Fangs*, placed in the Sockets, and of a *Conical* form.

The *Neck* or *Collar* of the Teeth.

The *Sockets* are lined with a *Vascular Membrane*, which serves as a *Periostium* to the Teeth.

The *Cortex* or *Enamel*, which covers the base of each Tooth, and becomes gradually thinner towards the Cervix.

The *Fibres* of the Enamel are placed perpendicular to the Osseous Substance, to diminish the effects of Friction.

The *Fibres* of the Osseous Part of the Teeth form Lamellæ, which run in the direction of the surface of the Teeth.

A *Foramen* in the point of the root of each Tooth, and a passage leading from it into a common Cavity in the Base of the Tooth, for lodging the Vascular and Nervous Pulp of the Teeth.

The *Division* of the Teeth into *Three Classes*, viz.

—On each side of each Jaw,—

Two Incisores, or cutting Teeth; One Caninus, Cuspidatus, or Dog's Tooth; Two Bicuspides, or small Anterior Molares, or Grinding Teeth; and Three large Posterior Molares, or principal Grinders.

The Incisores, having their *Bases* formed into *Wedges*, which are sloped out behind.

The Caninus, having its *Base* in form of a *Wedge pointed in the middle*

The small Molares, each with *double points*, which, in the Upper Jaw, are nearly upon a level, but, in the Under Jaw, highest on the outside of the Teeth.

The Incisores, Caninus, and small Molares, with *single roots*, excepting the small Molaris of the *Upper Jaw*, which has frequently *two roots*

Of the three posterior, or lower Molares of the *Under Jaw*; the first has *five points*, and each of the other two has *four points*.

Each of these three Teeth, has *two, three, or sometimes four roots*.

In the *Upper Jaw*, the first large Molaris has only *four points*, and each of the other two only *three points*.

In each of these three Teeth, there is generally *one root more* in those of the *Upper*, than in the corresponding Teeth of the *Under Jaw*

The last, or backmost Molaris, called *Sapiens*, from its appearing much *later* than the rest, is *smaller* and has generally *fewer roots*.

The Teeth are *connected* to the Sockets by *Gomphoses*, (like a nail fixed in a board) and by a firm adhesion to the Gums.

In the Fœtus, the outer Shell only of five deciduous Teeth, and of one permanent Tooth, in each side of each Jaw, is found.

These Teeth are situated in Capsuls, within the Jaw, and under its surface. At this period there are no roots formed.

Between the inner side of the deciduous Teeth and the Alveoli, in the Fœtus, little Capsuls are placed, and connected by Processes with the Gums, in which the Incisores and Canina are afterwards formed; but at this time there is no appearance of the rudiments of any of the Teeth. See Dr. Baile's Thesis, 1758.

OS HYOIDES.

THE *Situation* of the Os Hyoides, at the root of the Tongue and top of the Larynx, where it serves as a Lever, allowing several Muscles, moving these parts, to be fixed to it.

The *Shape*, compared to that of the Greek letter ν .

The *Body* of the bone, *convex* before, and *concave* behind.

Several impressions are seen on its Body, occasioned by the numerous Muscles fixed to it.

The *Cornua*, extending backwards and upwards from each side of the Body.

The *Appendices*, placed at the upper part of the Articulation between the Body and Cornua.

From each Appendix a *Ligament* sent up to the Styloid Process of the Temporal Bone.

The Os Hyoides is not immediately connected to any other Bone, but is kept in its place by numerous Muscles and Ligaments, to be afterwards mentioned.

At birth, the greater part of the Bone is in a Cartilaginous state, and the Appendices continue so for many years after the other parts are completely ossified.



THE TRUNK.

THE Trunk, composed of the Spine, Pelvis, and Thorax.

The *Spine*, reaching from the Condyles of the Occipital Bone, to the lower end of the Os Coccygis.

The Spine appearing *straight*, when viewed anteriorly or posteriorly.

The several *Curvatures* of the Spine, when viewed in a lateral direction.

The Spine, composed of a long upper, and a short under Pyramid, joined together by their Bases.

The upper Pyramid, composed of *true Vertebrae*, or Bones which turn upon each other.

The under Pyramid, formed of *false Vertebrae*, or Bones which at an early period of life, resemble the

true Vertebræ, but afterwards grow together, so as not to contribute to the motions of the Trunk of the Body.

THE TRUE VERTEBRÆ,

Are Twenty-four in Number.

Each of the true Vertebræ composed of a *Body* and *Processes*.

The *Body* of a true Vertebra of a *spongy* nature, with *upper* and *under Surfaces* placed horizontally.

The anterior *convexity* of the *Body*, and posterior *concavity*.

Numerous *small Holes* on the anterior and lateral parts of the body, for the passage of Blood-vessels into the Substance of the Bone, or for the attachment of Ligamentous Fibres.

A *Ring of Bone*, at the upper and under edges of the *Body*, of a firmer texture than the rest of its Substance, and thereby adding to the general strength of the Bone.

The *Ring of Bone* forming a *superficial Cavity*, which receives the Intervertebral Cartilage.

The *Intervertebral Cartilages*, or *Cartilago-ligamentous Substances*, placed between the *Bodies* of the Vertebræ, for fixing them together, and allowing the Spine to be moved in all directions.

The Intervertebral Substances are composed of *Concentric Lamellæ*, with their edges fixed to the bodies of the Vertebræ.

The *Lamellæ* of these substances are formed of *Oblique Fibres*, which decussate each other, and are very compressible.

The *Centre* of these substances changes from *Lamellæ*, and puts on the appearance of a *Mucus* or *Pulp*, which has little compressibility, and serves as a *pivot* upon which the other parts move.

The *Intervertebral Substances*, like the Vertebræ themselves, *larger* and *thicker* as they descend, to give greater security to the parts they support.

An *Arch* sent out from the back-part of the *Body*, which, together with the *Body*, forms a *large Hole* for the passage of the Spinal Marrow.

A *Notch* at the upper and under edge of each side of the Arch, for the passage of the Spinal Nerves.

The *two Superior Oblique*, or *Articulating Processes*, covered with Cartilage, placed upon the upper part of the sides of the Arch.

The *two Inferior Oblique*, or *Articulating Processes*, also covered with Cartilage, and placed upon the under part of the sides of the Arch.

The *two Superior Oblique Processes* of one Vertebra, articulated with the *two Inferior Oblique* of the Vertebra immediately above it.

The *two Transverse Processes* projecting from the sides of the Arch, and between the Oblique Processes.

The *Spinous Process*, sent out from the back part of the Arch, which being sharp and pointed, gives name to the whole chain of Bones.

The *Edges* of the Processes, as well as of the Body, are *rough*, where Ligaments come off which fix them to each other.

The Vertebrae divided into seven *Cervical*, *Twelve Dorsal*, and five *Lumbar*.

The *Cervical Vertebrae*, or *Vertebrae of the Neck*, having their Bodies *smaller*, *more flattened*, *before and behind*, and *more hollowed above and below*, than those of the other Vertebrae.

The *Articulating Processes*, more *Oblique* than any others.

The *Transverse Processes*, perforated for the passage of the Vertebral Blood-vessels, and *hollowed above* for the transmission of the Spinal Nerves.

The *Spinal Processes*, strait out from the bodies of the Vertebrae, *shorter* than any other, and *forked* for the attachment of the Muscles.

The *Cervical Vertebrae* admit of *free motion*, in consequence of the thickness of their Cartilages, and the nature of their Processes.

The first Vertebra, called *Atlas* from its supporting the Globe of the Head, having only a small Arch instead of a Body.

The Upper and Under Surfaces of the Arch, marked by the Ligaments which fix it to the Head and second Vertebra.

The Back-part of the Arch. *hollow*, and covered by a

smooth Cartilage, where it turns upon the *Processus Dentatus*.

The inner parts of the sides of the *Vertebra*, between the *Superior* and *Inferior Oblique Processes*, marked by the *Lateral Ligaments* which go to the *Processus Dentatus*, and by the *Transverse Ligament* which passes behind that *Process*.

An *Arch* upon the back part of the *Atlas*, instead of a *Spinous Process*, marked by *Muscles* and *Ligaments*.

The *Superior Oblique Processes*, oval and hollow, for receiving the *Condyles* of the *Occipital Bone*.

A *Fossa* under the outer and back-part of each *Oblique Process*, for the circular passage of the *Vertebral Arteries* into the *Head*, and *Tenth pair of Nerves* out of it.

The *Transverse Processes*, longer than any other *Cervical Vertebra*, for the origin of several *Muscles*.

Upon the *Atlas* the head has its *flexion* and *extension*, but little other motion.

The second *Vertebra*, called *Dentata*, from the *Tooth-like Process* on the upper part of its *Body*.

The *Body* of this *Vertebra*, larger than the rest, and of a *Conical figure*.

The fore-part of the *Processus Dentatus*, covered with *Cartilage* where it turns upon the *Atlas*.

The *Sides* of this *Process*, marked by the insertion of the *Lateral Ligaments*, and its *Point* by the insertion of the *Perpendicular Ligament* which is fixed to the *Edge* of the *Foramen Magnum* of the *Occipital Bone*.

The *Superior Oblique Processes* placed horizontally, and elevated in the middle, to be received into the hollow *Inferior Oblique Processes* of the *Atlas*, where the *Head* has its principal rotary motion.

The *Spinous Process*, thick and strong, to give origin to the *Muscles* which assist in the *extension* and *rotation* of the *Head*, and turned down to allow these motions to be readily performed.

The *seventh Cervical Vertebra*, approaching to the form of the *Dorsal Vertebra*. The *Spinal* and *Transverse Processes* have no bifurcation.

The *Dorsal Vertebra*, or *Vertebra of the Back*, having their bodies larger, sharper before, flatter at the sides, and more hollow behind, than those of the *Cervical Vertebra*.

A *Pit*, lined with Cartilage at each side of their upper and under Edges, near the Transverse Processes, for the articulation of the Heads of the Ribs.

The *Intervertebral Cartilages*, thin, to admit of little motion only, and *thinnest* anteriorly, to enlarge the Curvature of the Spine, and increase the Cavity of the Thorax.

The *Oblique Processes*, having nearly a perpendicular direction, the upper ones slanting forwards, and the under ones backwards.

The *Transverse Processes*, long, turned obliquely backwards, enlarged at their outer extremity, where they are faced with Cartilage, to be articulated with the Tubercles of the Ribs.

The *Spinous Processes*, long, thick at the roots, but slender near the extremities, and pointing obliquely downwards over each other, by which the Spinal Marrow in this part is well protected.

The upper Edge of each of the Spinous Processes of these Vertebrae, formed into a *Ridge*, which, in certain motions of the Spine, is received by a Groove in the Vertebra immediately above it.

The last peculiarity of Structure, with the others already mentioned, prevent the Dorsal Vertebrae from having much motion.

The *first Dorsal Vertebra* has the whole Pit for the Head of the first Rib formed in it.

The *true 12th Dorsal Vertebra* receives the whole Head of the last Rib, and has no Cartilaginous Surface on its Transverse Process.

The *Lumbar Vertebrae*, or those of the Loins, having their bodies larger and broader than those of the other two classes.

The *Intervertebral Cartilages*, the thickest of any, and most so at their fore-part, by which the Spine is rendered convex there, for the support of the Abdominal Bowels.

The *Oblique Processes*, remarkably deep, and placed upright, the Superior Oblique Process of one Vertebra facing inwards, and receiving the Inferior Oblique Process of the Vertebra below it, which is turned in the opposite direction.

The *Transverse Processes*, long, slender, and almost

erect, to give origin to large Muscles, and admit of free motion.

The *Spinous Processes*, short, large, and strong, and placed horizontally, with narrow Edges above and below, and broad flat Sides, giving origin to Muscles of great strength.

The *Spinal Canal*, larger than in the Back, for the passage of the Cords of the Spinal Marrow which form the *Cauda Equina*

In consequence of the thickness of the intervertebral Cartilages, and the situation of the Processes of the Lumbar Vertebrae, the motion of this part of the Spine is extensive, though not so much so as in the Neck.



THE FALSE VERTEBRÆ.

The FALSE VERTEBRÆ, composed of the Os Sacrum and Os Coccygis.

THE OSSACRUM,

Supposed to be named rather from its size than from its having been offered in sacrifice.

The *triangular Form* of the Bone, with its pointed under extremity

The *flat concave anterior Surface*, in enlarging the cavity of the Pelvis

The *under and fore-part*, forming a *ture*, called by some. *Lesser Angle* of this Bone.

The *convex irregular Surface behind*, where strong Muscles arise.

Four transverse prominent Lines seen anteriorly, pointing out the situation of the Cartilages which originally divided the Bone into five pieces.

The *Spinal Canal*, of a triangular form, becoming gradually smaller in its descent; corresponding with the *Cauda Equina* which goes through it.

The *Arch* at the sides and back-part of the Spinal Canal, much thicker and stronger than in the True Vertebrae

Only *two Oblique Processes* belonging to this Bone, and these facing backwards, to correspond with the two inferior of the last Lumbar Vertebra.

A *large Oblong Process* on each side of the Bone, formed by all the original transverse Processes grown together.

The upper lateral Parts of the Bone, which correspond with the three superior transverse Processes, divided into *two irregular Cavities* on each side, by a *perpendicular Ridge*. The anterior of the two Cavities is lined with *Cartilage*, which glues this Bone to the Os Ilium, and does not allow any motion. The posterior Cavity is *rough and irregular*, and in the recent Subject is full of *Ligamentous Fibres* and *Cellular Substance*, which are included in the general Capsular Ligament, and also assist in fixing the two Bones to each other.

The *Spinous Processes*; the three uppermost commonly distinct, but remarkably *short*: There is a great variety however, in the appearances of the Spinous Processes in different Bones.

Four Pairs of large Holes on the *anterior Surface* of the Bone, at the end of the lines already described, and *Grooves* running out from the Holes, for the passage of the Sacral Nerves.

Four Pairs of Holes on the *posterior Surface*, not much smaller than those seen anteriorly; but so filled with Cellular Substance, and covered with Membranes in the Recent Body, as to admit small Nerves only to pass out to the Muscles on the back-part of the Pelvis.

A *Notch* at the under end of each side of the Bone, or a *Hole* common to it and the Os Coccygis, for the passage of the last Spinal Nerve.

The *Substance* of the Os Sacrum, like that of the other Vertebrae, is very *spongy*, and is covered only by a thin external Plate, which, however, is rendered considerably stronger by a Ligamentous Membrane which adheres to it.

The *Connection* of this Bone above to the last Lumbar Vertebra, in the way the other Vertebrae are connected to each other, and the same motions allowed as to these Vertebrae. The projection formed between these two Bones anteriorly, obtains the name of *Promontory*, or *Greater Angles* of the Os Sacrum.

In the Fœtus, the Os Sacrum is composed of five distinct Vertebrae which have Intervertebral Cartilages similar to those of the True Vertebrae.

At this time, each of the Vertebrae of the Os Sacrum, as well as of the True Vertebrae, consists of a Body and two lateral parts, which are joined together by Cartilages.

THE OS COCCYGIS.

The Os Coccygis, or *Rump-Bone*, compared in *shape* to the Beak of a Cuckoo.

The *Situation* of this Bone at the end of the Os Sacrum.

The Bone, *broad and flat above, and tapering below.*

The Bone, *convex behind, and forming a curve forwards*, which supports the end of the Rectum.

The *four pieces* of which it is composed in Young Subjects.

This Bone is considered by some authors as being formed of *three pieces*; and then the Os Sacrum is said to have six.

The *first or uppermost piece* the *largest*, with Shoulders reaching farther than the end of the Os Sacrum, which is considered by some as a proper distinction between the Os Coccygis and Os Sacrum.

From the back-part of the Shoulders, *two Cornua* frequently ascend to join the forked Spinous Process at the end of the Os Sacrum, for the passage of the last pair of Spinal Nerves, which goes through a hole common to this Bone and the Os Sacrum on each side.

The *three lower Bones* of the Os Coccygis becoming gradually smaller, the *fourth* terminating in a *rough point*.

A *Cartilage* is interposed between the different pieces of this Bone in Young Subjects, joining them together, as in the case of the Vertebrae, allowing motion upon each other forwards and backwards, but chiefly between the first and second pieces, and a greater degree of motion there in the Female than in the Male.

In advanced life, but earlier in Men than in Women, the pieces grow together so as to admit of no motion; but this circumstance is much longer of happening between the first and second, than between the other pieces.

The *Substance*, like that of the Os Sacrum, is *spongy*, but it differs from it, in having no passage for Spinal Marrow, nor Holes for Spinal Nerves.

The *Connection* of this Bone, in Young Subjects, to the Os Sacrum, by *Cartilage*.—In Old People by an *union* of Substance.

The Surface of the Bone is covered by a strong Ligament, which adds to its strength: Its sides give rise to numerous Muscular Fibres, which, while they originate from it, serve to protect it.

In the Fœtus, the Os Coccygis is almost entirely composed of Cartilage.

THE PELVIS.

The PELVIS or *Bones compared to a Basin*, situated at the lower part of the Trunk, and formed by the Os Sacrum, Os Coccygis, and two Ossa Innominata.

OS INNOMINATUM.

The *Situation* of the Os INNOMINATUM, or *nameless Bone*, in the fore-part and side of the Pelvis, and under the lateral parts of the Abdomen.

The *Division* of the Bone, in Children, into *Os Ilium*, *Os Ischium*, and *Os Pubis*.

In the Adult, the three Bones are *ossified together*, but retain their original names.

THE OS ILIUM.

The *Os Ilium*, or *Haunch-Bone*, forming the upper part of the Os Innominatum, and spreading out to assist in supporting the contents of the Abdomen.

The *Dorsum*, or *outer Convex Surface* of the Bone, raised in some parts and depressed in others, where the Glutei Muscles have their origin.

The *Spine*, or upper semi-circular edge of the Bone, for the attachment of the oblique and transverse Abdominal Muscles.

The *anterior superior Spinous Process*, or anterior extremity of the Spine, for the attachment of the Sartorius Muscle and Poupart's Ligament.

The *anterior inferior Spinous Process*, a little below the former, for the attachment of the Rectus Femoris Muscle.

The *two posterior Spinous Processes* at the back-part of the Spine, less considerable than the two anterior; partly for the origin of Muscles, but chiefly for the attachment of Ligaments which belong to the Joint between this Bone and the Os Sacrum.

The *Niche* of the Os Ilium under the posterior inferior Spinous Process, for the passage of the Pyriform Muscle, the Sciatic Nerve, and Blood-vessels.

The *Venter*, or *inner concave Surface* of the Bone, for the attachment of the internal Iliac Muscle, and the support of a portion of the Intestinum Ilium and Colon.

A *Passage* in the Venter for the Medullary Vessels of the Bone.

A *Depression* at the inside of the anterior inferior Spinous Process, where the Flexor Muscles of the Thigh, and the anterior Crural Vessels and Nerves pass.

The *Linea Innominata* at the under part of the Venter of the Bone, forming the lateral part of the Brim of the Pelvis, and the line of division between the Pelvis and Abdomen.

The *inner and back-part* of the Bone is very irregular, for the origin of some of the large Muscles of the Back, for the attachment of Ligaments which go to the Os Sacrum, and for the firm connection which subsists between this Bone and the Os Sacrum.

The *under, fore, and outer part* of the Bone, forming the upper and back-part of the Acetabulum.

THE OS ISCHIUM, or *Hip-Bone*.

The *Situation* of the Os Ischium in the lowest part of the Pelvis; its *figure irregular*, its size next to that of the Os Ilium.

The *upper thick part* of the Bone, forming the under part of the Acetabulum.

The *Spinous Process* sent back from the upper part of the Bone, for the attachment of Muscles and the superior Sacro-Sciatic Ligament.

The *Cervix* placed under the Spinous Process, and covered with Cartilage where the tendon of the Obturator Internus, Muscle plays.

The *Tubercity*, or *Tuber Ischii*, forming the part on which the Body rests in sitting, and giving attachment

to the inferior Sacro-Sciatic Ligament, and the greater part of the Flexor Muscles of the Leg.

The *Crus* which goes obliquely upwards and forwards, and gives attachment to the Crus Penis and its Erector, and to part of the Adductor Muscles of the Thigh.

THE OS PUBIS or *Sahre-Bone*.

The *Situation* of the Bone at the upper and fore-part of the Pelvis.

Its *size*, the least of the three parts of the Os Innominatum.

The *thick* and *strongest* part of the Bone, forming the upper and Fore-part of the Acetabulum.

The *smaller* and *hollow* part of the Bone, rendered smooth by the passage of the Flexor Muscles of the Thigh, with the anterior Crural Vessels and Nerves.

The rough *Crest*, or *Angle* of the upper and fore-part of the Os Pubis, where the Rectus and Pyramidalis Muscles, and the inner end of Poupart's Ligament, are attached.

A *Ridge* extended from the Crest along the upper inner edge of the Bone, to form, with a similar Ridge of the Os Ilium, the Brim of the Pelvis.

Another *Ridge* below the former, extending downwards and outwards towards the Acetabulum.

A *Cavity* below these Ridges, for the origin of the Pectineus Muscle.

A *Nitch* at the upper and inner part of the great Foramen, formed into a Hole in the Subject, for the passage of the Obturator Vessels and Nerves.

The *inner* end of the Bone, *rough* and *unequal*, but covered with a Ligamentous Cartilage, with fresh Bones, joins the two Ossa Pubis so firmly together, as to prevent them from moving upon each other.

The *Crus* of the Bone which goes downwards to join the Crus of the Os Ischium, and form along with that Crus the Arch of the Pubis.

The *Foramen Thyroideum*, or Shield-like-Hole, formed by the Os Pubis and Os Ischium and in the Subject, filled by a Membranous Ligament, excepting at the Nitch above mentioned, which gives origin to a large share of the Obturator Muscles.

The *Acetabulum* or *Cavity* (compared to a vinegar-measure used by the Ancients) placed further out than

the Foramen Thyroideum, and formed by the three pieces which compose the Os Innominatum, in such a manner that the Os Ilium forms near two-fifths, the Os Ischium more than two-fifths, and the Os Pubis one-fifth.

The *Brim* of the Acetabulum is very deep, especially behind, and made still deeper in the Subject by being tipped with a Cartilaginous Ligament.

Round the *Base* of the Brim, the Bone rough, where the Capsular Ligament of the joint is fixed.

A *Breach* in the inner and fore-part of the Acetabulum, which, in the Subject, has a strong Ligament stretched from one end to the other, but leaving a Hole behind for containing part of the Substance called *Glauc* of the Joint.

The *Cavity* of the Acetabulum lined with Cartilage, excepting at its under, inner, and fore-part, where there is a rough Surface for containing the Fatty Substance within the Joint.

The *Brim* of the Pelvis, or its *Upper Opening*.

The *Inferior Opening* is large in the skeleton, but, in the Subject, filled up, in a great measure, by Ligaments and Muscles which support and protect the contained parts, and leave only the passage from the Bladder of Urine and Rectum in the Male, and together with these, the passage from the Uterus in the Female.

The *Ossa Innominata*, joined behind to the Os Sacrum by a thin Cartilage and by strong Ligament, so as to have no motion; the Joint obtaining the name of *Posterior Symphysis*.

Before, these Bones connected to each other by a Ligamentous Cartilage and Ligaments, which also prevent motion here, and has the name of *Symphysis*, or *Anterior Symphysis of the Pubis*.

In the Fœtus, the Spine of the Os Ilium, and that part of the Bone which belongs to the Acetabulum, are Cartilaginous.—The Spinous Process, the Tuberosity, and Crus of the Os Ischium;—the Crus of the Os Pubis, and that portion of it which forms the Acetabulum, are also, at this period, in a Cartilaginous state.

THE THORAX, OR CHEST,

The *Thorax*, formed by the Sternum before, of the Ribs on each side, and of the Dorsal Vertebrae behind.

The general *Figure* of the Thorax approaching that of a *Cone*, but left open above for the passages to the Lungs and Stomach, and for the great Blood-vessels.

The *Lower Part* of the Thorax *slanting*, the *fore-part* being considerably shorter than it is behind.

The *Under Margin* on each side, forming a curved Line, the convex side of which is turned downwards.

The *under end* of the Thorax, in the subject filled by the *Diaphragm*, which forms a Partition between it and the Abdomen.

THE RIBS, OR COSTÆ.

Considered as Guards to the Heart and Lungs.

The whole of the Ribs *slanting* downwards with respect to Spine.

Their *Number*, commonly *twelve* on each side, though sometimes thirteen, and at other times only eleven, have been found.—In such cases the Vertebrae are one more or less than the common number.

The Ribs *convex* externally, by which their strength is increased.

The Ribs *concave* and *smooth* internally, with their flat sides turned towards the Lungs to protect them.

The *Head* of each Rib formed into a *Point* and two *hollow Surfaces* covered with Cartilage, to be articulated with the bodies of two Vertebrae and their intervertebral Cartilage.

Round the Head, the Bone is *spongy*, for the attachment of the Capsular Ligament of the Joint.

The *Tubercle* of the Rib, at a little distance from its Head, with a flat surface and irregular Edge, to be articulated to the transverse Process of the undermost of the two Vertebrae, to which the Head of the Rib is joined.

The *Cervix* of the Rib, between its Head and Tubercle, of a rounder form than the Bone, is farther out.

Another *small Tubercle* seen in most of the Ribs, at the outer side of the former one, for the attachment of Ligaments which fix the Ribs to each other and to the transverse Processes, and for the insertion of the outer Sheath of the Longissimus Dorsi Muscle.

Beyond the Tubercles, the Rib rendered *flat* by the Sacro-Lumbalis Muscle.

The *Angle* of the Ribs to which the *Sacro-Lumbar Muscle* is fixed, where the *Bones* are about to bend, to form the lateral part of the *Thorax*.

The *Rib flat* where it forms the lateral part of the *Thorax*, and the flat *Surface* opposed to the *Lungs*.

The *Upper Edge* of the *Rib*, *round* where the *intercostal Muscles* are fixed.

The *Under Edge sharp* where the *external intercostal Muscles* are fixed.

A *Fossa* at the inside of the *under Edge*, for lodging the *intercostal Vessels* and *Nerve*.

The *Fossa* *wanting* towards the extremities of the *Ribs*; for behind, the *Vessels* have not reached them; and before, they are too small to impress them.

An *Oval Pit* in the anterior extremity of the *Rib*, for receiving the *Cartilage* which runs from it to the *Sternum*.

The *Cartilage* of the *Ribs*, placed between the *Rib* and *Sternum*.

The *Cartilages*, like the *Ribs*, *flat* on their outer and inner *Surfaces*, and *smooth* where they are opposed to the *Lungs*.

The *Cartilage* of each *Rib*, forming with the *Rib* itself, a *Curve* with the concave part upwards.

And with the *Sternum*, an *obtuse Angle* above, and an *acute one* below.

The *Ribs articulate behind* to the *Vertebrae*, by a double articulation, and *before* to the *Sternum* by the *Cartilages*, or by the *Cartilages* to each other, in such a manner as to allow motion upwards and downwards, though only a small degree in any single *Rib*, and that towards its middle; but no motion in any other direction.

PECULIARITIES of the RIBS.

The *first Rib* the *most crooked*:—From this downwards they become gradually straighter.

The *uppermost Ribs* approaching nearer to the horizontal situation. As they descend, their obliquity with respect to the *Spine* increases, and their anterior extremities become more distant from each other.

The *Cartilages* of the *Ribs*, like the *Ribs* themselves, becoming gradually longer, but, contrary to what hap-

pens in the Ribs, they approach nearer to each other in their descent.

The *length* of the rib, *increasing* from the first to the seventh, and then *decreasing* to the twelfth Rib.

The *Distance* between the Heads of the Ribs and their Angles, increasing to the ninth Rib, corresponding with the breadth of the Sacro-Lumbalis Muscle which covers it.

The *Division* of the Ribs into *True* and *False*

The *True Ribs*,—the seven uppermost,—having their Cartilages joined to the Sternum, and opposed to the Heart and Lungs, from which they are termed the *True Custodes*, or *Guards of Life*.

The *False*, or *Bastard Ribs*;—the five inferior, which do not reach the Sternum.

The *Cartilages* of the False Ribs *shorter* as they descend.

The *posterior Extremity* of the first Rib, *articulated only with the first Vertebra*.

A *flat Surface* upon the upper part of the first Rib, where the *Subclavian Vessels* pass over it to the arm.

There is no *Fossa* at the edge of the Rib for the Intercostal Vessels.

The *Cartilages* of the two under True Ribs, and three upper False Ribs, *joined* to each other by an union of Substance.

The *Head* of the eleventh Rib *has no Tubercle* for articulation behind, being only loosely joined to the transverse Process.

The twelfth Rib, *much shorter* than the rest;—its Head is only joined to the twelfth Vertebra of the Back, and it has no Tubercle, nor articulation with the transverse Process: Neither has it any *Fossa* at its under edge, because the Vessels run below it.

The *anterior Extremities* of the eleventh and twelfth Ribs not joined to each other, nor to any other Rib, but lying loose among the Muscles;—hence sometimes named *Floating Ribs*.

THE STERNUM, OR BREAST-BONE.

The *Situation* of the Sternum in the fore-part of the Thorax.

Three pieces composing the Sternum, in a person of middle age, and these joined together by Cartilage.

The different pieces of this Bone are frequently found *ossified together* in old people.

The Sternum *thick and broad above, and thin and narrow below.*

The *outer Surface flat.*

The *inner Surface is slightly hollowed* to enlarge the Cavity of the Thorax.

Pits upon the edges of the Sternum, to receive the Cartilaginous ends of the seven True Ribs.

The *Pits* at a considerable distance from each other above, but becoming gradually nearer as they descend.

The *Cancellæ* of the Sternum, covered only by a thin external plate; but this rendered stronger by a Tendinous Membrane which covers it in the recent state.

The *upper Piece* of the Sternum, of a somewhat *triangular* figure, compared to that of a heart as painted on playing-cards, only appearing to be cut across below.

The *upper and back-part hollowed*, to make way for the Trachea.

The *upper Corners* thicker and stronger than the rest of the Bone, with a *Cavity* in each, for receiving the ends of the Collar Bones

Under these Cavities, the Bone becoming *thinner*, and having a Pit upon each side, for receiving the Cartilage of the first Rib.

Part of a *Pit* in the *under Corner* of the first piece, for the Cartilage of the second Rib.

The *second Piece* of the Sternum, of an oblong form, but a little broader below than above, and considerably longer than the former.

Complete Pits upon the edge of this piece, for the Cartilages of the third, fourth, fifth, and sixth Ribs, and part of the Pits for those of the second and seventh.

Line. extending between the Pits, pointing out the original marks of division of this piece.

The *Connection* of the second piece of the Sternum to the first by Cartilage, which, in the earlier period of life, allows some yielding, but this becomes gradually less as the person advances in life.

The *third Piece* of the Sternum, *cartilaginous* in a Young subject, and pointed like a broad-sword, hence termed *Cartilago Ensiformis.*

In the Adult, it is commonly *ossified* in the middle, and *cartilaginous* at the edges.

The *Size* of this piece *much less* than that of the other two.

Only *one half* of the Pit, for the Cartilage of the seventh Rib, formed in the side of this piece.

The *Variations* of the Cartilago-Ensiformis are considerable in different Subjects; for, instead of the common form, it is sometimes narrow like the point of a small sword, or turned obliquely to one side, or forwards, or backwards; or forked at the point, or perforated in the middle.

These Variations may happen without any inconvenience; but where it projects much in any direction different from the common one, it is attended with bad consequences.

The Sternum *joined* by Cartilage to the seven upper or True Ribs, and by an interarticular Cartilage to the anterior ends of the clavicles.

In the Fetus, the Bone is composed of seven or eight pieces, but the number of these varies in different Subjects.



THE SUPERIOR EXTREMITIES.

THE Superior Extremities are composed of the Bones of the Shoulders, Arms, and Hands.

The Shoulder consists of the Clavicle and Scapula.

THE CLAVICLE, or *Collar-Bone*.

The *Situation* of the Clavicle, between the upper part of the Sternum and top of the Scapula, where it acts as a beam supporting the Shoulder, and bearing it off the Trunk of the Body.

The Sternal, or internal Extremity, *triangular* and *larger* than the Body, with one of the angles elongated, where it gives origin to a Ligament extended between the two Clavicles.

The Surface next to the Sternum *irregularly hollowed*, to correspond with the interarticular Cartilage, which

with the Capsular Ligament of this Joint, allows a small degree of motion in all directions.

The body of the Bone next the Sternum *bent forwards*, and that next the Shoulder *turned back* in form of an Italic *f*, or like a key used by the ancients; from which, or the support it gives the Shoulder, its name is derived.

The upper part of the Clavicle next the Sternum, *rounded*, and that next the Scapula *flat*, where it lies over the Joint of the Humerus.—Over the Bone in general, rough marks are observed for the attachment of Muscles and Ligaments.

The under Surface *hollow*, for lodging a portion of the Subclavian Muscle.

The *External* or *Scapulary Extremity*, tipped with Cartilage, to be articulated with the Acromion of the Scapula.

THE SCAPULA, or *Shoulder-Blade*.

The *Situation* of the Scapula, upon the upper and back-part of the Thorax, at some distance from the Ribs, the interval being filled up by a cushion of Flesh.

The *shape* of the Scapula *triangular*, and one of the angles placed downwards.

The *Venter*, or inner Surface, or that next the Ribs, *concave* and marked with *Ridges* and *Depressions* by the Subscapularis Muscle.

The *Dorsum*, or outer Surface of the Scapula, rendered *convex* in some parts, and *concave* in others, by the action of the Muscles which cover it.

The body of the Scapula is *remarkably thin*, and in an Old person, *transparent*.

The *edges* of the Bone are *thick* and *strong*, and are termed *Costæ*.

The superior Costa the *shortest* of the three, and placed nearly opposite to the second rib.

A *semilunar Notch* near the fore-part of the superior Costa, for the passage of the superior Scapulary Vessels and Nerve.

The *inferior* or *anterior Costa*, extending obliquely downwards and backwards, between the third and eighth Ribs.

The *posterior Costa*, or *Base* of the Bone, placed ob-

Equally with respect to the Spine, the upper end being considerably nearer to it than the under.

The *upper part of the Base*, above the Spine, running obliquely forwards to the upper angle, and giving attachment to the Levator Scapulæ Muscle.

The *inferior Angle* very acute, and marked by the passage of the Latissimus Dorsi, and the origin of the Teres Major.

The *superior Angle* approaching a right one.

The *anterior Angle*, forming the Cervix which supports the head of the Bone.

The *Glenoid Cavity*, placed on the fore-part of the head of the Bone, and lined with Cartilage for the articulation of the Os Humeri.

The *shape* of that Cavity, resembling that of an Egg cut longitudinally, with the large end undermost, but so shallow as to receive only a small portion of the Ball of the Os Humeri, the rest of the Ball being contained in the Capsular Ligament.

The *Spine*, running across the Bone, and dividing it into a small upper, and large under Surface.

The Spine, *small* at its beginning, and becoming *higher* and *broader* in its course forwards.

A *triangular Space*, between the root of the Spine and Base of the Bone, where part of the Trapezius Muscle is fixed.

The *Fossa Supra Spinata*, or space above the Spine, for the origin of the Supra-Spinatus Muscle.

The *Fossa Infra-Spinata*, for the origin of the Infra-Spinatus Muscle.

The Spine becoming broad and flat at its anterior extremity, where it is termed *Acromion*, or *Top* of the Shoulder.

The Under Surface of the Acromion *hollow* for the passage of the Spinati Muscles.

The *Situation* of the Acromion over the Joint of the Humerus, which it assists in protecting.

The anterior Edge of the Acromion *tipped with Cartilage* for its articulation with the outer end of the Clavicle, where very little motion is allowed.

The *Coracoïd*, or *Crow's beak like Process*, arising from the neck of the Bone, and making a curvature forwards, so as to leave a hollow at its root for the passage of the Subscapularis Muscle.

The *Point of this Process* gives origin to Muscles, and from its side a strong Ligament goes across to be fixed to the Acromion for the protection of the Joint.

The Scapula is articulated with the Trunk of the Body, by means of the Clavicle, which allows it to play in all directions.

THE OS HUMERI, or *Arm Bone.*

The *Situation* of the Os Humeri at the side of the Thorax, and under the Scapula.

The *Ball*, or *Head* of the Os Humeri, forming a small Segment of a large Sphere, and this covered with Cartilage, and placed at the upper, posterior, and inner part of the Body of the Bone, to correspond with the Glenoid Cavity on the Scapula.

The *Cervix*, or *Neck* surrounding the edge of the Ball, and forming a superficial Fossa where the Capsular Ligament is fixed, which allows the Bone an extensive motion in all directions.

Numerous Holes round the upper end of the Bone, for the insertion of the Fibres of the Capsular Ligament, and for the passage of Blood-vessels into the Bone.

A *Groove*, or long *Fossa*, in the upper and fore-part of the Bone, for lodging the Tendon of the long head of the Biceps Muscle.

The *smaller Tubercle*, placed at the upper and inner side of the above-mentioned Groove, for the attachment of the Subscapularis Muscle.

The *larger Tubercle*, opposite to the former, and on the outer side of the Groove, for the attachment of the Muscles which cover the Dorsum of the Scapula.

A *Ridge* continued down from each Tubercle along the sides of the long Fossa, for the insertion of Muscles coming from the Trunk of the Body, or from the Scapula.

A *Passage* slanting downwards in the fore and inner part of the Bone, near its middle, for the Medullary Vessels.

At the *under End* of the *Groove* for lodging the long head of the Biceps Muscle, the Bone marked by the attachment of the Deltoid and other Muscles.

The *Body of the Bone* round near its upper end; but,

as it descends, it appears twisted, then flat, and increases in breadth at the lower extremity.

From the Muscular Prints on the fore-part of the body of the Bone, a *blunt Ridge* continued to the upper part of the Trochlea.

The under and back-part of the Bone, *flat and smooth*, by the motion of the Triceps Extensor of the Fore-Arm.

A *large Ridge* at the under and outer, and a *small Ridge* at the under and inner edge of the Bone, for the attachment of strong Tendinous Fasciæ, which give origin to part of the Muscles of the Fore-Arm.

The Ridges end in the two Condyles.

The *external Condyle* placed at the under and outer part of the Bone, for the origin of the Extensor Muscles of the Hand and Fingers.

The *internal Condyle*, at the under and inner part of the Bone, more prominent than the former, for the origin of the strong Flexor Muscles of the Hand and Fingers.

The *articulating Surface* at the under end of the Bone, covered with Cartilage for the articulation with the Bones of the Fore-Arm.

The *inner Part* of the articulating Surface, consisting of a large internal, and small external eminence, with a middle Cavity, or a Trochlea upon which the Ulna moves.

The *oblique Situation* of the articulating Surface, the inner end being lower than the outer, by which the hand turns more readily to the upper parts of the Body.

The *outer Part* of the articular Surface upon which the head of the Radius moves, of a round form, and considered by some authors as the smooth part of the outer Condyle.

Round the edge of the articular Cavity, the Bone marked by the insertion of the Capsular Ligament of the Joint.

A *Cavity* at the under and fore-part of the Bone, above the Trochlea, for receiving the Coronoid Process of the Ulna in the Flexion of the Fore-Arm.

A *Cavity* at the back-part of the Bone, above the Trochlea, the under part of it for receiving the Olecranon of the Ulna in the extension of the Fore-Arm, and the upper part for containing the Fat of the Joint.

Between these Cavities, the Bone is pressed so thin as to become transparent, especially in an Old Person.

THE FORE-ARM.

It consists of two Bones, the *Ulna* and *Radius*.

THE ULNA, or *Cubit*.

The *Situation* of the *Ulna* at the inner part of the Fore-arm, the Arm being supposed to hang by the side of the Body, with the Palm of the Hand turned forwards.

The *Olecranon*, *Processus Anconæus*, or *top of the Cubit*, placed at the upper end of the Bone.

The upper end of the *Process*, rough where the *Triiceps Extensor Cubiti Muscle* is fixed.

The *Coronoid*, or *sharp Process*, at the upper and fore-part of the Bone, but considerably lower than the *Olecranon*, for forming a part of the hinge of the Joint of the Elbow.

The *great Sigmoid*, or *Semilunar Cavity*, between the *Olecranon* and *Coronoid Process*, lined with Cartilage, and divided into two slanting Surfaces by a middle Ridge, the whole adapted to the *Trochlea* of the *Os Humeri*, and with it forming a complete hinge, which allows an extensive degree of flexion, and as much extension as to approach a straight line with the Upper Arm, but little or no rotation.

Across the middle of the great *Sigmoid Cavity*, there is a *Pit* for lodging part of the Fat of the Joint.

The *small Sigmoid*, or *semilunar Cavity*, lined with Cartilage at the outer side of the *Coronoid Process*, where the round head of the *Radius* plays.

The *Tubercle* of the *Ulna*, or small rough Spot for the insertion of the *Brachialis Internus Muscle*.

The *Body* of the *Ulna*, of a *triangular form*, and becoming gradually smaller in its descent.

The *sharpest Angle* opposed to the *Radius*, for the attachment of the *Interosseous Ligament*.

The sides forming this Angle, *flat*, and marked by the Muscles which originate from them.

A *Passage* slanting upwards, about a hand-breadth below the upper end of the Medullary Vessels.

The under end of the Bone, forming a *small round Head*, which is covered with Cartilage on that side where the Radius moves upon it, and also on its extremity, where it is opposed to the moveable Cartilage placed between it and the Carpus.

The *Styloid Process*, from which a strong Ligament goes off to be fixed to the Bones of the Wrist.

THE RADIUS.

The *Situation* of the Radius at the outer part of the Fore-Arm.

The *upper End of the Radius*, covered with Cartilage, formed into a circular head, and hollowed above for receiving the outer part of the Articular Cavity of the Os Humeri, where it bends, and extends upon the Bone, along with the Ulna.

The *inner Side of the Head* smooth, and also covered with Cartilage, where it plays upon its own axis in the small semilunar Cavity, at the outer side of the Ulna.

The *Cervix* of the Radius, smaller than the head, surrounded, in the Subject, by a circular Ligament which keeps the Bone in its place, and allows it to roll upon the Ulna.

The *Tubercle* of the Radius, at the under and inner part of the Cervix, for the insertion of the Biceps Flexor of the Arm.

The *Body* of the Bone, convex on its outer and back-part, and rounded by the Muscles which cover it.

The *Surfaces* next the Ulna, *flat*, where Muscles of the Hand take their origin.

The *anterior and posterior Surfaces* terminating in a *sharp Ridge*, to which the Interosseous Ligament of the Fore-Arm is fixed.

A *Passage* slanting upwards, for the Medullary Vessels, on the fore-part of the Bone, and about a hand-breadth below its upper end.

A *rough Surface* is found at the outer and middle part of the Bone, for the insertion of the Pronator radii teres.

The *lower end of the Radius*, becoming gradually larger, and flat on its fore-part, where it is covered by the Pronator radii quadratus Muscle.

A *Ridge* upon the under and back part of the Radius, with a *Fossa* upon each side of it, where the Tendons of the Extensor Muscles of the fingers pass.

The outer side of this extremity of the Bone, *hollowed* by the Extensors of the Thumb.

A *semilunar Cavity* at the inner side of the under end of the Radius, lined with Cartilage, for receiving the corresponding extremity of the Ulna upon which the Radius rolls, carrying the Hand with it.

The *lower End* of the Bone formed into a *Cavity* of an *oval form*, and lined with Cartilage for receiving the two first Bones of the Carpus.

The under and outer Part of the Radius, forming a Process somewhat similar to the Styloid Process of the Ulna.—From this Process a Ligament is sent to the Wrist.

THE HAND,

Composed of the Bones of the *Carpus*, *Metacarpus*, and *Fingers*.

The *outer Surface* of the Hand *convex*, which gives it a greater degree of strength.

The *inner Surface* of the Hand *concave*, for grasping and holding Substances.

THE CARPUS, or *Wrist*,

Composed of eight Bones, which form two Rows.

In the first Row are,

The *Os Scaphoides*, *Lunare*, *Cuneiforme*, *Pisiforme*.

In the second Row.

The *Os Trapezium*, *Trapezoides*, *Magnum*, *Unciforme*.

The posterior Surface of the Carpus is *convex*, and *marked* by the numerous Ligaments attached to it. The anterior Surface is *hollow*, and also marked by Ligaments.

The Surfaces of the Bones of the Carpus, which are articulated with each other, or with the neighbouring Bones, and *covered with Cartilage*, to facilitate the motion of the Joints.

The *Os SCAPHOIDES*, or *Boat-like Bone*, placed at the outer and upper part of the Carpus

The *upper Surface convex*, and articulated with the Radius.

The under and outer Surface, also *convex*, to be articulated with the *Os Trapezium*, and *Trapezoides*.

Between the upper and under Cartilaginous Surfaces, a *rough Fossa* for the insertion of the Capsular Ligament.

The anterior and inner surface, having an *oval Cavity* which gives name to the Bone, where it is articulated with the *Os Magnum*.

A *Process* upon the outer end of the Bone, for the attachment of part of the anterior Transverse Ligament of the Wrist.

The *Os LUNARE*, situated upon the inner side of the former Bone.

The upper Surface *convex*, for its articulation with the Radius.

The *outer Edge* in form of a *Crescent*, from which the Bone is named, articulated with the *Os Scaphoides*.

The *under Surface hollow*, for its articulation with the *Os Magnum*.

The *inner Surface* of the Bone, articulated with the *Os Cuneiforme*.

The *Os Scaphoides* and *Os Lunare*, forming an *oval head*, which is received in the Socket of the Radius, where extensive motion is allowed forwards, backwards, and to either side.

The *Os CUNEIFORME*, or *wedge-like Bone*, situated on the inner side of the former one.

The *anterior Edge* is *thin*, in form of a *wedge*.

The *upper and outer Surface* articulated with the *Os Lunare*.

The *under and outer Surface* articulated with the *Os Unciforme*.

The anterior and inner Surface, forming a slight *convexity* for its articulation with the *Os Pisiforme*

Between the upper part of this Bone and the *Ulna*, the *moveable Cartilage* formerly mentioned is interposed.

The *Os PISIFORME*, or *Pea-shaped Bone*, placed upon the anterior and inner Surface of the *Os Cuneiforme*,

and forming a Prominence which is readily felt in the Wrist, and which gives attachment to strong Tendinous and Ligamentous Substances, particularly to part of the Ligamentum carpi annulare.

The Os TRAPEZIUM, named from the four unequal Edges of its posterior Surface.

The *Situation* of this Bone, at the root of the Metacarpal Bone of the Thumb.

The upper part of the Bone forming a *smooth Pit*, to be articulated with the Os Scaphoides.

The inner side *hollow*, and articulated with the Os Trapezoides.

The under Surface forming a *Pulley*, on which the Metacarpal Bone of the Thumb moves.

The anterior Surface sending out a *Process*, which is prominent in the Palm, and marked by the transverse Ligament of the Wrist, by the Flexor carpi radialis, and and Flexors of the Thumb.

The Os TRAPEZOIDES, so named from its being somewhat like the former Bone; but it is considerably smaller.

The *Situation* of the Os Trapezoides, at the inner side of the Os Trapezium.

The upper surface *hollow*, where it joins the Os Scaphoides.

The outer Surface *convex*, and articulate dwith the Trapezium.

The *inner Surface*, articulated with the Os Magnum.

The *under Surface*, formed into a sort of *Pulley*, to be articulated with the Metacarpal Bone of the Fore Finger.

The Os MAGNUM, OR CAPITATUM, OR *largest Bone* of the Carpus, placed at the inner side of the former Bone, and consisting of four oblong sides, with a round head, and triangular under end.

The *head or ball* of the Bone, received into the hollow Surfaces of the Os Scaphoides and Lunare; like ball and Socket.

The *under part* of the outer side joined to the Os Trapezoides.

The *inner side* to the Os Unciforme.

The *under end* opposed to the Metacarpal Bone of the Middle Finger.

The Os UNCIFORME, or *hook-like bone*, placed in the under and inner part of the Wrist.

The *upper and inner Surface* articulated with the Os Cuneiforme.

The *outer Surface*, articulated with the Os Magnum.

The *inferior Surface*, opposed to the Metacarpal Bones of the Ring and Little Fingers.

The anterior Surface, sending out the *Unciforme Process*, which gives name to the Bone.

The Unciforme Process *curved*, for the passage of the Flexor Muscles of the Fingers.

The articulation between the first and second Row of Carpal Bones, allows motion to each side, but chiefly forwards and backwards, though the motion is less extensive than between the Fore-Arm and Wrist.

In a Fœtus, the Bones of the Carpus are in a Cartilaginous state.

THE METACARPUS, or *Part annexed to the Carpus*,

Consisting of *four Bones* for supporting the Fingers, and *one* for the thumb.

The Metacarpal Bones of the —Fingers.—

Their *bodies* long and round.

The *extremities* of these Bones, considerably larger than their bodies.

The *upper ends or bases flat*, where they are articulated with the Bones of the Carpus.

The flatness of this end of the Metacarpal Bones, and their strong connecting Ligaments render the Motions here inconsiderable.

Round the Edges of the Cartilaginous Surfaces, at the upper end, the *Depressions* where the Capsular Ligaments are fixed.

The sides of the upper ends *flat*, where they are articulated with each other.

A *Ridge* at the upper and back-part of their bodies, with a depression on each side of it, formed by the Interossei Muscles.

The under and back-part of their bodies, made *flat* by the motion of the Tendons of the Extensors of the Fingers.

The anterior Surface of the bodies *concave*, and rendered *flat at the sides* by the Interossei Muscles.

The *lower ends*, or heads, formed into *Balls*, which are flattened upon their sides by their motions upon each other.

At the fore-part of each side of the heads, a little *prominence*, for the attachment of the Ligaments which fix these Bones to each other.

Round the heads, a *depression*, for the insertion of the Capsular Ligaments.

PECULIARITIES of the METACARPAL BONES of the FINGERS.

The *Base* of the *Metacarpal Bones of the Fore-Finger*, opposed to, and corresponding with, the Os Trapezoides, and partly with the Trapezium.

The inner part of the *Base*, forming a *Ridge*, which is articulated with the Os Magnum, and with the next Metacarpal Bone.

The connection of the base is so firm, that it has little or no motion.

The *Metacarpal Bone of the Mid-Finger*, commonly the *second in length*.

The *Base* of the Bone commonly slants inwards and downwards, opposed to the Os Magnum.

The outer and back-part of the *Base*, *projecting*, and forming a sort of *Process*, the external Surface of which is connected with the *Ridge* of the former Bone.

The motion of this Bone is little more than that of the former one.

The *Metacarpal Bone of the Ring-Finger*, shorter than the former one.

Its *Base semi-circular* where it is opposed to the Os Unciforme

The motion is something greater than that of the former Bone.

The *Metacarpal Bone of the Little-Finger* the *smallest* of the four.

The *Base*, which slants downwards and outwards opposed to the under and inner part of the Os Unciforme

The inner part of the Base has no smooth Surface, not being contiguous to any other Bone.

From the nature of the Joint, the looseness of the Ligaments, and from there being a proper Muscle here, this Bone possesses a larger share of motion than any of the rest.

The *Metacarpal Bone of the Thumb*, having the general resemblance of those of the fingers; but it differs from them in being placed oblique with respect to the Metacarpal Bones of the Fingers, and in some measure opposing them.

It is thicker and stronger, but shorter than those of the Fingers.

The *Base* of this Bone articulated with the Pulley formed by the Trapezium. It appears to admit of flexion and extension only, but, from the looseness of the Ligaments, it enjoys the same kind of motion with Joints formed after the manner of Ball and Socket.

The *inferior extremity* of the Bone, considerably *flatter* than those of the other Metacarpal Bones.

The *FINGERS*, composed each of three Bones, and the three Rows of Bones termed *Phalanges*.

The different *Phalanges*, *tapering* a little as they descend, and their Bases larger than their inferior extremities.

The posterior Surfaces *convex*, and covered chiefly by the tendinous expansions of the extensors of the Fingers.

Their anterior Surfaces, *flat*, and in some parts *concave*, for lodging the Tendons of the Flexor Muscles.

Ridges at the sides of their anterior Surfaces, for the attachment of the retaining Ligaments of the Tendons of the Flexor Muscles.

The first Phalanx *longer* than the second, and the second than the third.

The *Bases* of the first Phalanx, formed into *Sockets* to receive the Balls of the Metacarpal Bones, and to allow motion to all sides.

The lower ends of this Phalanx, consisting of *lateral Prominences*, and *middle Cavities* or Pulleys, the Cartilaginous Surfaces of which reach considerably farther up in the fore than in the back-part.

The *Bases* of the second Phalanx, with *lateral Cavities* and *middle Ridges*, corresponding with the Pulley

of the first Phalanx, and admitting of flexion and extension only.

The *lower ends* of this Phalanx similar to that of the first.

The *Base* of the *third Phalanx*, like that of the second, and the motions also similar.

The under ends of the third Phalanx, *rough* where the Pulpy, Vascular, and Nervous Substance of the points of the Fingers are situated.

The Peculiarities of the Bones of the Fingers consist only in their size.

The Bones of the Mid-finger the largest and longest. Those of the Ring-Finger the next in length.

The Bones of the Fore-Finger, next to the Ring-Finger in length, and to the Mid-Finger in thickness.

Those of the Fourth-Finger the smallest.

The *Thumb*, consisting only of *two* Bones.

The *first* Bone, like those of the first Phalanx of the Fingers, but *thicker* and *shorter*.

The *Cavity* at the Base of the Bone, longer from one side to the other, and shallower than those of the Fingers, but, like them, forming a Socket for the Metacarpal Bone. From the flatness of the Joint, however, and strength of the lateral Ligaments, the motions here are confined to flexion and extension.

The *lower end* of the first Bone of the Thumb, like that of the first of the Fingers.

The *second* Bone of the Thumb, like the *third* of the Fingers, but broader.

The *Base* of this Bone, like that of the second and third Bones of the Fingers, and like their joints also, admitting of flexion and extension only.



THE INFERIOR EXTREMITIES.

THE *Inferior Extremities* are composed of the Thighs, Legs, and Feet.

The *Thigh* consists of a single Bone, viz.

THE OS FEMORIS, or *Thigh-Bone*

The Os Femoris is the *longest* of the Body, and *thickest* and *strongest* of the Cylindrical Bones.

The *Situation* of the Bone, at the under and outer part of the Pelvis.

The *oblique Situation* of the *body* of the Bone, the under end being considerably nearer its fellow on the other side, than the upper one is, which is favourable for the passages at the bottom of the Pelvis, for the origin of Muscles, and for walking.

The *Ball*, or *Head* of the Thigh-Bone, smooth covered with Cartilage, and forming almost two-thirds of a Sphere, which is received into a deep Socket formed by the Acetabulum of the Os Innominatum.

A *rough Pit* at the under and inner part of the Ball, for the attachment of the Ligamentum Rotundum, which is fixed by its outer end to the bottom of the Acetabulum.

The *Cervix*, or *Neck*, much longer than that of any other Bone, passing obliquely downwards and outwards from the Ball, to allow the free motion of the body of the Bone, in different directions. It is restrained, however in its motion outwards, by the Ligamentum Rotundum, and by the high Brim of the Acetabulum.

Numerous Holes in the Cervix, for the insertion of the Fibres of the Ligament reflected from the Capsular one.

The *Trochanter major*, placed at the outer part of the Neck, and upper end of the body of the Bone, for the insertion of the Extensor, Abductor, and Rotator Muscles of the Thigh.

Two rough Surfaces upon the upper and fore-part of the large Trochanter, for the insertion of the two small Glutei Muscles.

A *Cavity* is placed at the inner side of the root of the large Trochanter, for the insertion of the Rotator Muscles of the Thigh.

The *Trochanter minor*, at the under and inner part of the Cervix for the insertion of the Flexor Muscles of the Thigh.

A *rough Line* on the fore-part of the Bone, between the two Trochanters, for the insertion of the Capsular Ligament.

A rough line between the Trochanters, on the back-

part of the Bone, for the insertion of the Capsular Ligament, and the Quadratus Femoris Muscle.

The *Body* of the Thigh-bone, *bent forwards*, and of a *roundish form* above, but somewhat *triangular* about its middle.

The *fore-part* of the Bone *flat*, where it is covered by the Crureus Muscle.

The *Sides* of the Bone are *flattened* at its middle and lower part, by the two Vasti Muscles.

The *Linea Aspera*, or *ragged Ridge* on the back-part of the Bone, extending from the Trochanters, but chiefly from the large one, to the lower part of the Bone, and giving attachment to numerous Muscles which pass from the Pelvis to the Thigh, or form the Thigh to the Leg.

The lower End of the Linea Aspera, dividing into *two Lines*, which terminate in the Condyles.

The *Canal* for the Medullary Vessels, slanting upwards, a little below the middle of the posterior part of the Bone.

The under and back-part of the Bone, *flat* where the Popliteal Vessels and Nerves are placed.

The *lower End* of the Bone, much larger than its body, and perforated by many Holes, for the insertion of the Capsular Ligament of the Knee, and passage of the Nutritious Vessels of the Bone — It is also marked by the insertion of several Muscles

The *Cartilaginous Trochlea* at the under and fore part of the Bone, placed obliquely, with its outer Surface higher than its inner one, to be adapted to the Patella, which moves upon it.

The *external* and *internal Condyles*, continued back from the Trochlea, and covered with Cartilage for the motion of the Tibia

The *internal Condyle*, *larger* and *deeper* than the external to compensate for the obliquity of the Thigh, and give less obliquity to the Leg.

A *Notch* between the back-part of the Condyles, for lodging the Popliteal Vessels and Nerves

A *semilunar rough Notch*. deeper and lower than the former one, for the attachment of the Crucial or internal Ligaments of the Knee.

THE LEG.

Composed of the two Bones —the Tibia and Fibula, to which may be added the Patella.

THE TIBIA,

Situated at the inner part of the Leg.

The *upper End* of the Tibia, forming a *large Head*, and that divided on its upper Surface into *two superficial Cavities*, for receiving the Cartilaginous part of the Condyles of the Thigh Bone.

A *rough Protuberance* between the articulating Cavities, pitted on its fore and back-part, for the insertion of the anterior and posterior Crucial Ligaments.

The articulating Surfaces at the upper end of the Tibia, are rendered deeper in the Subject by the addition of two semilunar Cartilage placed upon their Edges.

The Circumference of the Head of the Bone, *rough and porous*, for the insertion of the Capsular Ligament.

The articulation of the upper end of the Tibia with the Os Femoris, is of such a nature as to allow flexion and extension, but no lateral nor rotary motion in the extended state, though a small degree of both when the Knee is bended.

A Tubercle at the upper and fore-part of the Bone, for the insertion of the lower Tendon or Ligament of the Patella.

A *Cartilaginous Surface* under the outer Edge of the Head of the Bone, for the articulation with the upper end of the Fibula.

The *Body* of the Bone *triangular*, with the sharpest Angle placed anteriorly.

The *anterior Angle* called *Spine* or *Shin*, a little wavyed, and extending from the Tubercle to the inner Ankle.

The *anterior and inner Surface* of the Bone, *smooth*, being covered with skin only.

The *anterior and outer Surface*, *hollowed* above and below by the Extensor muscles of the Toes.

The middle of the posterior Surface, *hollowed* by muscles which assist in extending the Foot, and bending the Toes.

A *Ridge* extending obliquely downwards from the upper and outer part of the Bone, posteriorly to its inner

Angle, and giving origin to part of the Muscles which extend the Foot and bend the Toes.

A *flat Surface* above the Ridge, pointing out the situation of the Popliteous Muscle.

The *Canal* for the Medullary Vessels, slanting downwards at the inner and back-part of the Bone, a little above its middle.

The under end of the Tibia, *smaller* than the upper one, and its inferior Surface covered with Cartilage, for the articulation with the Astragalus.

The *Malleolus Internus*, or *inner Angle*, produced from the inner part of the under end, and covered with Cartilage where the Astragalus plays.

A *Pit* in the point of the Malleolus Internus, for the attachment of the internal lateral Ligament, and a *Groove* behind, where the Tendons of the Tibialis Posterior Muscle is placed.

The *semilunar Cavity*, at the under and outer side of the Tibia, for receiving the under end of the Fibula.

Round the edge of the articulating Cavity, the Bone is marked by the insertion of the Capsular Ligament.

THE FIBULA,

Placed at the outer side of the Tibia, and by much the smaller of the two Bones.

The upper end of the Fibula, formed into a *large Head*, with a *superficial smooth Cavity* towards its inner side, to be articulated with the Tibia, where it is tied by Ligaments of such strength as to allow very little motion.

The *Head* of the Fibula, *irregular* and *rough* externally, for the insertion of the Biceps Flexor Cruris, and the external lateral Ligament of the Knee.

The *Body* of the Bone bent a little inwards and backwards, and unequally triangular, with the Surfaces between the Angles, marked by the Muscles which arise from it, or are placed upon it.

A *Ridge* at the inner side of the Fibula, opposed to one at the outer part of the Tibia, for the insertion of the Interosseous Ligament.

A *Canal* on the back-part of the Bone, slanting obliquely downwards, for the passage of the Medullary Vessels.

The *under End* of the Fibula, *broad and flat*, to be received by the semilunar cavity of the Tibia, where it is fixed so firmly by strong Ligaments, as to have no sensible motion.

The *Malleolus externus* of the Bone, or outer Ankle, lower and farther back than the inner Ankle.

A *convex smooth Surface* on the inner side of the Malleolus externus, opposed to the outer side of the Astragalus, which moves upon it.

The *Coronoid Process*, sent down from the Malleolus externus, from which Ligaments go to the Bones at the outer side of the Foot.

There is a *Furrow* upon the back-part of the Malleolus externus, for lodging the Tendons of the Peronei Muscles.

THE PATELLA, ROTULA, OR KNEE-PAN,

Placed at the fore-part of the Joint of the Knee, and compared by some authors to the Olecranon of the Ulna.

The *shape* of the Patella, *triangular and flat*, or of the figure of a Heart, as painted upon playing cards.

The *anterior Surface* of the Bone, *convex*, and perforated by numerous Holes for the insertion of Tendons and Ligaments which cover it.

The *posterior Surface*, which corresponds with the Trochlea of the Os Femoris, smooth, covered with Cartilage, and divided by a longitudinal prominent Ridge into two unequal Cavities.

The circumference of the articular Surface, *marked* by a *rough Line*, into which the Capsular Ligament of the Joint is fixed.

The Base, or upper part of the Bone. *horizontal*, and *marked* by the insertion of the Tendons of the Extensors of the Leg.

The back-part of the Apex, *rough and depressed*, for the attachment of the Ligament passing from the Patella to the Tubercle of the Tibia.

The Ligaments of the Patella allow it to be moved *upwards and downwards*; and when the Leg is extended, they admit of its *motion to either side*, or to be *rolled*.

When the Leg is extended, the Patella is lodged in the Trochlea of the Os Femoris; when the Limb is

bent, it is pulled down by the Tibia, and lodged in a hollow at the fore-part of the Knee.

The Patella allows the Muscles fixed to it to act with greater advantage in extending the Leg.

It is entirely Cartilaginous at birth.

THE FOOT,

Composed of *Tarsus*, *Metatarsus* and *Toes*.

THE TARSUS, or *Instep*.

Composed of seven Bones, viz. The *Astragalus*, Or *Calcis*, *Naviculare*, *Cuboides*. *Cuneiforme externum*, *Cuneiforme medium*, and *Cuneiforme internum*.

The upper part of the Tarsus is *convex*, the under part *concave*.

In the *Concavity* are lodged numerous *Muscles*, *Vessels*, and *Nerves*, belonging to the Sole.

The different Bones of the Tarsus have their *rough Surfaces joined together by strong Ligaments*, and their parts of articulation *covered with Cartilage*, in such a manner as to form a strong and elastic arch, for supporting the weight of the Body, and lessening the shock it would otherwise undergo in the different motions it has to sustain.

The *ASTRAGALUS*, or *Ankle-Bone*, placed under the Bones of the Leg.

The upper part of the Astragalus, formed into a *large Head* which is smooth on its upper part and sides, to be articulated with the under end of the Leg-bones.

Each of the Cartilaginous Surfaces of the Head of this Bone is *depressed* in its middle, to correspond with the parts of the Leg-bones with which they are articulated.

Round the edge of the articulating Surfaces, a *rough Fossa* for the insertion of the Capsular Ligament; and at the sides of this Surface, the Bone marked by the lateral Ligaments.

The Joint between the Astragalus and Leg-Bones, forming a complete Hinge, which together, with the above-mentioned Ligaments, allows the Foot to bend

and extend upon the Leg, but admits of no lateral or rotatory motion, except in the extended state, when there is a little of each.

The under part of the Bone, consisting of a *deep Fossa*, which divides it into an anterior and posterior articulating Surface.

The Fossa in the under Surface, narrower at the inner part of the Bone, and becoming gradually wider as it goes outwards and forwards.

The *posterior articulating Surface*, large and concave, for its articulation with the upper and middle part of the Os Calcis.

The *anterior articulating Surface*, irregular and convex, where it plays upon two smooth Cavities at the inner and fore-part of the Os Calcis, and upon a Cartilaginous Ligament extended between the Os Calcis and Os Naviculare.

A large oblong smooth Head, at the fore-part of the Bone, for its articulation with the Os Naviculare.

The Os CALCIS or *Heel-Bone*, the largest of the Tarsal Bones, situated under the Astragalus, and in the back-part of the Foot.

A large Knob, projecting behind, to form the Heel.

A superficial Cavity in the upper and back-part of this Knob, for the insertion of the *Tendo-Achillis*.

A smooth Convexity on the upper part of the Bone, for its articulation with the under and back-part of the Astragalus.

A Fossa at the fore-part of this articulating Surface, running forwards and outwards, and giving origin to strong Ligaments which are inserted in the corresponding Fossa of the Astragalus.

Two Prominences at the inner and fore-part of the Bone, concave and smooth above, with a pit between them, for the articulation with the under and fore-part of the Astragalus.

From the posterior Prominence the Cartilaginous Ligament arises, which is fixed to the Os Naviculare.

A large Cavity at the inner side of the Bone, between the posterior or the two last mentioned Processes and projection of the Heel, for lodging the Tendons of the long Flexors of the Toes, together with the Vessels and N

The external Surface of the Bone, *depressed* near its forepart, where the Tendon of the long Peronous Muscle runs in its way to the Sole.

The under and back-part of the Bone, forming *two Prominences*, where it gives origin to the Aponeurosis and several Muscles of the sole; and before the Prominences, the Bone *concave*, where it lodges part of these Muscles.

The anterior Surface *concave*, and somewhat in form of a Pulley placed obliquely, for its articulation with the Os Cuboides.

The *Os Calcis* is articulated with the Astragalus by Ligaments of such strength, that this part of the Foot, upon which the Body rests, is rendered firm and secure, but enjoys very little motion.

The Os NAVICULARE, or *Boat-Like Bone*, situated at the fore-part of the Astragalus, and inner part of the Foot.

The *posterior Surface*, forming a Cavity somewhat like that of a Boat, for receiving the head of the Astragalus in the manner of Ball and Socket.

A *Prominence* at the inner side of the Bone, for the insertion of Tendons, Muscles, and strong Ligaments, particularly for the Ligament stretched between this Bone and the Os Calcis, for the support of the Astragalus.

The *fore-part* of the Bone, *convex*, and divided into *three articular Surfaces*, for the articulation with the Ossa Cuneiformia.

Between the Os Naviculare and Astragalus, the Foot has its principal lateral and rotatory motions, though each of the other Joints of the Tarsus contributes a little.

The Os CUBOIDES, or *Bone of a Cubic form*, placed at the fore and outer part of the Tarsus.

The *posterior Surface* of this Bone, *smooth*, *convex* at its *inner*, and *concave* at its *outer* part, corresponding with the anterior extremity of the Os Calcis.

The *inner side*, articulated with the Os Naviculare and external Cuneiforme Bone.

Its *under Surface irregular*, where it gives attachment to strong Ligaments, and to the Adductor Pollicis Muscle.

A *deep Fossa* in the outer and under part of the Bone, for lodging the Tendon of the *Péroncus longus*, where it crosses the Sole.

The *anterior* extremity, divided into a small inner, and large outer plain Surface, to be articulated with the fourth and fifth *Metatarsal* Bones.

The three *OSSA CUNEIFORMIA*, or *wedge-shaped* Bones, situated at the fore-part of the *Tarsus*, and inner side of the *Cuboid* Bone.

The *upper part* of these Bones, *flat*, where they are covered with *Ligaments*.

The *under part*, *irregular*, for the attachment of *Muscles* and strong *Ligaments* lying in the Sole.

The *posterior Surface*, *flat*, and covered with *Cartilage*, to be articulated with the *Os Naviculare*.

The *anterior Surface*, also *flat*, for the articulation with the *Metatarsal* Bones.

The *Os Cuneiforme externum*, or *medium*, of a middle size between the next two Bones, and opposed to the *Metatarsal* Bone of the *Third Toe*.—The outer side of this Bone is articulated with the *Os Cuboides*.

The *Os Cuneiforme medium*, or *minimum*, the least of the three, and articulated at its outside with the former Bone, and anteriorly with the second *Metatarsal* Bone.

The *Os Cuneiforme internum*, or *maximum*, the largest of the *Cuneiforme* Bones, and placed obliquely, with its anterior Surface opposed to the *Metatarsal* Bone of the great *Toe*.

The sharp *Edge* of this Bone is turned upwards, while that of the other two is in the opposite direction.

The *Navicular*, *Cuboid*, and *Cuneiforme* Bones, are almost *Cartilaginous* at birth.

THE *METATARSUS*, or *Bones placed upon the Tarsus*, Composed of *five* Bones, which answer to the general characters given to the *Metacarpal* Bones.

Their *bodies* are *long*, *arched upwards*, and *tapering* towards their anterior extremities.

The *extremities* *large* in proportion to their *Bodies*, and the posterior much larger than the anterior.

The *Bases* *flat*, or a very little *hollowed*, to be articulated with the fore-part of the *Tarsal* Bones.

From the flatness of their Bases, and the strength of the Ligaments which fix these Bones to those of the Tarsus, very little motion is allowed to this part of the Foot.

Round the Bases *rough Surfaces* for the attachment of Ligaments

The *Sides of the Bases, flat*, where they are articulated with each other.

A *Ridge* above, and a *flat Surface* at each side of their bodies, for the origin of the Interosseous Muscles.

The *flat Surfaces* turned obliquely outwards, and the obliquity increasing the more externally the Bones are placed.

The *anterior Extremities* forming *Balls*, to be articulated with the Toes;—the Balls much longer from above downwards, than they are from one side to the other.

Round the Heads, a *distinct impression*, where the Capsular Ligaments are fixed.

Peculiarities of the Metatarsal Bones.

The *Metatarsal Bone of the Great Toe*, by much the thickest and strongest, but shortest of the Metatarsus.

The *articulating Cavity* of its Base, *deeper* than the rest.

The *anterior Extremity* bears a greater proportion to the *Base* than the rest, having a much larger share of the weight of the Body to sustain here, and is formed into a *middle Prominence*, with *two lateral Depressions*, where the *Ossa Sesamoidea* move.

The *Metatarsal Bone of the second Toe*, the longest of the five.

The *Metatarsal Bone of the Middle Toe*, the second in length with a Base like that of the former Bone, triangular, but a little larger, to be articulated with the *Os Cuneiforme externum*.

The *Metatarsal Bone of the fourth Toe*, nearly of the same length as the former, but distinguished from it by its Base being thicker below, and its Cartilaginous Surface being more of a square form, corresponding with the anterior and inner part of the *Os Cuboides*, with which it is articulated.

The *Metatarsal Bone of the little Toe*, the shortest, with flat surfaces facing upwards and downwards.

The *Base* which rests on the *Os Cuboides* projecting outwardly into a large *Tuberosity*, which gives origin to *Muscles*, and forms one of the points on which the *Body* rests in standing.

The *Bones of the Toes*, the same in number with those of the *Fingers*, viz. two to the *Great Toe*, and three to each of the smaller *Toes*, and the different *Bones* here, as in the *Fingers* disposed in *Ranks* or *Phalanges*.

The *two Bones of the great Toe*, like those of the *Thumb* but stronger, and placed in the same *Row* with the *Bones* of the *Toes*, for the purpose of walking, and assisting in supporting the *Body*.

The *Bones of the smaller Toes*, every way less than those of the *Fingers*

Their *under Surface*, *depressed*, where the *Tendons* of the *Flexor Muscles* are lodged

The *Bases* of the first *Phalanx*, as in the *Fingers*, forming *Sockets* to receive the *Balls*, or *Heads* of the *Metatarsal Bones*.

The *Joints* between the first and *Second Phalanx*, and also between the second and third, as in the *fingers*, forming *Hinges*, and the motions similar, but more confined.

Of the small *Toes*, the *first*, or that next the *Great Toe*, the *largest*, the rest becoming *smaller* the more externally they are placed.

The second and third *Bones*, especially of the little *Toe*, are frequently joined by an union of *Substance*.

OSSA SESAMOIDEA.

The Ossa Sesamoidea are the only Bones of the Skeleton which remain to be described.

THEY are small *Bones*, compared in shape to the seeds of the *Sesamum*, or oily grain.

Their size, situation, and number, vary in different persons.

They are sometimes found at the roots of the *Fingers* and small *Toes*; at the second joint of the *Thumb* and that of the *Great Toe*; between the *Condyles* of the *Os Femoris* and *Gastrocnemius Muscle*; between the *Tendons* of the *Peroneus Longus* and *Os Cuboides*, &c.

Those commonly observed are placed in pairs at the

roots of the Thumb and Great Toe, between the tendons of their Flexor Muscles and Joints.

They are *convex* on their outer Surface, where they are inclosed by the Tendons and Ligaments fixed to them :

And *concave*, and lined with Cartilage next the Joints, where they play upon the Bones with which they are articulated.

They are considered by Anatomists as serving the same general purpose with the Patella.

PRINCIPAL DIFFERENCES

BETWEEN THE MALE AND FEMALE SKELETON.

THE Female Skeleton is observed, in general, to be smaller and slenderer throughout than that of the Male.

A Ripe Female Bone, of the same size with a male Bone, is usually distinguished by the Ridges, Depressions, rough Surfaces, and other inequalities, being less conspicuous in the former.

The circumference of the Female Skull is said by a late Author to be larger.

The Os Frontis has been found to be more frequently divided by a continuation of the Sagittal Suture.

The Frontal Sinuses are observed to be narrower.

All the Bones of the Face more delicate.

The Bodies of the Vertebrae longer.

The Intervertebral Substances deeper or thicker.

The upper part of the Thorax in proportion wider.

The under part narrower, or the whole Thorax less conical.

The Cartilages of the True Ribs longer in proportion to the Osseous part and broader and flatter to support the Breasts.

The Sternum more raised, and the whole thorax more distant from the Pelvis.

The length of the Sternum less, and terminating below in a line nearly opposite to the plane of the fourth pair of Ribs, but in the Male Skeleton terminating opposite to the fifth Rib.

The length of the Loins greater.

All the diameters of the Pelvis larger.

The Spines and Processes of the Ossa Innominata farther distant from each other.

The Os Sacrum broader, and turned more backwards for enlarging the Cavity of the Pelvis.

The Os Coccygis more slender, and turned more backwards, and having a greater degree of motion.

The Ossa Ilia flatter, and more reflected outwards, by which the under part of the Abdomen is rendered more capacious.

The Notches of the Ossa Ilia wider, and the conjoined Surfaces of the Ossa Innominata and Os Sacrum less.

The space between the Ossa Pubis larger; of course the Ligamentous Cartilage of the Symphysis broader, though shorter.

The Angle formed by the Crura of the Ossa Pubis with the Symphysis larger; that of the Male being acute, while in the Female the Angle extends to 80 or 90 degrees.

The Tuberosities of the Ossa Ischia flatter, and at a greater distance from each other.

The Brim of the Pelvis wider, and of an oval form, corresponding with the head of a child, and the longest diameter extending between the Ossa Ilia.

In the Male the Brim of the Pelvis has more of a circular appearance, and has the greatest extent between the Ossa Pubis and Sacrum.

The opening at the under part of the Pelvis in the female is much wider, and of an oval form, but the oval the reverse of that at the Brim.

The Foramina Ovalia wider.

All the openings at the under part of the Pelvis, being wider, leave a large passage for the birth of the child.

In consequence of the Pelvis being wider, the Acetabula are farther distant from each other, which obliges women who are very broad at this part of the Body to waggle when they walk.

The Ossa Femorum are more curved, the neck of the Thighbone forms a greater Angle with the Body, and the Internal Condyle is larger.

The feet are smaller.

The Clavicles less crooked.

The Scapulæ are smaller, and their Angles more acute.

The Superior Extremities shorter.

The Ossa Carpi narrower, and

The Fingers more tapering towards their extremities.

End of the First Part.

PART II.

OF THE MUSCLES.

OF THE

MUSCLES IN GENERAL.

THE *Muscles* serve for the motions of the different parts of the Body, and derive their general name from their power of contracting.

The following parts to be observed of Muscles in general.

The *Cellular Substance*, which surrounds the Muscles, and allows them to move upon each other, and upon the adjacent parts.

The *Cellular Substance*, condensed in certain parts of the Body, and giving an appearance of *Membrane*, formerly called *Tunica Propria Musculorum*.

The *division* of a Muscle into

Origin, or *Head*;—or that which arises from the most stable or fixed part, and towards which the contraction is made :

Belly, or *thickest part*, which swells when the Muscle is in action :

Insertion, or termination, which is implanted into the part to be moved, and which is commonly smaller than the Origin.

The division of a Muscle into Fleehy and Tendinous parts.

The *Fleehy part* distinguished by being *soft, sensible*, generally of a *red colour*,—from the great quantity of blood in it,—and possessing *contractility*.

The Fleehy part having numerous *Blood-vessels, Lymphatics, and Nerves*

Division of Muscles into Rectilineal,—as in the *Sartorius*;—*Simple Penniform*, as in the *Peroneus Longus*;—*Complete Penniform*, as in the *Rectus Femoris*;—*Compound Penniform*, as in the *fore-part of the Soleus*;—and *Radiated*, as in the *Pectoralis Major*;—*Hollow*, as in the *Heart, Intestines, Bladder of Urine, &c.*

The *particular names of Muscles*. taken from their *shape, size, situation, direction, composition, use, and attachment*.

Tendon, distinguished from the Fleehy part, by being generally *smaller, firmer, stronger*;—of a *white glistening colour*, having no *contractility*, and little or no *sensibility* in the sound state.

Tendons having very few *Blood-vessels*, and no evident *Nerves*.

The *use of Tendons*, to connect *Muscles to Bones*, and take up less room, &c.

The *Appendages of Muscles*, viz.

Aponeuroses, or Fasciæ, (the former name derived from the parts having been mistaken for nerves) are the *Tendons* expanded upon a wide *Surface*, and serving to give insertion to *Muscular Fibres*. to keep them in their proper situation, and brace them in their action.

Annular Ligaments, to keep *Tendons* from starting.

Trochleæ, or Pulleys, to alter the direction of *Tendons*.

Bursæ Mucosæ, placed where *Tendons* play over hard *Substances*, and serving to contain *Synovia*, and prevent *Abrasion*.

*MUSCLES of the INTEGUMENTS of the CRANIUM,
and of the EYE-LIDS.*

OCCIPITO-FRONTALIS,

Or Occipitalis and Frontalis, or Epicranius, &c.

Origin : Fleſhy from near the middle of the upper arched Ridge of the Occipital Bone, Tendinous from the extremity of that Ridge, where it joins the Temporal Bone ; it ariſes after the ſame manner on the other ſide. From the Fleſhy origins, and alſo from between them, a Tendinous expansion is continued along the upper part of the Cranium, adhering firmly to the ſkin, and but looſely to the Pericranium.—At the upper part of the Fore-head it becomes Fleſhy, and, deſcending with ſtraight Fibres, has its

Insertion in the Skin and parts under it belonging to the Eye-brows.

From the under and middle part of the Muſcle, a *Slip* is continued down upon the root of the Noſe, to be connected with the Compressor Nariſ, and Levator Labii Superioris, et Alæ Naſi.

Action of the Muſcle : To move all that part of the Skin which covers it, and particularly the Skin of the Brow and Eye brows.

The Slip upon the Noſe may either aſſiſt the Naſal Muſcles connected with it, or antagonize the Occipito-Frontalis.

Corrugator Supercilii.

Origin : From the internal angular Proceſs of the Os Frontis, above the joining of that Bone with the Os Naſi.

From that it runs upwards and outwards, in the direction of the Superciliary Ridge, and behind the inferior part of the Frontal Muſcle.

Insertion : Into the inner part of the Occipito-Frontalis and Orbicularis Palpebrarum, where theſe two Muſcles join each other.

Action : To aſſiſt its fellow in drawing the Eye-brows downwards and inwards, and corrugating or wrinkling the Skin between them into longitudinal folds.

Orbicularis Oculi, or Palpebrarum.

Origin: From the Orbital Process of the superior Maxillary Bone; from the internal Angular Process of the Frontal Bone; and, by a small round Tendon, from the Nasal Process of the superior Maxillary Bone.

From these origins the Muscle passes outwards, under the Skin of the Eye-lids, surrounding the Orbit in a circular direction, extending somewhat beyond it, and covering the upper part of the Cheek.

The outer Surface of the Muscle adheres to the Skin of the Eye-lids; its upper and inner Edge is intimately connected with the Frontal and Corrugator Muscles.

Action: To close the Eye by bringing the Eye-lids together, to press the Ball of the Eye inwards, and act upon the Lacrymal Organs, so as to assist them in the production and direction of the Tears.

Musculus Ciliaris of some Authors,—named from its situation near the Cilia or Eye-lashes,—is that part of the *Orbicularis Oculi* which covers the Cartilages of the Eye-lids, and is remarkably thin.

A *Fleshy Slip* frequently passes down from the under and outer part of the *Orbicularis*, to join the *Levator Labii Inferioris et Alæ Nasi*. When present it may draw the parts to which it is attached a little towards each other.

Levator Palpebræ Superioris.

Origin: From the margin of the Foramen Opticum of the Sphenoid Bone.

It runs forwards within the Orbit, over the *Levator Oculi*, where it becomes gradually broader, its anterior extremity passing under the *Orbicularis Palpebrarum*.

Insertion: By a broad thin Tendon into nearly the whole length of the Cartilage of the upper Eye-lid.

Action: To open the Eye by raising the upper Eye-lid.



MUSCLES common to the HEAD and EXTERNAL EAR.

Attollens Aurem, or Superior Auris.

Origin: By a broad Tendinous expansion, from the Tendon of the *Occipito-Frontalis*. It goes down over the Aponeurosis of the Temporal Muscle.

In its passage, it forms a thin fleshy Slip, which becomes gradually narrower, and has its

Insertion in the upper part of the root of the Cartilage of the Ear.

Action : To give tension to the part into which it is inserted, and, in some persons, to raise the Ear.

Anterior Auris.

Origin : Thin and Membranous, near the posterior part of the Zygoma.

The middle part is mixed with Fleshy Fibres.

Insertion : By a narrow Tendon into the back-part of the beginning of the Helix.

Action : To stretch that part of the Ear to which it is fixed.

Retrahentes Auris, or Posterior Auris.

Origin : By two, and sometimes by three distinct Muscles, from the upper and outer part of the Mastoid Process : Passing forwards, they have their

Insertion, by small Tendons in the back-part of the Concha.

Action : To stretch the Concha, and, in some persons, to draw the Ear back.



MUSCLES of the NOSE and MOUTH.

Compressor Naris.

Origin : By a narrow beginning from the Ala Nasi, where it is connected with the Levator Labii superioris et Alæ Nasi ; it spreads into a number of thin scattered Fibres, which cross the Wing, and run towards the Dorsum of the Nose, where it joins its fellow.

Insertion : Into the anterior extremity of the Nasal Bones, and to the Slip which descends from the Frontal Muscle.

Action : To press the Ala towards the Septum, as in sneezing ; or if the Fibres in the Frontal Muscle which are connected to it act, they pull the Ala outwards.— It also corrugates the Skin of the Nose, and assists in expressing certain passions.

Levator Labii Superioris et Ala Nasi.

Origin: By two thin Fleshy Slips; the first from the external part of the Orbital Process, and the second from the upper part of the Nasal Process of the Superior Maxillary Bone.

Insertion of the first part of the Muscle into the Upper Lip, and of the second into the Upper Lip and Wing of the Nose.

Action: To raise the Upper Lip, in opening the Mouth, and to dilate the Nostril.

Depressor Labii Superioris et Ala Nasi.

Origin: Thin and Fleshy, from the Alveoli of the Dentes Incisivi and Caninus of the Upper Jaw, and running upwards, at the side of the furrow of the Lip, it has its

Insertion in the Upper Lip, and root of the Ala Nasi.

Action: To draw the Upper Lip and Ala Nasi downwards.

Levator Anguli Oris, or Levator Labiorum Communis, or Caninus.

Origin: Thin and Fleshy, from the superior Maxillary Bone, immediately under the Foramen Infra-Orbitarium and running down deeper and farther out than the Levator Labii Superioris; it has its

Insertion into the angle of the Mouth, where it joins with its antagonist.

Action: To raise the corner of the Mouth,—as in expressing the cheerful passions.

Depressor Labii Inferioris, or Quadratus Genæ.

Origin: Broad and Fleshy, from the under part of the Lower Jaw, at the side of the Chin:—from thence it runs obliquely upwards and inwards, till it becomes contiguous to its fellow in the middle of the Lip.

Insertion: Into one half of the edge of the Under Lip

Action: To assist in opening the Mouth, by depressing the Under Lip, and pulling it a little outwards.

Levator Labii Inferioris, or Levator Mentis.

Origin : From the roots of the Alveoli of the Dentes Incisores and Caninus of the Lower Jaw

Insertion : Into the Under Lip, and Skin of the Chin.

Action : To raise the parts into which it is inserted.

Depressor Anguli Oris, or Musculus Triangularis.

Origin : Broad and Fleshy, from the under edge of the Lower Jaw, at the side of the Chin.—It runs over the origin of the Depressor Labii Inferioris ; and becoming gradually narrower, has its

Insertion into the angle of the Mouth, and intermixes with the Levator Anguli Oris.

Action : To depress the corner of the Mouth,—as in expressing the angry passions.

Zygomaticus Major.

Origin : Fleshy, from the Os Malæ, near the Zygomatic Suture ; and descending obliquely forward, it has its

Insertion into the angle of the Mouth, its Fibres intermixing with those of the Depressor Anguli Oris, and Orbicularis Oris.

Zygomaticus Minor.

Origin : Higher on the Os Malæ than the former Muscle. It takes the same course, but is much more slender, and lies before it.

Insertion : Into the Upper Lip, along with the Levator Anguli Oris.

Action : To raise the corner of the Mouth, and draw it obliquely outwards.

This Muscle is often a wanting.

By the frequent action of the Zygomatic Muscles, that Furrow is formed which extends between the outer corners of the Nose and Mouth, and which is so conspicuous in the Face of a person advanced in life.

Buccinator, or Trumpeter, or Retractor Anguli Oris.

Origin : From a Ridge of the Lower Jaw, extending between the last Dens Molaris and Coronoid Process of

the Lower Jaw;—also from the Upper Jaw, between the last Dens Molaris and Pterygoid Process of the Sphenoid Bone. From thence going forwards with straight Fibres, and adhering closely to the Membrane which lines the Mouth, it has its

Insertion into the corner of the Mouth, with the Orbicularis Oris.

Action: To draw the angle of the Mouth backwards and outwards, and to contract its Cavity by pressing the Cheek inwards, by which the food is thrust between the Teeth in the Time of manducation.—It is likewise active in blowing wind-instruments—as a Trumpet—from which it has obtained its name.

Orbicularis Oris, or Sphincter Labiorum,

Is a complete Sphincter surrounding the Mouth, and composing the principal part of the Lips, and in a great measure formed by the Muscles which terminate in it.—At the corners of the Mouth, the Fibres decussate each other, so as to make it resemble two semi-circular Muscles, from which it has been named by some, *Semi-Orbicularis Superior*, and *Semi-Orbicularis Inferior*.

Action: To shut the Mouth, and to counteract the different Muscles inserted into it.

Nasalis Labii Superioris, of ALBINUS, may be considered as part of the former Muscle, running up to be connected to the Septum Nasi, and serving as a Levator of the Upper Lip, or a Depressor of the under part of the Nose.



MUSCLES of the LOWER JAW.

Aponeurosis Temporalis.

Previous to the description of the Temporal Muscle, it is necessary to take notice of a strong Tendinous Membrane which arises from the Bones which give origin to the upper semi-circular part of the Muscle, and descending over it, is fixed to the Zygoma.—It gives origin to part of the Temporal Muscle, and braces it in its action.

Temporalis.

Origin: In a semi-circular manner, Fleshy, from the lower half of the Parietal and Temporal Fossa of the Frontal Bones; from the Squamous part of the Temporal, and Temporal Plate of the Sphenoid Bones — It arises likewise from the Aponeurosis which covers it: From these different origins the Fibres descend like Radii, and the Muscle changes into a strong Tendon, which passes under the Jugum, to have its

Insertion into the whole of the Coronoid Process of the Lower Jaw, which it incloses as in a sheath.

Action: To pull the Lower Jaw upwards and backwards against the Upper Jaw, — and thereby it becomes useful in biting, chewing, &c.

Masseter.

Origin: By strong Tendinous and Fleshy Fibres from the superior Maxillary Bone, where it joins the Os Mala, and from the whole length of the under and inner edge of the Zygoma, — the outer part of the Muscle slanting backwards, the inner part forwards, and in some measure decussating the other. In its descent, it covers and conceals the Coronoid Process and under end of the Temporal Muscle, and has its

Insertion into the angle of the Lower Jaw, and from that upwards, to the outside of the Coronoid Process.

Action: To raise the Lower Jaw.

Pterygoideus Internus, or Major.

Origin: From the Fossa Pterygoidea of the Sphenoid and Palate Bones: It passes downwards and outwards, and has its

Insertion into the Cervix and Capsular Ligament of the Lower Jaw, and it is continued as far as the Groove for the inferior Maxillary Nerve.

Action: To raise the Jaw, and draw it obliquely towards the opposite side.

Pterygoideus Externus, or Minor.

Origin: From the outer side of the Pterygoid Process of the Sphenoid Bone; from the Tuberosity of the superior Maxillary Bone, and from the root of the

Temporal Process of the Sphenoid Bone. From these origins it passes, almost horizontally, outwards and a little backwards.

Insertion: Into the Cervix and Capsular Ligament of the Lower Jaw.

Action: To pull the Lower Jaw to the opposite side, and, if both Muscles act, to bring it forwards, so as to make the Fore Teeth project beyond those of the Upper Jaw. The Muscle, in its different motions, acts also upon the Interarticular Cartilage.



MUSCLES on the FORE and LATERAL PART of the NECK.

Platysma Myoides.

Origin: By a number of separate Fleehy Slips, from the Cellular Substance, which covers the upper parts of the Pectoral and Deltoid Muscles —In their ascent, they unite to form a thin Muscular expansion, similar to the Cutaneous Muscle of Quadrupeds, which runs obliquely upwards along the side of the Neck, adhering to the Skin.

Insertion: Into the side of the Lower Jaw,—the Depressor Anguli Oris,—and into the Skin which covers the under part of the Masseter Muscle and Parotid Gland.

Action: To assist in depressing the Skin of the Cheek, the corner of the Mouth, and the Lower Jaw, and, when the Jaws are shut, to raise all that part of the Skin connected with it under the Lower Jaw.

Sterno-Cleido-Mastoideus, or Sterno-Mastoideus.

Origin: From the top of the Sternum, and from the anterior end of the Clavicle, by two distinct heads. A little above the Clavicle, these unite to form a strong Muscle, which runs obliquely upwards and outwards, the greater part of it being covered by the Cutaneous Muscle.

Insertion: By a thick strong Tendon, into the Mastoid Process, which it surrounds; and becoming thinner, the insertion extends as far as the Lambdoid Suture.

Action : To turn the head to one side, and assist in rolling it. When both Muscles act, they bow the Head.

MUSCLES situated between the Os HYOIDES and TRUNK.

Sterno-Hyoideus.

Origin : From the upper and inner-part of the Sternum, and from the adjacent parts of the Clavicle and Cartilage of the first Rib; it ascends upon the fore-part of the Trachea and following Muscle, to have its

Insertion into the Base of the Os Hyoides.

Action : To depress the Os Hyoides.

Sterno-Thyroideus.

Origin : From the upper and inner part of the Sternum, and partly from the Cartilage of the first Rib;— it runs along the fore-part and side of the Trachea and Thyroid Gland, and has its

Insertion into the under and lateral part of the Thyroid Cartilage

Action : To draw the Larynx downwards.

Thyro-Hyoideus, or Hypo-Thyroideus.

Origin : Where the former Muscle terminates, having the appearance of being continued from it.

Insertion : Into part of the Base, and almost all the Cornu of the Os Hyoides.

Action : To depress the Os Hyoides, or to raise the Thyroid Cartilage.

Omo-Hyoideus.

Origin : From the superior Costa of the Scapula, near the scapular Notch; it goes obliquely upwards and forwards, and is of a very slender form. Under the Sterno Mastoideus, it becomes Tendinous, and again growing Fleshy, has its

Insertion into the Base of the Os Hyoides, at the side of the Sterno-Hyoideus.

Action : To depress the Os Hyoides, and pull it to one side; or when both act, to draw it directly down.

MUSCLES situated between the LOWER JAW and OS HYOIDES.

DIGASTRICUS, or *Biventer Maxille Inferioris*.

Origin : By its posterior Belly, from the Groove at the root of the Mastoid Process of the Temporal Bone, it runs downwards and forwards, and forms a strong round Tendon, which passes through the Stylo-Hyoides Muscle ; it is then fixed by a Ligament to the Os Hyoides, and, having received an addition of Tendinous and the Muscular Fibres, runs obliquely upwards and forwards, forming another Fleishy Belly, which has its

Insertion into a rough sinuosity at the under part of the Symphysis of the Lower Jaw.

Action : To open the Mouth by pulling the Lower Jaw downwards and backwards ; and, when the Jaws are shut, to raise the Os Hyoides, and of consequence the Throat,—as in swallowing.

Mylo-Hyoides.

Origin : Fleishy, broad, and thin from the inside of the Lower Jaw, between the last Dens Molaris and the middle of the Chin, where it joints its fellow. It runs down behind the digastricus, and has its

Insertion into the Body of the Os Hyoides, and joined to its fellow by the intervention of a white Tendinous line.

Action : To pull the Os Hyoides forwards, upwards, and to a side.

Genio-Hyoides.

Origin : From a Tubercle on the under and inner part of the Symphysis of the Lower Jaw, by a slender beginning, which by degrees becomes broader, and running down, has its

Insertion into the body of the Os Hyoides, under the former Muscle.

Action : To draw the Os Hyoides towards the Chin, when the Jaws are shut ; or the Chin towards the Os Hyoides, when the latter is fixed by the Muscles coming from the Sternum.

Genio-Hyo-Glossus,

Origin : From the same Tubercle with the former Muscle : Its Fibres, spread out like a Fan, and have their

Insertion into the whole length of the Tongue, and Base of the Os Hyoides.

Action : According to the direction of its Fibres,—to draw the Tongue forwards, backwards, and downwards, and to make the Os Hyoides advance towards the Chin.

Hyo-Glossus.

Origin : From the whole length of one half of the Os Hyoides : It runs upwards, and has its

Insertion into the side of the Tongue, near the Stylo Glossus.

Action : To depress the edges of the Tongue, and thereby to render its upper Surface convex.

Lingualis.

Origin : From the root of the Tongue laterally ; it advances between the Genio-Hyo-Glossus, and Hyo-Glossus, and has its

Insertion into the Tip of the Tongue.

Action : To raise the point of the Tongue ; to contract its substance, and bring it backwards.

Crico-Thyroideus.

Origin : From the side and fore-part of the Cricoid Cartilage it runs obliquely upwards, and has its

Insertion by two portions ; the one into the under part of the Thyroid Cartilage, the other into its inferior Cornu.

Action : To depress and pull forwards the Thyroid Cartilage, or to raise and draw backwards the Cricoid Cartilage.

Stylo-Glossus.

Origin : From the Styloid Process of the Temporal Bone, and from a Ligament which connects that process to the angle of the Lower Jaw ;—goes downwards and forwards,—of a slender form,—to have its

Insertion into the root of the Tongue, near the Hyo-

Glossus : It runs along its side, and is insensibly lost near its tip.

Action : To draw the Tongue backwards and to one side.

Stylo Hyoides.

Origin : From the under half of the Styloid Process; it goes downwards and forwards, and, after splitting for the Passage of the Digastric Muscle, has its

Insertion into the Os Hyoides, at the junction of the Base and Cornu.

Action : To pull the Os Hyoides to one side, and a little upwards.

Stylo-Hyoides Alter.

When present, it is a more slender Muscle than the former, but, like it, has the same Origin, Insertion, and Action.

Stylo-Pharyngeus.

Origin : From the root of the Styloid Process; it goes downwards and forwards, to have its

Insertion into the side of the Pharynx, along which it expands. It is also fixed to the back-part of the Thyroid Cartilage.

Action : To dilate and raise the Pharynx, and thereby prepare it to receive the morsel from the Mouth.— It at the same time lifts the Thyroid Cartilage.

Circumflexus, or Tensor Palati.

Origin : From Spinous Process of the Sphenoid Bone, and from the osseous part of the Eustachian Tube. It runs along the Pterygoideus Internus, passes over the Hook of the Internal Plate of the Pterygoid Process, and plays on it by a round Tendon, as on a Pulley, and, spreading out into a broad Membrane, has its

Insertion into the Velum Palati and semilunar edge of the Os Palati, extending as far as the Suture which joins the two Bones : Generally some of its posterior Fibres join the Constrictor Pharyngis Superior, and Palato-Pharyngeus.

Action : To Stretch the Velum, to draw it downwards and to a side toward the Hook.

Levator Palati, or Levator Palati Mollis.

Origin : From the point of the Pars Petrosa of the Temporal Bone, and also from the Eustachian Tube ; from these parts it descends, and has its

Insertion, by a broad expansion, into the Velum Palati, extending as far as the root of the Uvula, and uniting with its fellow.

Action : To raise the Velum in the time of swallowing, and press it against the Nose, so as to prevent the food or drink from passing there.

Constrictor Isthmi Faucium.

Origin : From the side of the root of the Tongue : It runs in the doubling of the Skin, which forms the anterior Arch of the Palate.

Insertion : Into the middle of the Velum Palati, at the root of the Uvula, where it is connected with its fellow.

Action : It draws the Palate and Root of the Tongue towards each other, and thereby shuts the opening into the Fauces.

Palato-Pharyngeus.

Origin : From the middle of the Velum Palati, at the root of the Uvula, and from the insertion of the Constrictor Isthmi Faucium and Circumflexus Palati. The Fibres proceed within the posterior Arch of the Palate, and run to the upper and lateral part of the Pharynx, where they spread, and mix with those of the Stylo-Pharyngeus.

Insertion : Into the edge of the upper and back part of the Thyroid Cartilage, some of its Fibres being lost between the Membrane and inferior Constrictors of the Pharynx.

Action : It draws the Velum and Uvula downwards, the Larynx and Pharynx being at the same time raised. Along with the Constrictor Superior and Tongue, it assists in shutting the passage into the Nostrils, and, in swallowing, it conveys the food from the Fauces into the Pharynx.

Salpingo-Pharyngeus of Albinus.

Is composed of a small portion of the former Muscle,

which arises from the Eustachian Tube, and which, when acting, may affect it.

Azygos Uvulae.

Origin : From the posterior extremity of the longitudinal Palate Suture : It runs in the middle of the Velum Palati, and goes through the whole length of the Uvula, adhering in its passage to the Circumflexi Muscles

Insertion : Into the point of the Uvula.

Action : To shorten the Uvula.



MUSCLES *situated upon the BACK-PART of the*
PHARYNX.

Constrictor Pharyngis Inferior.

Origin : From the sides of the Thyroid and Cricoid Cartilages : The superior Fibres, running obliquely upwards, cover the under part of the following Muscle, and terminate in a point, the inferior Fibres run more transversely, and cover the beginning of the Esophagus

Insertion : Into its fellow, by the medium of a longitudinal Tendinous line in the middle of the back-part of the Pharynx.

Action : To compress the lower part of the Pharynx.

Constrictor Pharyngis Medius.

Origin : From the Appendix and Cornu of the Os Hyoides, and also from the Ligament which connects the Cornu to the Thyroid Cartilage. The Muscle, in its passage, spreads out, and terminates in a point above and below, the upper part covering the following Muscle.

Insertion : Into the Cuneiform Process of the Occipital Bone, before the Foramen Magnum, and to its fellow on the opposite side by a Tendinous line, similar to the former Muscle.

Action : To compress the middle and upper part of the Pharynx,

Constrictor Pharyngis Superior.

Origin : From the Cuneiform Process of the Occipital Bone, before the Foramen Magnum; from the Pterygoid Process of the Sphenoid Bone, and from both Jaws, near the last Dentes Molares : It is likewise connected with the Buccinator Muscle, and with the root of the Tongue and Palate.—From these Origins, it runs almost horizontally, and has its

Insertion into its fellow, by the intervention of a Tendinous line, as in the case of the former Muscle.

Action : To compress the upper part of the Pharynx, and, with the assistance of the other Constrictors, to thrust the Food down to the Esophagus.



MUSCLES of the GLOTTIS.

CRICO-ARYTENOIDEUS POSTICUS.

Origin : Broad and Flethy, from the back-part of the Cricoid Cartilage.

Insertion : By a narrow extremity into the back-part of the Base of the Arytenoid Cartilage.

Action : To pull back the Arytenoid Cartilage, by which the Ligament of the Glottis is made tense, and the Glottis itself longer.

Crico-Arytenoideus Lateralis.

Origin : From the side of the Cricoid Cartilage, where it is covered by the Thyroid.

Insertion : Into the side of the Base of the Arytenoid Cartilage.

Action : To open the Glottis, by separating the Arytenoid Cartilages, and, with them, the Ligaments of the Glottis.

Thyro-Arytenoideus.

Origin : From the under and back-part of the middle of the Thyroid Cartilage, from which it runs backwards and a little upwards, upon the side of the Glottis and Ventricle of the Larynx.

Insertion : Into the fore-part of the Arytenoid Cartilage.

Action : It pulls the Arytenoid Cartilage outwards and forwards, and so widens the Glottis, and relaxes its Ligaments.—It may also affect the Ventricle of the Larynx.

Arytenoideus Obliquus, or Minor.

Origin : From the root of one of the Arytenoid Cartilages ; crossing its fellow obliquely, it has its

Insertion near the point of the other Arytenoid Cartilage.

Action : To draw the Arytenoid Cartilages towards each other, and assist in closing the Aperture of the Glottis.

N. B. Frequently one of the oblique Arytenoid Muscles is a wanting.

Arytenoideus Transversus, or Major.

Origin : From almost the whole length of the back-part of one of the Arytenoid Cartilages : It goes across to have its

Insertion in a similar manner, in the other Arytenoid Cartilage.

Action : To close the Glottis, by drawing the Arytenoid Cartilages and Ligaments of the Glottis together.

Thyro-Epiglottideus.

Origin : By a few scattered Fibres, from the Thyroid Cartilage.

Insertion : Into the side of the Epiglottis.

Action : To assist its fellow in drawing the Epiglottis towards the Glottis.

Aryteno-Epiglottideus.

Origin : By a number of small Fibres, from the Arytenoid Cartilage : It runs along the outer side of the external opening of the Glottis.

Insertion : Into the Epiglottis, along with the former Muscle.

Action : To assist its fellow in drawing the Epiglottis immediately down upon the Glottis.

It is counteracted by the elasticity of the Epiglottis.

N. B. The two last mentioned Muscles are obscurely seen, excepting in robust Bodies.

MUSCLES situated on the ANTERIOR and LATERAL
PARTS of the ABDOMEN.

OBLIQUUS DESCENDENS EXTERNUS,
Or *Obliquus Externus Abdominis*.

Origin : In a serrated manner, from the lower edge of the eight inferior Ribs, near their Cartilages. The Serræ internix with the indentations of the Serratus Major Anticus, and it is commonly connected with the Pectoralis Major, Intercostales, and Latissimus Dorsi, the last of which covers the edge of a portion of it, extending from the twelfth Rib to the Spine of the Os Ilium—From these Origins the Fibres run obliquely downwards and forwards, and terminate in an Aponeurosis, which, near its margin, is firmly connected with the Aponeurosis of the following Muscle, where it forms a curved line, called *Linea Semilunaris*. From this the Fibres are continued in the same direction with the Fleishy Fibres, to the middle of the Abdomen.

Insertion : Into its fellow of the opposite side, by the medium of the *Linea Alba*, which extends from the Cartilago-Ensiformis to the Pubes, is formed by the meeting of the Tendons of the oblique and transverse Muscles of the Abdomen, and is perforated in the middle by the Umbilicus,—originally a passage for the Umbilical Cord, now formed into a Cicatrix.

The under part of the Tendon divides into two columns, which leave an oval space between them, called *Ring* of the External oblique Muscle, for the passage of the Spermatic Cord in the Male, in whom it is larger than in the Female, where it gives passage to the round Ligament of the Uterus.

The Muscle is also inserted into the anterior half of the Spine of the Os Ilium, from the superior anterior Spinous Process of which it is stretched, Tendinous, to the Crest of the Os Pubis. This part of the Tendon, which passes over the Flexor Muscles and the great Blood-vessels of the Thigh, is termed *Poupart's* or *Fallopian's Ligament*, or *The Inguinal Ligament*.

From the under part of this Tendon, a thin expansion is sent downwards, and is lost in the Aponeurosis of the Thigh.

Action. To support and compress the Abdominal Viscera, assist the Evacuations, draw down the Ribs, and bend the Trunk forwards, or obliquely to one side.

Obliquus Ascendens Internus, or Obliquus Internus Abdominis.

Origin: From the back-part of the Os Sacrum;—from the Spinous Processes of the three lowest Lumbar Vertebrae, by a Tendon common to it and the Serratus Posticus Inferior;—from the whole length of the Spine of the Os Ilium;—and from the inside of Poupert's Ligament, at the middle of which it sends off the Cremaster Muscle.—From these Origins the Fibres are disposed in a radiated manner; but the greater part of them run in a slanting direction upwards.—At the Linea Semilunaris, the Muscle becomes Tendinous, and adheres firmly to the Tendon of the Obliquus Externus: Here its Tendon divides into two Layers. The anterior Layer, with the greater part of the inferior portion of the posterior Layer, joins the Tendon of the external Oblique, and goes over the Rectus Muscle, to be inserted into the whole length of the Linea Alba. The posterior Layer joins the Tendon of the Transversalis, and goes behind the Rectus; and this union is continued down, till it reaches about half way between the Umbilicus and Os Pubis. Lower than this, only a few scattered Fibres of the posterior Layer are to be found behind the Rectus, the principal part of it passing before the Muscle, to be inserted into the Linea Alba.

Insertion of the Muscle in general: Into the Cartilages of all the False Ribs, the Cartilago-Ensiformis, and whole length of the Linea Alba.

Action: To assist the former Muscle. But it bends the Body in the same direction with the Obliquus Externus of the opposite side.

Transversalis, or Transversus Abdominis.

Origin: Fleishy, from the inner Surface of the Cartilages of the six or seven lower Ribs, where it intermixes with the digitations of the Diaphragm, and with the Intercostal Muscles; from the transverse Processes

of the twelfth Dorsal and four superior Lumbar Vertebrae;—from the whole inner edge of the Spine of the Os Ilium; and anterior to this, it is connected to the under Edge of the external oblique Muscle. At the Linea Alba, the Muscle becomes Tendinous, and the Tendon is continued across, adhering to the internal oblique Muscle, in the manner already mentioned.—In the whole of its course, it is closely connected to the Surface of the Peritoneum.

Insertion: Into the Cartilago Ensiformis, and Linea Alba.

Action: To support, and immediately compress the Abdominal Bowels.

Rectus Abdominis.

Origin: Tendinous from the fore and upper part of the Symphysis of the Ossa Pubis;—it soon becomes Fleishy, and runs upwards in form of a flat band, the whole length of, and parallel to, the Linea Alba.

In its course it is divided by three Tendinous intersections, at and above the Umbilicus; and there is generally a half-intersection below it.

These seldom penetrate through the whole thickness of its substance; they adhere firmly to the anterior part of the sheath which incloses the Muscle, but slightly to the posterior Layer.

Insertion: Into the Cartilages of the three inferior True Ribs and extremity of the Sternum; it frequently intermixes with the under edge of the large Pectoral Muscle.

Action: To compress the fore-part of the Abdomen, to draw down the Ribs in Expiration, and to bend the Body forwards, or to raise the Pelvis. By means of its Sheath and Tendinous intersections, it is kept in its place, and allowed to act more equally.

Pyramidalis.

Origin: By a broad Base, from the upper part of the Symphysis of the Ossa Pubis;—It runs upwards within the same Sheath with the Rectus, and tapering to a point in its ascent, it has its

Insertion between the Pubis and Umbilicus in the Linea Alba, and inner edge of the Rectus Muscle.

Action: To assist the under part of the Rectus in drawing down the Ribs, or in compressing the under part of the Abdomen.

It is frequently wanting in both sides, and then the under end of the Rectus is larger, as if to supply its place.

MUSCLES of the MALE PARTS of GENERATION and ANUS.

CREMASTER.

Origin: From the under edge of the internal oblique Muscle of the Abdomen: Passing through the Ring of the External oblique, it surrounds the Spermatic Cord as far as the Testicle; there the Fibres separate and expand, and have their

Insertion into the Tunica Vaginalis Testis, and Cellular substance of the Scrotum.

Action: To suspend and elevate, and to compress and evacuate the Testicle.

Erector Penis, or Ischio-Cavernosus.

Origin: Tendinous, from the inner side of the Tuberosity of the Os Ischium;—it runs upwards, fleshy, increasing in breadth, and embracing the whole Crus of the Penis.

Insertion: By a thin Tendon, into the elastic Membrane which covers the Corpora Cavernosa Penis, as far up as the union of the Crura.

Action: To compress the Crus Penis, and push the Blood from it into the fore-part of the Corpora Cavernosa, in the time of its distention. It is likewise supposed by some to give a proper direction to the Penis.

Accelerator Urinae, or Ejaculator Seminis.

Origin: Fleshy, from the Sphincter Ani, and membranous part of the Urethra, and Tendinous, from the Crus and beginning of the Corpus Cavernosum Penis.—In its course, it forms a thin Fleshy Layer, the inferior Fibres of which run more transversely than the

superior, which descend in an oblique direction, the Muscles on the opposite sides completely inclosing the Bulb of the Urethra.

Insertion : Into its fellow, by a Tendinous line running longitudinally on the middle of the Bulb.

Action : To propel the Urine or Semen forwards ; and by the compressing the Bulb, to push the Blood into, and thereby distend the Corpus Caverosum Urethrae, and glans of the Penis.

Transversus Perinei, or Transversalis Urethrae.

Origin : From the inside of the tuberosity of the Os Ischium, close to the Erector Penis ; running across, it has its

Insertion into the back-part of the Accelerator Urinae, and adjoining part of the Sphincter Ani.

Action : To dilate the Bulb for the reception of the Semen or Urine ; or it may also assist the Levator Ani in retracting the Anus, after the discharge of the Faeces.

There is frequently another Muscle, termed *Transversalis Perinei Alter*, running along with the former, and having the same Origin, Insertion, and Action, but going more obliquely upwards.

Sphincter Ani.

Origin : From the extremity of the Os Coccygis.— It runs forwards within the skin and fat which cover the verge of the Anus, and in its passage forms a broad, flat, oval Muscle, which surrounds the extremity of the Intestinum Rectum.

Insertion : By a narrow point, into the Acceleratores Urinae and Transversi Perinei.

Action : To shut the Anus, and also to pull down the Bulb of the Urethra, by which it may assist in throwing out the Urine and Semen.

The *Sphincter Internus* of some authors, is merely the circular Muscular Coat of the end of the Rectum.

Levator Ani.

Origin : By a semi-circular edge, from the Os Pubis, within the Pelvis, at the upper edge of the Foramen Thyroideum ; from the Aponeurosis which covers the

Obturator Internus and Coccygeus Muscles ; and from the Spinous Process of the Os Ischium —Its Fibres descend like rays from a circumference, to meet those of its fellow, and with it to form a kind of inverted funnel.

Insertion : Into the Sphincter Ani, Accelerator Urinæ, and under and fore-part of the Os Coccygis. It surrounds the extremity of the Rectum, neck of the bladder, Prostate Gland, and part of the Vesiculæ Seminales.

Action : To support the contents of the Pelvis, to retract the end of the Rectum, after the evacuation of the Fæces, to assist in the evacuation of the Rectum and Bladder, of the Vesiculæ Seminales and Prostrate Gland.—It is likewise considered by some as a principal agent in the distention of the Penis, by pressing upon its Veins.

MUSCLES of the FEMALE PARTS of GENERATION and ANUS.

ERECTOR CLITORIDIS.

The same as the Erector Penis in the Male, but smaller.

Insertion : In the same manner, into the Crus and Body of the Clitoris.

Sphincter Vagina.

Origin : From the Sphincter Ani, and from the posterior side of the Vagina, near the Perineum.—It passes along the outer end of the Vagina, covers the Corpus Caverosum Vaginæ, and going behind the Nymphæ, it has its

Insertion into the union of the Crura Clitoridis.

Action : To contract the external Orifice of the Vagina, by compressing its Corpus Caverosum, from which last it likewise pushes the Blood into the Nymphæ and Clitoris.

Transversus Perinei.

Origin : As in the Male.

Insertion : Into the upper part of the Sphincter Ani, and into a tough white substance in the Perineum.

Action : Upon the Perineum and Anus, as in the Male.

Sphincter Ani.

Origin and course, as in the Male.

Insertion : Into the tough white substance in the Perineum.

Action : To shut the Anus, and, by pulling down the Perineum, to assist in contracting the external Orifice of the Vagina.

Levator Ani.

Origin : As in the Male. In its descent, it embraces the inferior part of the Vagina and Rectum.

Insertion : Into the Perineum, Sphincter Ani, extremity of the Vagina, and Rectum.

Action : Upon the Bladder and Rectum, as in the Male. It also assists in supporting and contracting the Vagina, and may, by pressing upon the Veins, contribute to the distention of the Cells of the Clitoris and Corpus Caverosum Vaginæ.



MUSCLES of the Os COCCYGIS.

COCCYGEUS.

Origin : By a narrow point, from the Spinous Process of the Os Ischium.—In its passage, it gradually expands, and covers the inside of the posterior Sacro-Ischiatic Ligament.

Insertion : Into the whole length of the side of the Os Coccygis.

Action : To move the Os Coccygis forwards, by which it must assist the Levator Ani in supporting or raising the end of the Rectum.



MUSCLES situated within the CAVITY of the ABDOMEN.

DIAPHRAGMA.

The Diaphragm forms a Flethy and Tendinous Partition, which separates the Cavity of the Abdomen from that of the Thorax, and is perforated by several Holes,

for the passage of Vessels and Nerves which go into, or out from the Abdomen. It is concave below, and convex above, the middle of it reaching as high within the Thorax, as the fourth pair of Ribs. Above, it is covered by the Pleura; and below, by the Peritoneum; and is commonly divided into two portions, called Superior and Inferior Muscles of the Diaphragm.

Superior, or Greater Muscles of the Diaphragm.

Origin: By Fleshy indentations, from the Catilago Ensiformis, and from the Cartilages of the seventh, and of all the inferior Ribs on both sides. From these different Origins, the Fibres run in a radiated manner, and have their

Insertion into a Cordiform Tendon, placed in the middle of the Diaphragm, and in which the Fibres of the opposite sides are interlaced.—Towards the right side, the Tendon is perforated by a triangular hole for the passage of the Vena Cava Inferior; and to the upper convex part of it, the Pericardium and Mediastinum are connected.

Inferior, or Lesser Muscle, or Appendix of the Diaphragm.

Origin: By four pair of Heads, of which one pair in the middle commonly called its Long or Tendinous *Crura*, is the longest. The long *Crura* arise from the fore-part of the fourth Lumbar Vertebra, and adhere to the bodies of all the Vertebrae of the Loins above this, by the intervention of the common Ligament covering these Bones. In their ascent, they leave an oval opening for the passage of the Aorta and Thoracic Duct. The other Heads arise from the third, and also from the second Lumbar Vertebra, and are placed farther out. From the different Heads the Muscular Fibres run upwards, and form in the middle, two Fleshy Columns, or *Crura*, which decussate, and leave an opening for the passage of the Esophagus.

Insertion: By strong Fleshy Fibres, into the posterior edge of the Cordiform, or middle Tendon.

Action: To enlarge the Cavity of the Thorax in inspiration, by its Fleshy part contracting, and bringing

its two sides down from a convex to a plane Surface, the Abdominal Muscles at the same time yielding, but the Tendinous part of the Diaphragm remaining nearly in the same situation. In expiration, the Diaphragm is replaced, chiefly by the action of the Abdominal Muscles. It is the antagonist of the Abdominal Muscles in inspiration, but acts in concert with them in dejection and vomiting.

Quadratus Lumborum.

Origin : Broad, Tendinous, and Fleshy, from the posterior half of the Spine of the Os Ilium, and from a Ligament extended between it and the transverse Process of the last Lumbar Vertebra.

Insertion : Into the transverse Processes of all the Lumbar Vertebrae ; into the last Rib, near the Spine ; and, by a small Tendon, into the side of the last Dorsal Vertebra.

Action : To move the Loins to one side, pull down the last Rib, and, when both act, to bend the Loins forwards.

Psoas Parvus.

Origin : Fleshy, from the last Vertebra of the back, and one or two upper Vertebrae of the Loins. It sends off a slender Tendon which runs down by the inner side of the Psoas Magnus, and an Aponeurosis which expands upon the neighbouring Muscles.

Insertion : Into the brim of the Pelvis, at the joining of the Os Ilium and Pubis.

Action : To assist in bending the Spine upon the Pelvis, or in raising the Pelvis.

This Muscle is frequently wanting.

Psoas Magnus.

Origin : From the side of the Bodies, and from the transverse Processes of the last Dorsal, and all the Lumbar Vertebrae, by an equal number of Fleshy Slips, which, uniting, form a thick strong Muscle, bounding the upper part of the side of the Pelvis, and passing down over the Os Pubis, behind Poupart's Ligament.

Insertion : Tendinous and Fleshy, into the Trochanter Minor, and part of the Body of the Os Femoris.

Action : To bend the Thigh, and turn it a little outwards, or, when the Inferior Extremity is fixed, to assist in bending the Body.

Iliacus Internus.

Origin : Fleſhy, from the tranſverſe Proceſs of the laſt Lumbar Vertebrae ; from all the inner edge of the Spine of the Os Ilium ; from the edge of that Bone, between its anterior ſuperior Spinous Proceſs and the Acetabulum ; and from moſt of the hollow part of the Os Ilium.—It joins the Pſoas Magnus, where it begins to become Tendinous on the Os Pubis.

Insertion : Along with the Pſoas Magnus.

Action : To aſſiſt the Pſoas in bending the Thigh.



MUSCLES *situated upon the ANTERIOR PART of the THORAX.*

PECTORALIS MAJOR, OR PECTORALIS.

Origin : From the Sternal half of the Clavicle ; from the edge of the Sternum, where it is connected with its fellow ; and from the Cartilages of the fifth and ſixth Ribs, where it mixes with the Obliquus Externus : The Fibres from thence converge towards the Axilla, where they decuſſate, and ſend off a flat twisted Tendon, which has its

Insertion Into the Ridge at the outer edge of the Groove for lodging the Tendon of the long head of the Biceps.

Action : To draw the arm towards the Sternum.

Pectoralis Minor, Or Serratus Minor Anticus.

Origin : Tendinous and Fleſhy, from the third, fourth and fifth Ribs, near their Cartilages : Paſſing obliquely outwards, it becomes gradually narrower.

Insertion : Tendinous into the point of the Coracoid-Proceſs of the Scapula.

Action : To bring the Scapula downwards and forwards, or to raiſe the Ribs.

Subclavius.

Origin: Tendinous, from the Cartilage of the first Rib. It soon becomes Fleshy, and runs outwards, under the Clavicle, increasing in breadth.

Insertion: Into the under Surface of the Clavicle, from near its head, as far outwards as the Coracoid Process of the Scapula.

Action: To pull the Clavicle, and with it the Scapula, downwards and forwards.

Serratus Magnus, Or Serratus Major Anticus.

Origin: From the nine superior Ribs, by an equal number of Fleshy digitations. It runs obliquely upwards and backwards upon the side of the Thorax, and between it and the Scapula.

Insertion: Fleshy, into the whole length of the Base of the Scapula, and in a manner folded round it, between the insertion of the Rhomboid and the Origin of the Subscapularis Muscles.

Action: To move the Scapula forwards or downwards according to the direction of its different digitations, and, when the Scapula is forcibly raised, to assist in dilating the Thorax, by raising the Ribs.



MUSCLES *situated between the RIBS, and within the THORAX.*

INTERCOSTALES EXTERNI.

Origin: From the under edge of each superior Rib. They run obliquely downwards and forwards, from the Spine to the joining of the Ribs with their Cartilages, from which, to the Sternum, they are discontinued, that place being occupied by an Aponeurosis.

Insertion: Into the upper edge of each inferior Rib. Portions of the External Intercostals, which arise from the transverse Processes of the Vertebrae, and terminate in the Ribs immediately below, are termed, by ALBINUS, *Levatores Costarum Breviores*—Other portions, which arise in the same manner, but pass

over one Rib, and terminate in the next below it, are named, by the same author, *Levatores Costarum Longiores*.

Intercostales Interni.

Origin: The same with that of the External; but they begin at the Sternum, and run downwards and backwards, decussating the former Muscles like the strokes of the letter X, and continuing as far as the angle of the Ribs, from which to the Spine they are wanting.

Insertion: In the same manner as the External.

Portions of the Internal Intercostals, near the under part of the Thorax, which pass over one Rib, and terminate in the next below it, are called, by DOUGLASS, *Costarum Depressores Proprii*.

Action of the Internal, as well as of the External Intercostals -- To enlarge the Cavity of the Thorax, by elevating the Ribs in the Time of inspiration; and the obliquity of the one set balancing that of the other, allows them to be raised more immediately upwards.

From the obliquity of their Fibres, they are found to possess a greater power to raise the Ribs, than Fibres going in a perpendicular direction.

The External Intercostals cease near the Sternum, and the Internal near the Spine, to admit the ready motion of the Ribs; for had the former been continued to the Sternum, and the latter to the Spine, the parts of these Muscles supposed to be thus fixed, would of course have become antagonists to the rest.

The portions called *Levatores* and *Depressores Costarum* assist in raising the Ribs, in the same manner as the rest of the Intercostales.

Sterno-Costalis, or Triangularis Sterni.

Origin: From the edges of the Cartilago Ensiformis, and lower half of the middle Bone of the Sternum, within the Thorax. It runs upwards and outwards, behind the Cartilages of the Ribs.

Insertion: Generally by three angular terminations, into the Cartilages of the third, fourth, and fifth Ribs, and sometimes, also, by a fourth termination into the Cartilage of the second or sixth Rib, near where they join the Osseous part of the Ribs.

Action: To depress the Ribs into which they are fixed, and, of consequence, assist in contracting the Cavity of the Thorax during Expiration.

MUSCLES situated on the ANTERIOR PART of the VERTEBRÆ of the NECK.

Longus Colli.

Origin: From the side of the Bodies of the three superior Vertebræ of the Back, and from the transverse Processes of the four inferior Vertebræ of the Neck.

Insertion: Into the fore-part of the Bodies of all the Vertebræ of the Neck, by as many small Tendons, which are covered with Flesh.

Action: It bends the Neck forwards and to one side, or when both Muscles act, they immediately bend the Neck.

Rectus Capitis Anterior Major, or Rectus Anterior Longus.

Origin: From the transverse Processes of the third, fourth, fifth, and sixth Vertebræ of the Neck. It runs upwards, and a little inwards, covering the outer edge of the Longus Colli.

Insertion: Into the Cuneiform Process of the Occipital Bone, near its joining with the Os Sphenoides.

Action: To bend the Head forward.

Rectus Capitis Anterior Minor, or Rectus Anterior Minor.

Origin: From the fore-part of the Atlas, opposite to its superior Oblique Process. It runs obliquely inwards behind, and a little to the outside of the former Muscle.

Insertion: Into the Cuneiform Process of the Occipital Bone, immediately before the Condyles.

Action: To assist the Rectus Major.

Rectus Capitis Lateralis.

Origin: From the anterior part of the Transverse Process of the Atlas.—It goes obliquely outwards.

Insertion : Into the Occipital Bone, immediately behind the Jugular Fossa.

Action : To incline the head a little to one side.



MUSCLES *situated upon the* POSTERIOR PART *of* the TRUNK.

Trapezius, or Cucullaris.

Origin : From the middle of the great arched Ridge of the Occipital Bone ; from its fellow, over the Spinous Processes of the Cervical Vertebræ, by the intervention of a strong Tendon, called *Ligamentum Nuchæ*, or *Colli* ; from the Spinous Processes of the two inferior Vertebræ of the Neck ; and from all those of the back, adhering Tendinous to its fellow the whole length of its Origin.

Insertion : Into the Scapular half of the Clavicle, into the Acromion, and into the Spine of the Scapula.

Action : To move the Clavicle and Scapula, according to the directions of its different Fibres. The superior Fibres, descending, raise the Shoulder ; the middle, running transversely, pull it backwards ; and the inferior Fibres, ascending, depress it. The whole acting together, bring it immediately back.—When the Scapula is fixed, the Muscle must assist in moving the Head backwards.

Latissimus Dorsi.

Origin : By a broad Tendinous expansion, from the posterior part of the Spine of the Os Ilium ; from all the Spinous Processes of the Vertebræ, extending between the bottom of the Os Sacrum and sixth Vertebra of the back ; and, by three or four Tendinous or Fleishy Slips, from an equal number of inferior Ribs. The Tendon by degrees changes into a Muscle of great breadth, the inferior Fibres of which run upwards and outwards, and the superior run transversely over the inferior angle of the Scapula, receiving a small Slip from it in their way to the Axilla where they are collected, twisted, and folded, like those of the Pectoral Muscle.

Insertion: By a strong thin Tendon, into the inner edge of the Groove for lodging the Tendon, of the long head of the Biceps Muscle.

Action: To pull the Arm downwards and backwards, and to roll the Os Humeri inwards, by which the Palm of the hand is made to face backwards. When the largest Pectoral Muscle acts at the same time with this one, the Arm is brought immediately down towards the Trunk.

The Latissimus Dorsi and Pectoralis Major form the Arm-Pit, in which the great Vessels and Nerves, and likewise the Glands, lie, which belong to the Arm.

Serratus Posticus Inferior.

Origin: By the same common Tendon with the Latissimus Dorsi, from the two inferior Vertebrae of the Back, and from the three superior of the Loins.

Insertion: By four Fleshy Slips; into the same number of Ribs near their Cartilages.

Action: To depress the Ribs into which it is inserted, and thereby assist in contracting the Cavity of the Thorax in the Time of Expiration.

Rhomboideus.

Origin: Tendinous, from the Spinous Processes of the four or five superior Vertebrae of the Back;—from the three inferior of the Neck, and from the Ligamentum Nuchae.—It descends obliquely, and has its

Insertion into the whole length of the Base of the Scapula.

Action: To draw the Scapula upwards and backwards.

This Muscle is frequently divided by an indistinct line into two unequal portions: The part arising from the Vertebrae of the Back, and fixed to the Base of the Scapula, under the Spine, is commonly called *Rhomboides Major*, and the other part of the Muscle, *Rhomboides Minor*.

Splenius.

Origin: Tendinous, from the four superior Spinous Processes of the Vertebrae of the Back;—Tendinous and Fleshy, from the five inferior of the Neck: It adheres firmly to the Ligamentum Nuchae. At the third

Vertebra of the Neck, it recedes from its fellow, so that that part of the Complexus Muscle is seen.

Insertion: By as many Tendons, into the five superior transverse Processes of the Vertebrae of the Neck; and Tendinous and Fleshy, into the posterior part of the Mastoid Process, and into the Os Occipitis, where it joins with that Process.

Action: To antagonize the Sterno-Mastoidens, by bringing the Head, and upper Vertebrae of the Neck, obliquely backwards and to one side. When the Splenii act together, they draw the Head directly backwards.

This Muscle is divided by ALBINUS into *Splenius Capitis*, or that which arises from the Neck, and goes to the Head; and *Splenius Colli*, or that which arises from the Back, and is fixed to the Neck.

Serratus Posticus Superior.

Origin: By a broad thin Tendon, from the Ligamentum Nuchæ, over the Spinous Processes of the three last Vertebrae of the Neck, and from the two uppermost of the Back. It goes obliquely downwards.

Insertion: By four Fleshy Slips into the second, third, fourth, and fifth Ribs, under the upper and back-part of the Scapula.

Action: To elevate the Ribs, and dilate the Thorax in inspiration.

Sacro-Lumbalis.

Origin: In common with the Longissimus Dorsi, Tendinous without, and Fleshy within, from the side, and all the Spinous Processes of the Os Sacrum; from the posterior part of the Spine of the Os Ilium; from all the Spinous Processes and Transverse Processes of the Vertebrae of the Loins. The common head fills up the space between the Os Ilium and Os Sacrum, and also the hollow of the Loins. At the under part of the Thorax, the Muscle begins to send off Tendons, which lie flat upon the Ribs, and become gradually longer the nearer they are to the Spine.

Insertion: Into the angles of all the Ribs, by an equal number of Tendons.

From the sixth or eighth lower Ribs arise an equal

number of *Fleshy Portions*, which terminate in the inner side of this Muscle, and get the name of *Musculi Accessorii*, or *Additamentum ad Sacro-Lumbalem*.

Action : To assist in raising and keeping the Trunk of the Body erect. It also assists the *Serratus Inferior*, and *Quadratus Lumborum*, in depressing the Ribs.

From the upper part of this Muscle, a *Fleshy Slip* called *Cervicalis Descendens*. runs up to be fixed to the transverse Processes of the fourth, fifth and sixth *Vertebræ* of the Neck, by three distinct Tendons. When it acts, it turns the Neck obliquely backwards and to one side.

Longissimus Dorsi.

Origin : In common with the *Sacro-Lumbalis*. It forms a large, thick, and strong Muscle, which fills the hollow between the Spine and angles of the Ribs, and which, becoming gradually smaller in its ascent, has its

Insertion into all the transverse Processes of the *Vertebræ* of the Back, chiefly by small double Tendons; and, by a *Tendinous and Fleshy Slip*, into the lower edge of each of the Ribs, excepting the two inferior, near their Tubercles.

From the upper part of this Muscle, a round *Fleshy Slip* runs up to join the *Cervicalis Descendens*.

Action : To extend the Trunk, and keep it erect.

Complexus.

Origin : By distinct Tendons, from the transverse Processes of the seven superior *Vertebræ* of the Back, and four inferior of the Neck; and by a *Fleshy Slip*, from the *Spinous Process* of the first *Vertebra* of the Back. In its passage upwards, it is intermixed with *Tendinous and Fleshy parts*.

Insertion : Into a depression, under the large arched Ridge of the *Occipital Bone*.

The long portion of this Muscle, which lies next the *Spinous Processes*, is more loose than the rest, and has a roundish Tendon in the middle of it, with a *Fleshy Belly* at each end, on which account it is called, by ALBINUS, *Biventer Cervicis*.

Action : To draw the Head backwards, and to one side; and when both act, to draw the Head directly backwards.

Trachelo-Mastoideus ;

It is likewise called *Complexus Minor*, or *Mastoideus Lateralis*.

Origin: From the transverse Processes of the three uppermost Vertebrae of the Back, and five lowest of the Neck, where it is connected to the *Transversalis Cervicis* by as many thin Tendons, which unite into a slender belly, and run up under the *Splenius*.

Insertion: Into the posterior margin of the Mastoid Process by a thin Tendon.

Action: To assist the *Complexus*; but it pulls the Head more to a side.

Levator Scapulae or Levator Proprius, or Musculus Patientiae.

Origin: From the transverse Processes of the five superior Vertebrae of the Neck, by the same number of distinct heads, which soon unite to form a flat Muscle, which runs downwards and outwards.

Insertion: Into the superior angle of the Scapula.

Action: To pull the Scapula upwards and a little forwards, as in shrugging the shoulder; and, when the Scapula is fixed, the Muscle may act upon the Neck.

Semi-Spinalis Dorsi, or Transverso-Spinalis Dorsi.

Origin: From the transverse Processes of the seventh, eighth, ninth, and tenth Vertebrae of the Back, by as many distinct Tendons, which soon grow fleshy, and then become Tendinous again.

Insertion: Into the Spinous Processes of the six or seven uppermost Vertebrae of the Back, and two lower of the Neck, by as many Tendons.

Action: To extend the Spine obliquely backwards.

Spinalis Dorsi.

Origin: By five Tendinous Slips, from the Spinous Processes of the two upper Vertebrae of the Loins, and the three lower of the Back — In its ascent, it is incorporated with the *Longissimus Dorsi*, and has its

Insertion into the Spinous Processes of the eight or

nine uppermost Vertebrae of the Back, excepting the first, by as many Tendons.

Action : To fix the Vertebrae, and to assist in extending the Trunk, and keeping it erect.

Multifidus Spinae.

Formerly Transverso-Spinalis Lumborum, Transverso-Spinalis Dorsi, and Transverso-Spinalis Colli.

Origin : From the side, and Spinous Processes of the Os Sacrum, and from that part of the Os Ilium which joins with the Sacrum ; from all the oblique and transverse Processes of the Vertebra of the Loins ; from all the transverse Processes of the Vertebra of the Back, and of the four inferior of the Neck, by as many distinct Tendons, which soon become Fleshy, and run obliquely upwards and inwards.

Insertion : By distinct Tendons, into all the Spinous Processes of the Vertebra of the Loins, Back, and Neck, excepting the Atlas.

Action : To extend the Spine obliquely, and pull it to a side. When both Muscles act, they draw the Spine directly backwards.

Semi-Spinalis Colli, or Transverso-Spinalis Colli.

Origin : From the transverse Process of the six uppermost Vertebrae of the Back, by as many distinct Tendons, which run obliquely under the Complexus.

Insertion : Into the Spinous Process of all the Vertebrae of the Neck, except the first and last.

Action : To extend the Neck obliquely backwards and to a side.

Transversalis Colli.

Origin : From the transverse Process of the Vertebrae of the Back, by the same number of Tendinous and Fleshy Slips : It runs between the Trachelo-Mastoides, Splenius Colli, and Cervicalis Descendens.

Insertion : Into the transverse Processes of all the Cervical Vertebrae, except the first and last.

Action : To turn the Neck obliquely backwards, and a little to one side.

Rectus Capitis Posticus Minor, or Rectus Minor.

Origin : Tendinous, close to its fellow, from a small Protuberance which is in place of the Spinous Process of the first Vertebra of the Neck. It spreads out in its ascent, and has its

Insertion, Fleishy, in a depression between the smaller Arch and Foramen Magnum of the Occipital Bone.

Action : To assist the following Muscle in drawing the Head backwards.

Rectus Capitis Posticus Major, or Rectus Major.

Origin : Fleishy from the external part of the Spinous Process of the second Vertebra of the Neck. It becomes gradually broader, and goes obliquely upwards and outwards.

Insertion. Tendinous and Fleishy, into the Os Occipitis, at the outside of the insertion of the Rectus Minor, part of which it conveys and conceals.

Action : To pull the Head backwards, and to assist a little in its rotation.

Obliquus Capitis Inferior.

Origin : Fleishy, from the Spinous Process of the second Vertebra of the Neck, at the outside of the Rectus Major. It forms a thick belly, which runs upwards and outwards.

Insertion : Into the transverse Process of the first Vertebra of the Neck.

Action : To roll the Head.

Obliquus Capitis Superior.

Origin : From the transverse Process of the first Vertebra of the Neck. It passes upwards and a little inwards.

Insertion : Into the Occipital Bone, at the outer part of the insertion of the Rectus Major.

Action : To assist in drawing the head backwards.

Scalenus Anticus.

Origin : Tendinous and Fleishy, from the upper part of the first Rib, near its Cartilage.

Insertion : Into the transverse Processes of the fourth, fifth, and sixth Vertebræ of the Neck, by as many Tendons.

Scalenus Medius.

Origin : From the upper and outer part of the first Rib, from its Root to near its Cartilage.

Insertion : Into the transverse Processes of all the Vertebræ of the Neck, by as many strong Tendons

The Subclavian artery, and Nerves which form the Blachial Plexus, pass between this and the former Muscle.

Scalenus Posticus.

Origin : From the upper edge of the second Rib, near the Spine

Insertion : Into the transverse Processes of the fifth and sixth Vertebræ of the Neck.

Action of the three Scaleni : To bend the Neck to one side ; or, when the Neck is fixed, to raise the Ribs, and dilate the Thorax.

Interspinales Colli.

The spaces between the Spinous Processes of the Vertebræ of the Neck, most of which are forked, are occupied by double Fleшы Portions, which have their

Origin from each inferior Spinous Process, and their *Insertion* into each superior.

Action : To draw these Processes nearer to each other, and of consequence the Neck a little backwards.

Intertransversales Colli.

The spaces between all the transverse Processes of the Vertebræ of the Neck, which are also forked, are filled up in like manner with double Fleшы Portions.

Action : To draw these Processes towards each other, and turn the Neck a little to one side.

Interspinales and Intertransversales Dorsi,

Are rather small Tendons than Muscles, serving to connect the Spinal and Transverse Processes.

Interspinales Lumborum.

Are of the same nature with the Interspinales and Intertransversales Dorsi.

Intertransversales Lumborum,

Are five distinct Muscles which occupy the space between the transverse Processes of the last Dorsal and all the Lumbar Vertebrae, and serve to draw them a little towards each other.



MUSCLES

OF THE

SUPERIOR EXTREMITY.



MUSCLES arising from the SCAPULA.

SUPRA-SPINATUS.

Origin: Fleishy, from all the Fossa Supra-Spinata of the Scapula, and from the Spine and superior Costa. It passes under the Acromion, adhering to the Capsular Ligament of the joint.

Insertion: Tendinous, into the large Tubercle on the head of the Os Humeri.

Action: To raise the Arm, and at the same time to pull the Capsular Ligament from between the Bones, to prevent it from being pinched.

Infra-Spinatus.

Origin: Fleishy, from all that part of the Dorsum of the Scapula which is below its Spine; and from the Spine itself, as far as the Cervix of the Scapula. The Fibres run obliquely towards a Tendon in the middle of the Muscle, which runs forwards, and adheres to the Capsular Ligament.

Insertion: By a flat thick Tendon, into the upper and posterior part of the large Protuberance on the head of the Os Humeri.

Action: To roll the Os Humeri outwards; to assist

in raising, and in supporting it when raised; and to pull the Ligament from between the Bones.

These two Muscles are covered by an Aponeurosis, from which many of their Flešhy Fibres arise.

Teres Minor.

Origin: Flešhy, from the inferior Costa of the Scapula. It ascends along the inferior edge of the Infra-Spinata, adheres to the Capsular Ligament, and has its *Insertion*, Tendinous, into the back-part of the large Protuberance on the head of the Os Humeri, a little below the Infra-Spinatus.

Action: To roll the Os Humeri outwards, and draw it backwards, and to prevent the Ligament from being pinched between the Bones.

Teres Major.

Origin: Flešhy, from the Dorsal side of the inferior angle of the Scapula, and from a small part of its inferior Costa. It is situated at the under part of the Teres Minor, and sends off a broad flat Tendon, which accompanies the Tendon, of the Latissimus Dorsi, and, like it, has its

Insertion into the Ridge at the inner side of the Groove for lodging the Tendon of the long Head of the Biceps Muscle.

Action: To roll the Humerus inwards, and draw it backwards and downwards.

Deltoides.

Origin: Flešhy, from all the outer part of the Clavicle, which is not occupied by the Pectoralis Major, and is separated from it by a small Fissure; Tendinous and Flešhy from the Acromion, and lower Margin of almost the whole Spine of the Scapula opposite to the insertion of the Trapezium.

From these Origins it runs, under the appearance of three Muscles going in different directions, and separated from each other by slight Fissures; viz. from the Clavicle outwards, from the Acromion downwards, and from the Spine of the Scapula forwards; and is composed of a number of Fasciculi, forming a strong Flešhy Muscle, which covers the Joint of the Os Humeri.

Insertion : By a short and strong Tendon, into a rough Surface, on the outer side of the Os Humeri, near its middle, where the fibres of this Muscle intermix with part of Brachialis Externus.

Action : To pull the arm directly outwards and upwards, and a little forwards or backwards, according to the different directions of its Fibres.

Coraco Brachialis.

Origin : Tendinous and Fleshy, from the fore-part of the Coracoid Process of the Scapula, in common with the short head of the Biceps Muscle, to which it adheres through the greater part of its length

Insertion : Tendinous and Fleshy, into the internal part of the Os Humeri, near its middle, where it sends down an Aponeurosis to the internal Condyle of the Os Humeri.

Action : To bring the Arm obliquely upwards and forwards.

Subscapularis.

Origin : Fleshy, from the three Costæ, and whole inner Surface of the Scapula. It is composed of a number of Tendinous and Fleshy portions, which run in a radiated manner, and make prints on the Bone. In its passage outwards, it adheres to the Capsular Ligament of the Joint, and has its

Insertion, Tendinous, into the upper part of the Internal Protuberance, at the head of the Os Humeri.

Action : To roll the Arm inwards, draw it to the side of the Body, and to prevent the Capsular Ligament from being pinched.



MUSCLES chiefly situated on the ARM, serving for the MOTIONS of the FORE-ARM.

APONEUROSIS OF THE SUPERIOR EXTREMITY.

The greater part of the Superior Extremity is covered by a Tendinous Membrane, or Aponeurosis, which arises from the Bones of, and Muscles on, the Shoulder. On the Humerus, it incloses the Flexor and Extensor

Muscles of the Fore-Arm, and is connected to the Ridges and Condyles at the under end of the Os Humeri.

At the bending of the Elbow, it receives considerable additions from the Tendons of the Biceps and Triiceps Muscles of the Fore-Arm, where the Fibres from the opposite sides decussate each other. It becomes thicker and stronger on the Fore-Arm, and forms a firm covering to the Muscles there. In its descent, it gives off partitions among the Muscles, and these are fixed to the Radius and Ulna, the Membrane itself being lost insensibly upon the Hand. It is thicker and stronger on the outer than upon the inner side of the Extremity, particularly on the Fore-Arm, at the under and back-part of which it forms a thick and strong band, which, running transversely, gets the name of *Ligamentum Carpi Annulare Posterius*.

The use of this Aponeurosis is, like that in other parts of the Body, it braces the Muscles, by keeping them in their proper place while in action, and gives origin to many of the Muscular Fibres which lie immediately under it.

Biceps Flexor Cubiti, or Biceps.

Origin : By two heads ; the outer one, called its Long Head begins by a slender Tendon from the upper edge of the Glenoid Cavity of the Scapula, passes over the ball of the Os Humeri within the Joint, and, in its descent without the Joint, is inclosed in a Groove upon the upper and fore-part of the Bone, by a Ligament which proceeds from the Capsular one and the adjacent Tendons. The inner Head, called the short one, arises, Tendinous and Fleshy, from the Coracoid Process of the Scapula, in common with the Caraco-Brachialis Muscle. A little below the middle of the fore-part of the Os Humeri, the two Heads unite, and form a thick Fleshy Belly.

Insertion : By a strong roundish Tendon, into the Tubercle at the upper and inner part of the Radius, and by a Tendinous expansion into the Aponeurosis of the Fore-Arm, which it likewise assists in forming.

Action : To bend the Fore-Arm, and to assist the Supinator Muscles in rolling the Radius outwards, and

of consequence turning the Palm of the Hand upwards.

Brachialis Internus.

Origin : Fleshy, from the middle of the Os Humeri or Brachii, at each side of the Deltoides, covering all, and attached to most of the under and fore-part of the Bone : it runs over the Joint, adhering firmly to the Capsular Ligament.

Insertion : By a strong short Tendon, into the Coronoid Process of the Ulna.

Action : To Bend the Fore-Arm, and to prevent the Ligament of the Joint from being pinched.

Triceps Extensor Cubiti.

Origin : By three Heads ; the first, or *long* one, broad and Tendinous, from the inferior Costa of the Scapula, near its Cervix : The second, or *short* one, by an acute Tendinous, and Fleshy beginning, from the outer and back-part of the Os Humeri, a little below its Head : The third, called *Brachialis Externus*, arises, by an acute beginning, from the back-part of the Os Humeri, near the insertion of the Teres Major. The three Heads unite about the middle of the Humerus, and cover the whole posterior part of that Bone, adhering to it in their descent.

Insertion : Into the upper and outer part of the Olecranon of the Ulna, and partly into the Condyles of the Os Humeri, adhering firmly to the Ligament.

Action : To extend the Fore-Arm.

Anconeus.

Origin : Tendinous, from the posterior part of the external Condyle of the Os Humeri ; it soon becomes Fleshy, and part of its Flesh is likewise continued from the third Head of the Triceps. It descends under a triangular form, and has its

Insertion, Fleshy and thin, into a Ridge on the outer and posterior edge of the Ulna, and a little below the Olecranon.

Action : To assist the Triceps in extending the Fore-Arm.

MUSCLES on the FORE-ARM and HAND, SERVING for the
MOTIONS of the HAND and FINGERS

To prevent confusion in the application of the terms *Outer* and *Inner*, when the Muscles are described in the prone state of the Hand,—the Arm is here supposed to hang by the side of the Body, with the Palm turned forwards, so that the Radius and Thumb are upon the outer, and the Ulna and little finger upon the inner side.

Palmaris Longus.

Origin: Tendinous from the internal Condyle of the Os Humeri. It soon becomes Fleshy, and sends off a long slender Tendon, which has its

Insertion into the Ligamentum Carpi Annulare Anterioris and into the

Aponeurosis Palmaris, which begins at the Anterior Annular Ligament of the Wrist; and, after expanding and covering the greater part of the Palm of the Hand, is fixed to the roots of all the Fingers by an equal number of double slips.

Action of the Palmaris Muscle: To bend the Hand, and stretch the Aponeurosis Palmaris.

This Muscle is frequently wanting, but the Aponeurosis is always to be found.

Palmaris Brevis.

Origin: By small bundles of Fleshy Fibres, from the Ligamentum Carpi Annulare, and Aponeurosis Palmaris.

Insertion: Into the Skin and Fat which covers the Abductor Minimi Digiti, and into the Os Pisiforme.

Action: To assist in contracting the Palm of the Hand.

Flexor Carpi Radialis, or Radialis Internus.

Origin: Tendinous and Fleshy, from the inner Condyle of the Os Humeri, and from the fore and upper part of the Ulna, between the Pronator Radii Teres and Flexor Sublimis, to which it firmly adheres. It forms a long Tendon, which passes down near the Radius, goes through a Fossa in the Os Trapezium, and becomes flat at its under extremity.

Insertion : Into the fore and upper part of the Metacarpal Bone which sustains the Fore-Finger.

Action : To bend the Wrist, and to assist in the pronation of the Hand.

Flexor Carpi Ulnaris, or Ulnaris Internus.

Origin : Tendinous, from the inner Condyle of the Os Humeri, and by a small Fleishy beginning, from the inner side of the Olecranon. It passes along the inner side of the Ulna, and originates from it for a considerable way down: A number of Fleishy Fibres likewise arise from the Aponeurosis of the Fore-Arm.

Insertion : By a strong Tendon, into the Os Pisiforme.

Action : To assist the former Muscle in beding the Wrist.

Extensor Carpi Radialis Longior, Or Radialis Externus Longior.

Origin : Broad, thin, and Fleishy, immediately below the Supinator Longus, from the Lower part of the Ridge of the Os Humeri, above its external Condyle. It sends off a long flat Tendon, which passes down, first upon the outer, and then upon the back-part of the Radius, descending in a Groove there, and going under the Annular Ligament of the Wrist.

Insertion : Into the upper, back, and outer part of the Metacarpal Bone of the Fore-Finger.

Action : To extend the Wrist, and bring the Hand backwards.

Extensor Carpi Radialis Brevior, Or Radialis Externus Brevior.

It is similar to the former Muscle, but its Fleishy Belly is placed farther down.

Origin : Tendinous, in common with the Extensor Longior, from the external Condyle of the Os Humeri, and from the Ligament which connects the Radius to it: Passing down upon the back-part of the Radius, its tendon goes under the Annular Ligament in the same channel with the Tendon of the Extensor Longior.

Insertion : Into the upper and back-part of the Metacarpal Bone of the Middle Finger.

Action : To assist the former Muscle in extending the Wrist ; or, with it and the Flexor Carpi Radialis, to draw the Hand to the side next the Thumb.

Extensor Carpi Ulnaris, or Ulnaris Externus.

Origin : Tendinous, from the external Condyle of the Os Humeri and in its progress, Fleshy, from the middle of the Ulna, where it passes over it.

Its round Tendon is enclosed by a Membranous Sheath, in a Groove at the back-part of the extremity of the Ulna.

Insertion : Into the posterior and upper part of the Metacarpal Bone of the Little Finger.

Action : To assist the two former Muscles in extending the Wrist ; or, with the assistance of the Flexor Ulnaris, it draws the Hand towards the side next the Little Finger.

Flexor Digitorum Sublimis, or Perforatus.

Origin : Tendinous and fleshy, from the internal Condyle of the Os Humeri ; Tendinous, from the root of the Coronoid Process of the Ulna ; and Membranous and Fleshy from the middle of the fore-part of the Radius. Its Fleshy Belly sends off four round Tendons before it passes under the Annular Ligament of the Wrist. In their course, they are connected to those of the following Muscle by fine Membranous Webs, and upon the Fingers they are inclosed in strong Tendinous Sheaths.

Insertion : Into the anterior and upper part of the second Phalanx, of the fingers, being near the under part of the first Phalanx, split and twisted to form a passage, and at the same time a kind of Sheath for the Tendons of the Flexor Profundus.

Action : To bend the second, and then the first Phalanx of the Fingers.

Flexor Digitorum Profundus, or Perforans.

Origin : Fleshy, from the external side and upper part of the Ulna, for some way downwards ; and from a large share of the Interosseous Ligament. It runs down behind the Flexor Sublimis, and, like it, splits into four Tendons, a little before it passes under the

Annular Ligament, and these pass through the slits in the Tendons of the Flexor Sublimis.

Insertion : Into the anterior and upper part of the third Phalanx of the Fingers.

Action : To bend the last Joint of the Fingers.

Lumbricales.

Origin : Thin and fleshy, from the outside of the Tendons of the Flexor Profundus, a little above the lower edge of the Annular Ligament of the Wrist. They send off long slender Tendons at the under ends of the Metacarpal Bones, which have their

Insertion into the outer side of the broad Tendons of the Interossei Muscles, about the middle of the first Phalanx.

Action : To bend the first Phalanx, and increase the Flexion of the Fingers while the long Flexors are in full action.

Extensor Digitorum Communis.

Origin : Tendinous and fleshy, from the external Condyle of the Os Humeri, where it adheres to the Supinator Radii Brevis. It passes down upon the back-part of the Fore-Arm, and before it goes under the posterior Annular Ligament of the Wrist, it splits into three or four Tendons, some of which may be divided into smaller ones.

Upon the back of the Metacarpal Bones, the Tendons become broad and flat, and near the Heads of the Metacarpal Bones send Aponeurotic expansions to each other.

Insertion : Into the posterior part of all the Bones of the four Fingers, by a Tendinous expansion.

Action : To extend all the Joints of the Fingers.

Supinator Radii Longus.

Origin : By an acute Fleshy beginning, from the Ridge of the Os Humeri, above the external Condyle, nearly as high as the middle of the Bone. It forms a thick Fleshy Belly, which covers the upper part of the Extensor Carpi Radialis Longior; and about the middle of the Fore-Arm sends a tapering Tendon along the edge of the Radius.

Insertion : Into the outer side of the under end of the Radius.

Action: To roll the Radius outwards, and of consequence to turn the Hand into a supine situation, or with the palm forwards.

Supinator Radii Brevis.

Origin: Tendinous, from the external Condyle of the Os Humeri; Tendinous and Fleshy, from the outer and upper part of the Ulna, and from the Interosseous Ligament. It passes over the external edge of the Radius, and has its

Insertion into the upper and fore-part of the Radius.

Action: To assist the Supinator Longus.

Pronator Radii Teres.

Origin: Fleshy, from the internal Condyle of the Os Humeri, and Tendinous from the Coronoid Process of the Ulna. It passes obliquely across the upper end of the Flexor Muscles of the Wrist, and is of a tapering form.

Insertion: Thin, Tendinous, and Fleshy, into the middle of the posterior part of the Radius.

Action: To roll the Radius inwards, by which it brings the Palm of the Hand backwards, or into a state of Pronation.

Pronator Radii Quadratus.

Origin: Broad, Tendinous, and Fleshy, from the under and inner part of the Ulna: The Fibres run transversely.

Insertion: Into the under and fore-part of the Radius.

Action: To assist the Pronator Teres.

Flexor Longus Pollicis Manus, Or Flexor Tertii Internodii.

Origin: By an acute Fleshy beginning, from the fore-part of the Radius and Interosseous Ligament, the Origin extending from the Tubercle of the Bone, as far as the Pronator Quadratus Muscle. It has frequently another Origin by a distinct Fleshy Slip, from the internal Condyle of the Os Humeri.

Insertion: Into the last joint of the Thumb, after passing its Tendon under the anterior Annular Ligament of the Wrist.

Action: To bend the last Joint of the Thumb.

Flexor Brevis Pollicis, Or Ule cor Secundi Internodii.

Origin: From the Os Trapezoides, Magnum, and Unciforme. It is divided into two portions, which form a Groove for the Tendon of the Flexor Longus Pollicis.

Insertion: Into the Ossa Sesamoidea, and Base of the first Bone of the Thumb.

Action: To bend the first Joint of the Thumb.

Opponens Pollicis, Or,

Flexor Ossis Metacarpi Pollicis, or Flexor Primi Internodii.

Origin: Fleshy, from the Os Trapezium and anterior Annular Ligament of the Wrist. It lies immediately under the Abductor Pollicis.

Insertion: Tendinous and Fleshy, into the under and fore-part of the Metacarpal Bone of the Thumb.

Action: To bring the Thumb inwards, so as to make it oppose the Fingers, from which circumstance it has derived its name.

Extensor Ossis Metacarpi Pollicis.

Origin: Fleshy, from the middle of the posterior part of the Ulna, Radius, and Interosseous Ligament. It runs obliquely over the Radius, sending one, or more, frequently two Tendons, through an Annular Sheath.

Insertion: Into the Os Trapezium, and upper and back-part of the Metacarpal Bone of the Thumb.

Action: To extend the Metacarpal Bone of the Thumb, and draw it from the Fingers.

Extensor Primi Internodii Pollicis, Or Extensor Minor.

Origin: Fleshy, from the back-part of the Ulna, and from the Interosseous Ligament, near the former Muscle, by the side of which it runs.

Insertion: Tendinous, into the posterior part of the first Bone of the Thumb: Part of it may be traced as far as the second Bone.

Action: To extend the first Joint of the Thumb.

Extensor Secundi Internodii, or Extensor Major.

Origin: By an acute, Tendinous, and Fleshy begin-

ning, from the middle of the back-part of the Ulna, and from the Interosseous Ligament: Its Tendon runs through a small Groove at the inner, and back-part of the Radius.

Insertion: Into the last Bone of the Thumb.

Action: To extend the last Joint of the Thumb.

Abductor Pollicis.

Origin: Broad, Tendinous, and Flešhy, from the Ligamentum Carpi Annulare, and from the Os Trapezium. It lies immediately under the Skin, and over the Opponens Muscle, and has a portion upon its inner side, which ALBINUS calls *Abductor Brevis Alter*.

Insertion: Tendinous, into the outer side of the root of the first Bone of the Thumb.

Action: To draw the Thumb from the Fingers.

Adductor Pollicis.

Origin: Flešhy, from almost the whole length of the Metacarpal Bone of the Middle-Finger: Going across the Metacarpal Bone of the Fore-Finger, its Fibres converge, and send off a short Tendon.

Insertion: Into the inner part of the root of the first Bone of the Thumb.

Action: To pull the Thumb towards the Fingers.

Indicator, or Extensor Indicis Proprius.

Origin: By an acute Flešhy beginning, from the middle of the posterior part of the Ulna, at the inner side of the Extensor Secundi Internodii Pollicis: Its Tendon passes under the same Ligament with the Extensor Digitorum Communis, with part of which it has its

Insertion into the posterior part of the Fore-Finger.

Action: To assist the common Extensor in extending all the Joints of this Finger, particularly in pointing at any thing.

Abductor Indicis.

Origin: From the Os Trapezium, and from the upper part and inner side of the Metacarpal Bone of the Thumb.

Insertion: By a short Tendon, into the outer and back-part of the first Bone of the Fore-finger.

Action: To bring the Fore-Finger towards the Thumb.

Abductor Minimi Digiti.

Origin : Fleſhy, from the Os Piſiforme, and from that part of the Ligamentum Carpi Annulare Anterius next it.

Insertion : Tendinous, into the inner ſide of the Baſe of the firſt Bone of the Little Finger

Action : To draw the Little Finger from the reſt.

Adductor Minimi Digiti, or Metacarpeus.

Origin : Fleſhy, from the hook like Proceſs of the Os Unciforme, and from that part of the anterior Annular Ligament of the Wriſt next it : Paſſing obliquely over the under end of the former Muſcle, it has its

Insertion : Tendinous, into the inner ſide, and anterior or under extremity of the Metacarpal Bone of the Little Finger.

Action : To bend the Metacarpal Bone, and bring this Finger towards the reſt.

Flexor Parvis Minimi Digiti.

Origin : Like that of the former Muſcle, but a little farther down, the belly of the Muſcle lying deeper.

Insertion : By a roundiſh Tendon, into the inner part of the Baſe of the firſt Bone of this Finger.

Action : To bend the little Finger, and aſſiſt the Adductor.

INTEROSSEI.

Origin : From the ſides of the Metacarpal Bones.— They fill up the ſpaces between theſe, and are ſomething ſimilar to the Lumbricales, but larger.

Insertion : By ſlender Tendons, along with thoſe of the Lumbricales, into the ſides of the Tendinous expansions of the Extensor Digitorum Communis.

Action : To give the Fingers their lateral motions, and to aſſiſt a little, according to their ſituations, in bending or extending the firſt phalanx of the Fingers.

Of the Interosſei, three, ſeen in the Palm of the Hand, ariſe with ſingle Heads, and are called *Interni*; and four on the back of the Hand, with double Heads, termed *Externi*, or *Bicipitis*. Part of the *Externi*, however, are alſo ſeen in the Palm of the Hand.

INTEROSSEI INTERNI.

Prior Indicis.

Origin : From the outer part of the Metacarpal Bone of the Fore-Finger.

Insertion : Into the outside of the Tendon on the back of the Fore-Finger.

Action : To draw that Finger outwards, towards the Thumb.

Posterior Indicis,

Origin : From the inner part of the Metacarpal Bone of the Fore-Finger.

Insertion : Into the inside of the Tendon on the back of the Fore-Finger.

Action : To draw the Fore-Finger inwards.

Prior Annularis.

Origin : From the outside of the Metacarpal Bone of the Ring-Finger.

Insertion : Into the outside of the Tendon, on the back of the Ring-Finger.

Action : To draw the Ring-Finger outwards.

Interosseous Annularis.

Origin : From the outside of the Metacarpal Bone of the Little Finger.

Insertion : Into the outside of the Tendon on the back of the Little Finger.

Action : To draw the Little Finger outwards.

INTEROSSEI EXTERNI.

Prior Medii Digiti.

Origin : From the corresponding sides of the Metacarpal Bones of the Fore and Middle Fingers.

Insertion : Into the outside of the Tendon on the back of the Middle Finger.

Action : To draw the Middle Finger outwards.

Posterior Medii Digiti.

Origin : From the corresponding sides of the Metacarpal Bones of the Middle and Ring Fingers.

Insertion : Into the inside of the Tendon, on the back of the Middle Finger

Action : To draw the Middle Finger inwards.

Posterior Annularis.

Origin : From the corresponding sides of the Metacarpal Bones of the Ring and Little Fingers.

Insertion : Into the inside of the Tendon on the back of the Ring-Finger

Action : To draw the Ring-Finger inwards.



MUSCLES

OF THE

INFERIOR EXTREMITY.



MUSCLES on the PELVIS and THIGH, serving for the Motions of the THIGH and LEG

Aponeurosis of the Inferior Extremity.

Previous to the description of the Muscles of the Inferior Extremity, it is proper to take notice of a Tendinous expansion, which, as in the Superior Extremity, forms a general covering to the Muscles, and sends off Partitions between them, to be connected to the Ridges and Processes of the Bones.

It is thick and strong on the outside of the Thigh and Leg, but towards the inner side of both, particularly on the former, it gradually turns thinner, and has rather the appearance of Cellular Membrane.

It comes down from the Processes and other projections on the outside of the Bones of the Pelvis, especially from the Tendons of the external Layers of Muscles of the Loins and Abdomen.

A little below the Trochanter Major, it is firmly connected to the Linea Aspera; and at the Joint of the Knee, it receives additions from the Tendons of the Extensors of the Leg, and is there connected with the outer and inner sides of the Head of the Tibia and Fibula. In the Leg, it is firmly fixed to the Spine of the Tibia; and at the under end, to the Bones of the Ankle, where part of it is thicker and stronger than the rest, and forms the Annular Ligament of the Tarsus. It is lost at last upon the Foot.

It serves the same general purposes with the Aponeurosis of the Superior Extremity.

Psoas Magnus.
Iliacus Internus. } See p. 133 & 134.

Pectinalis, or Pectineus.

Origin: Broad and Fleehy, from the upper and fore-part of the Os Pectinis, or Pubis, immediately above the Foramen Thyroideum. It runs downwards and outwards at the inner side of the Psoas Magnus Muscle.

Insertion: By a flat and short Tendon, into the Linea Aspera of the Os Femoris, a little below the Trochanter Minor.

Action: To pull the Thigh upwards and inwards, and to give it, and of consequence the Foot, a degree of rotation outwards.

TRICEPS ADDUCTOR FEMORIS.

Under this appellation are comprehended three distinct Muscles, viz.

Adductor Longus Femoris.

Origin: By a strong roundish Tendon, from the upper and fore-part of the Os Pubis, and Ligament of the Synchondrosis at the inner side of the Pectinalis: It runs downwards and outwards, and has its

Insertion, By a broad flat Tendon, into the middle of the Linea Aspera.

Adductor Brevis Femoris.

Origin: Tendinous, from the Os Pubis, at the side of its symphysis below and behind the former Muscle: It runs obliquely outwards

Insertion: By a short flat Tendon, into the inner and upper part of the Linea Aspera, from a little below the Trochanter Minor, to the beginning of the insertion of the Adductor Longus

Adductor Magnus Femoris.

Origin: From the side of the Symphysis of the Pubis, a little lower than the former: The Origin is continued downwards from the Crus and Tuberosity of the Os Ischium; the Fibres run outwards and downwards, spreading out wide, and forming a very large Muscle.

Insertion: Into the whole length of the Linea Aspera, the under part of the Muscle extending along the Ridge which leads to the inner Condyle of the Os Femoris; it is also fixed by a roundish Tendon, into the upper part of that Condyle, a little above which the Femoral Artery, taking a Spiral turn towards the Ham, passes between the Tendon of this Muscle and the Bone.

Action of the three Adductores; To bring the Thigh inwards and upwards, according to the different directions of their Fibres, and to assist a little in rolling the Thigh outwards

Obturator Externus.

Origin: By a semi-circular margin, from the parts of the Os Pubis and Ischium, which form the anterior half of the Foramen Thyroideum, and from the Membrane which fills up that Foramen; the Fibres are collected like rays towards a centre, and pass outwards over the back part of the Cervix of the Os Femoris.

Insertion: By a strong round Tendon, into the Cavity at the inner and back-part of the root of the Trochanter Major, adhering in its course to the Capsular Ligament of the Thigh Bone.

Action: To roll the Thigh-Bone obliquely outwards, and to prevent the Capsular Ligament from being pinched.

Gluteus Maximus.

Origin: Flethy, from the back part of the Spine of the Ilium; from the under and outer part of the Os Sacrum, and from the Os Coccygis; from the posterior Sacro-Sciatic Ligament, over which part of the in-

ferior edge hangs in a flap. The Fibres run obliquely forwards, and a little downwards, to form a thick broad Muscle, which is composed of distinct coarse fasciculi. The upper part of it covers almost the whole of the Trochanter Major, and it is intimately connected with the broad Tendon of the *Tensor Vaginae Femoris*.

Insertion: By a strong, thick, and broad Tendon, into the upper and outer part of the Linea Aspera, along which it is continued for some way down.

Action: To extend the thigh, and pull it backwards and a little outwards.

Gluteus Medius.

Origin: Fleshy, from all that part of the Spine of the Os Ilium which is unoccupied by the Gluteus Maximus, from the upper part of the Dorsum of that Bone, and from an Aponeurosis which covers the Muscle, and joins the Fascia of the Thigh. It sends off a broad Tendon, which has its

Insertion into the outer and back-part of the Trochanter Major.

Action: To pull the Thigh outwards, and a little backwards. The fore-part of the Muscle assists in rolling it inwards.

Gluteus Minimus.

Origin: Fleshy, from the lower half of the Dorsum of the Os Ilium: The Origin being continued from the superior anterior Spinous Process, along a rising of the Bone, as far as the great Sciatic Notch, it runs in a radiated manner to a strong flat Tendon, which has its

Insertion into the fore and upper part of the Trochanter Major.

Action: To assist the former in pulling the Thigh outwards, and a little backwards, it also acts, along with other Muscles in rolling it inwards.

Pyriformis.

Origin: Within the Pelvis, by three Tendinous and Fleshy heads, from the second, third, and fourth pieces of the Os Sacrum; and becoming round and tapering, it passes out of the Pelvis, along with the Sciatic Nerve, through the great Notch of the Ilium, from which it receives the addition of a few Fleshy Fibres

Insertion : By a roundish Tendon, into the upper part of the Cavity, at the inner side of the root of the Trochanter Major.

Action : To assist in the Abduction of the Thigh, and in its rotation outwards.

Gemini, or Gemelli.

Origin : By two distinct Heads, the Superior from the Spinous Process, and the inferior from the Tuberosity of the Os Ischium, and from the Sacro-Sciatic Ligament. The two Heads are united by a Tendinous and Fleishy Membrane, and form a sheath for the reception of the Tendon of the Obturator Internus Muscle.

Insertion : Tendinous and Fleishy, into the Cavity at the inner side of the root of the Trochanter Major, on each side of the Tendon of the Obturator Internus, to which they firmly adhere.

Action : To roll the Thigh outwards, and to prevent the Tendon of the Obturator Internus from starting out of its place while the Muscle is in action.

Obturator Internus, formerly Marsupialis.

Origin : Within the Pelvis, by a semi-circular Fleishy margin from the anterior half of the Foramen Thyroideum, and, in part, from the Obturator Ligament.—its Fibres converge, and send off a round Tendon which passes over the Os Ischium, between the Spine and Tubercle of that Bone, in the manner a rope passes over a Pulley.—Where it goes over the Capsular Ligament of the Thigh-Bone, it is inclosed in the sheath of the Gemini Muscles.

Insertion : By a round Tendon, along with the Gemini Muscles, into the large Pit at the root of the Trochanter Major.

Action : To roll the Thigh obliquely outwards.

Quadratus Femoris.

Origin : Tendinous and Fleishy, from the outer side of the Tuberosity of the Os Ischium. It runs transversely outwards.

Insertion : Fleishy, into a rough ridge continued from the root of the great, to that of the small Trochanter.

Action : To roll the Thigh outwards.

The Pyriform, Gemini, Quadratus, and Obturatores Muscles, which are the Rotators of the thigh, when it is in a line with the Body, become its Abductors when it is in the bended state.

Tensor Vagina Femoris.

Origin: By a narrow, Tendinous, and Fleishy beginning, from the external part of the anterior superior Spinous Process of the Os Ischium. It goes downwards and a little backwards, forming a thick Fleishy Belly, which is inclosed in a doubling of the Aponeurosis or Vagma of the thigh.

Insertion: A little below the Trochanter Major, into the inner Surface of the Aponeurosis which covers the outside of the thigh.

Action: To stretch the Aponeurosis, to assist in the Abduction of the thigh, and in its rotation inwards.

Sartorius.

Origin: Tendinous, from the superior anterior Spinous Process of the Os Ilium: It soon becomes Fleishy, and runs obliquely downwards over the Muscles situated upon the fore and inner side of the Thigh, and is the longest Muscle of the Body.

Insertion: By a broad and thin Tendon, into the inner side of the Tibia, near the inferior part of its Tubercle.

Action: To move the Knee, and bring one Leg obliquely inwards across the other.

Gracilis, or Rectus Internus.

Origin: By a thin Tendon, from the Os Pubis, near the Symphysis; it soon becomes Fleishy, and descends in a direct course by the inside of the thigh.

Insertion: Tendinous, into the Tibia, under the Sartorius.

Action: To assist the Sartorius, in making the full Flexion of the Knee, after it has been bent to a certain degree by the Flexors on the back-part of the Thigh.

Rectus Femoris, or Gracillis Anterior.

Origin: Fleishy, from the inferior anterior Spinous Process of the Os Ilium, and Tendinous from the Dorsum of the Ilium, a little above the Acetabulum: It

runs down over the anterior part of the Cervix of the Os Femoris, and, in its passage along the fore-part of the Thigh, it becomes gradually larger as far down as its middle, and afterwards decreases towards its lower extremity. In the middle of the Muscle there is a longitudinal tendinous Line, from which the Muscular Fibres run off like the plumage of a Feather, the Tendon itself being most conspicuous behind.

Insertion: Tendinous, into the upper part of the Patella.

Action: To extend the Leg.

Cruralis, or Crureus.

Origin: Fleshy, from between the two Trochanters of the Os Femoris, near the Minor; and from the fore-part of the Thigh-Bone, to near its under extremity. Its sides are connected to both Vasti Muscles, and, below, it sends off a tendon which joins that of the former Muscle.

Insertion: Into the upper and back-part of the Patella, behind the Rectus.

Action: To assist in the extension of the Leg.

Vastus Externus.

Origin: Broad, Tendinous, and fleshy from the outer part of the root of the Trochanter Major. Its Origin is continued from the Trochanter, along the whole outer sides of the Linea Aspera, to near the outer Condyle of the Os Femoris, by Fleshy Fibres, which run obliquely forwards to a middle Tendon, where they terminate.

Insertion: Into the upper and outer part of the Patella, at the edge of the tendon of the Rectus, with which it is connected; part of it ends in an Aponeurosis, which is continued to the Leg, and in its passage is fixed to the Head of the Tibia.

Action: To extend the Leg.

Vastus Internus.

Origin: Tendinous and Fleshy, from the fore-part of the Os Femoris, and root of the Trochanter Minor. The Origin is also continued along the whole inside of the Linea Aspera, by Fibres running obliquely forwards and downwards.

Insertion : Tendinous, at the side of the Crureus, with which it is connected, into the upper and inner edge of the Patella, continuing Fleshy lower than the Vastus Externus. Part of it likewise ends in an Aponeurosis, which is extended down to the Leg, and is fixed, in its passage, to the upper part of the Tibia.

Action : To assist the three former Muscles in extending the Leg ; in doing which, the Patella, fixed to the Tubercle of the Tibia by a strong Ligament, supplies the office of a Pulley.

Semitendinosus.

Origin : Tendinous and Fleshy, in common with the long Head of the Biceps, from the posterior part of the Tuberosity of the Os Ischium : Its Fleshy Belly runs down the back-part of the thigh, and sends off a long roundish Tendon, which passing along the inner side of the Knee, ends flat, and has its

Insertion into the inside of the Ridge of the Tibia, a little below its Tubercle, and connected to the under edge of the Gracilis.

Action : To bend the Leg, and, when bended, to roll it inwards.

Semimembranosus.

Origin : By a broad flat Tendon, from the upper and posterior part of the Tuberosity of the Os Ischium. The Fibres composing the Fleshy Belly, run in a very oblique direction, towards a Tendon at the inner and under part of the Muscle, which is situated behind the Semitendinosus.

Insertion : Into the inner and back-part of the Head of the Tibia.

Action : To bend the leg, and bring it directly backwards.

Biceps Flexor Cruris.

Origin : By two distinct heads ; the first, or *Long Head*, arises in common with the Semitendinosus, from the upper and back-part of the Tuberosity of the Os Ischium. The second, or *Short Head*, arises from the Linea Aspera, a little below the termination of the Gluteus Maximus, by a Fleshy acute beginning, which soon grows broader, as it descends to join the first Head, a little above the external Condyle of the Os Femoris.

Insertion: By a strong Tendon, into the upper part of the Head of the Fibula.

Action: To bend the Leg.

The Semitendinosus and Semimembranosus form the *inner Ham-string*, and the Biceps the *outer Ham-string*. Between the Ham-strings the great Vessels and Nerves lie, which run to the Leg.

Popliteus.

Origin: By a small round Tendon, from the outer and under part of the external Condyle of the Os Femoris, and from the back-part of the Capsular Ligament of the Joint. In passing the Joint, it becomes Fleshy, spreads out, and the Fibres run obliquely inwards and downwards, being covered with a tendinous Membrane.

Insertion: Thin and Fleshy, into a Ridge at the upper and inner edge of the Tibia, a little below its Head.

Action: To assist in bending the Leg, and, when bent, to roll it inwards. The Muscle also prevents the Capsular Ligament from being pinched.



MUSCLES *situated on the LEG and FOOT, serving for the MOTIONS of the FOOT and TOES.*

Gastrocnemius Externus.

Origin: By two distinct Heads; one from the upper and back-part of the internal Condyle of the Os Femoris, and from that Bone, a little above its Condyle, by two separate beginnings. The other Head arises, Tendinous, from the upper and back-part of the external Condyle. A little below the Joint, their Fleshy Bellies meet in a middle Tendon, the union giving the appearance of a longitudinal Raphe; below the middle of the Tibia, the Muscle sends off a broad thin Tendon, which, becoming gradually narrower, joins that of the Gastrocnemius Internus, a little above the Ankle.

Gastrocnemius Internus, or Soleus.

Origin: By two Heads; the first is from the back-

part of the Head, and upper and back part of the Body of the Fibula. The other Origin is from the back-part of the Tibia, and runs inwards along the under edge of the Popliteus, towards the inner part of the Tibia, from which it receives Flethy Fibres for some way down. The Flesh of this Muscle, covered by the Tendon of the Gastrocnemius Externus, descends nearly as far as the extremity of the Tibia, a little above which the Tendons of both Gastrocnemii unite, and form a strong round Chord, called *Tendo-Achillis*.

Insertion: Into the upper and back-part of the Os Calcis, by the projection of which the Tendon-Achillis is at a considerable distance from the Tibia.

Action: To extend the Foot, by raising the Heel.

Plantaris.

Origin: Thin and Flethy, from the upper and back-part of the external Condyle of the Os Femoris, and from the Capsular Ligament of the Joint. A little below the Head of the Fibula, it sends off a long slender Tendon which descends obliquely inwards, between the inner Heads of the Gastrocnemii Muscles, and afterwards runs along the inner edge of the Tendo-Achillis.

Insertion: Into the inside of the posterior part of the Os Calcis, below the Tendo-Achillis.

Action: To assist the Gastrocnemii, and to pull the Capsular Ligament of the Knee from between the Bones.

This Muscle, though seldom, has been found wanting.

Tibialis Anticus.

Origin: Tendinous, from the upper part of the Tibia, between its tubercle and the articulation with the Fibula; it then runs down Flethy, on the outside of the tibia, adhering to it and to the upper part of the Interosseous Ligament; near the under part of the Leg, it sends off a strong round tendon, which passes under part of the Ligamentum Tarsi Annulare, near the inner Ankle.

Insertion: Tendinous, into the middle of the Os Cuneiforme Internum, and Base of the Metatarsal Bone of the Great toe.

Action : To bend the Foot, by bringing the fore-part of it towards the Leg.

Tibialis Posticus.

Origin : Fleishy, from the upper and fore-part of the tibia, under the Process which joins it to the Fibula ; then passing through a Fissure in the upper part of the Interosseous Ligament, it continues its Origin from the back-part of the Fibula, next the tibia, and from near one half of the upper part of the last named Bone, as also from the Interosseous Ligament, the Fibres running towards a middle tendon, which, in its descent, becomes round, and passes in a Groove behind the Malleolus internus.

Insertion : Tendinous, chiefly into the upper and inner part of the Os Naviculare and partly into the under Surface of the tarsal Bones by separate Slips, the last of which goes to the root of the Metatarsal Bone of the Middle toe.

Action : To extend the Foot, and, with the assistance of the Tibialis Anticus, to turn the toes inwards, and the outer edge of the Foot downwards

Peroneus Longus, or Primus.

Origin : Tendinous and Fleishy, from the fore-part of the Head of the Fibula ; and Fleishy from the outer part of the Bone, down to within a hand-breadth of the Ankle. The Fibres run in a Penniform manner towards a long tendon, which becomes round, and passes in a sheath through a channel, behind the Malleolus Externus. It is then reflected to the sinuosity of the Os Calcis, runs along a Groove in the Os Cuboides, and goes obliquely across the Bones in the middle of the Sole.

Insertion : Tendinous, into the outside of the root of the Metatarsal Bone of the Great toe, and partly into the Os Cuneiforme Internum

Action : To extend the foot a little, to draw it outwards, and to turn the inner-edge of it downwards.

Peroneus Brevis, or Secundus.

Origin : Fleishy, from the outer part of the Fibula, beginning some way above the middle height of the

Bone, and continuing its adhesion to the Malleolus Externus. The Fibres run, like those of the former Muscle, to an external Tendon, which becomes round, passes behind the outer Ankle, where it is included in the same sheath with the tendon of the preceding Muscle, and there, crossing behind that Tendon, it runs forwards in a sheath proper to itself.

Insertion : Tendinous into the root and external part of the Metatarsal Bone of the Little Toe.

Action : To assist the former Muscle in pulling the Foot outwards, and its outer edge upwards, and in extending the Foot in a small degree.

Extensor Longus Digitorum Pedis.

Origin : Tendinous and Fleshy, from the upper and outer part of the Head of the Tibia, and from the Head and almost the whole length of the anterior Spine of the Fibula. It arises, also, Fleshy, from the Aponeurosis which covers the upper and outer part of the Leg, and from the Interosseous Ligament. Under the Ligamentum Tarsi Annulare, it splits into four round Tendons, which pass along the upper part of the Foot.

Insertion : Into the Base of the first Phalanx of the four small Toes, by flat Tendons which are expanded over the upper side of the Toes to the root of the last Phalanx.

Action : To extend all the joints of the four small Toes.

A portion of this Muscle is called, by ALBINUS,

Peroneus Tertius.

Origin : From the middle of the Fibula, in common with the Extensor Longus Digitorum: It continues, down to near its inferior extremity, and sends its Fleshy Fibres forwards to a Tendon which passes under the Annular Ligament.

Insertion : Into the root of the Metatarsal bone of the Little Toe.

Action : To assist in bending the Foot.

Extensor Brevis Digitorum.

Origin : Fleshy and Tendinous, from the outer and fore-part of the Os Calcis. It soon forms a Fleshy belly, which is divided into four portions; these send off an

equal number of Tendons, which pass over the upper part of the Foot, crossing under the Tendons of the former Muscles.

Insertion: By four slender Tendons, into the Tendinous Expansion from the Extensor Pollicis, which covers the Great Toe, and into the tendinous Expansion from the Extensor Longus, which covers the other toes, excepting the little one.

Action: To assist in the extension of the toes.

Aponeurosis Plantaris.

This, like the Aponeurosis Palmaris, is a strong Tendinous Expansion, which covers the Muscles, Vessels, and Nerves of the Sole.

It arises from the Tuberosity at the under and back-part of the Os Calcis, and is divided into three portions, which run forwards to be connected to the Heads of the Metatarsal Bones of all the toes. The middle Portion is subdivided into five Slips, which split at the roots of the toes, and embrace the tendons of the Flexor Muscles.

It serves the same purpose with Aponeuroses in other parts of the Body, and also performs the office of a Ligament, by binding the two ends of the arch of the Foot together.

Flexor Brevis Digitorum Pedis, Or Flexor Sublimis, or Perforatus.

Origin: Narrow and Fleshy, from the inferior anterior part of the tuberosity of the Os Calcis, and from the Aponeurosis Plantaris. It forms a thick Fleshy Belly, which sends off four Tendons; and these split for the passage of the Tendons of the Flexor Longus.

Insertion: Into the second Phalanx of the four small toes. The Tendon of the little toe is often wanting.

Action: To bend the first and second Joints of the Toes, but particularly the second.

Flexor Longus Digitorum, Or Flexor Profundus, or Perforans.

Origin: By an acute Tendon, which soon becomes Fleshy, from the back-part of the Tibia, at the under edge of the Popliteus; and this beginning is continued down the inner edge of the Bone, by short Fleshy Fi-

bres ending in its Tendon; also by Tendinous and Fleſhy Fibres, from the outer edge of the Tibia; and between this double order of Fibres the Tibialis Poſticus lies incloſed. Having gone under two Annular Ligaments, it paſſes through a Sinuoſity at the inside of the Os Calcis; and about the middle of the Sole, it receives a Tendon from the Flexor Longus Pollicis; it then divides into four tendons, which run through the ſlits of the Perforatus.

Insertion: Into the Baſe of the third Phalanx of the four ſmaller toes, the tendons of this, as well as of the Flexor Brevis, being incloſed upon the toes by Annular Ligaments.

Action: To bend the different Joints of the Toes out, eſpecially the laſt one.

*Flexor Digitorum Accessorius, Or Massa Carnea
Jacobi Sylvii.*

Origin: By two portions; the Inner fleſhy, from the Sinuoſity of the Os Calcis; the outer tendinous, but ſoon becoming fleſhy from the fore and outer part of that Bone.

Insertion: Into the Tendon of the Flexor Longus, before it divides into ſmaller tendons.

Action: To aſſiſt the Flexor Longus.

Lumbricales.

Origin: By four Tendinous and fleſhy beginnings, from the tendon of the Flexor Profundus, juſt before its diſiſion; they run forwards, under the ſame general appearance with thoſe in the Hand, but are ſomewhat ſmaller.

Insertion: By four ſlender Tendons, at the inside of the firſt Joint of the four ſmall toes, into the Tendinous Expansion ſent from the Extensors to cover the upper part of the toes.

Action: To increaſe the flexion of the Toes, and to draw them inwards.

*Extensor Proprius Pollicis Pedis, or Extensor
Longus.*

Origin: By an acute, Tendinous, and fleſhy beginning, from the fore-part of the fibula, ſome way below

its Head; it continues its Origin from the same Bone, to near the outer Ankle, by fleshy fibres, which descend obliquely towards a Tendon.

Insertion: Tendinous, into the posterior part of both the Bones of the Great Toe.

Action: To extend the Great Toe.

Flexor Longus Pollicis.

Origin: Tendinous and Fleshy, from the back-part of the Fibula, some way below its Head, being continued down the same Bone, almost to its under end, by a double order of oblique Fleshy Fibres; its Tendon passes under an Annular Ligament at the inner Ankle.

Insertion: Into the last Joint of the Great Toe.

Action: To bend the Great Toe, and particularly the last Joint.

Flexor Brevis Pollicis.

Origin: Tendinous, from the under and fore-part of the Os Calcis, and from the Os Cuneiforme Externum; It is inseparably united with the Abductor and Adductor Pollicis.

Insertion: Into the external Os Sesamoideum, and root of the first Bone of the Great Toe.

Action: To bend the first Joint of the Great toe.

Abductor Pollicis.

Origin: Fleshy, from the anterior and inner part of the Protuberance of the Os Calcis, and Tendinous from the same Bone, where it joins with the Os Naviculare.

Insertion: Tendinous, into the internal Os Sesamoideum, and root of the first Bone of the Great toe.

Action: To pull the Great toe from the rest.

Adductor Pollicis.

Origin: By a long thin Tendon, from the under part of the Os Calcis; from the Os Cuboides; from the Os Cuneiforme Externum; and from the root of the Metatarsal Bone or the second toe: the Muscle is divided into two Fleshy portions, which unite, and have their

Insertion: into the external Os Sesamoideum, and root of the Metatarsal Bone of the Great Toe.

Action: To pull the Great Toe towards the rest.

Abductor Minimi Digiti Pedis.

Origin: Tendinous and Fleishy, from the edge of a Cavity on the under part of the Protuberance of the Os Calcis, and from the root of the Metatarsal Bone of the Little Toe.

Insertion: Into the outer part of the root of the first Bone of the Little Toe.

Action: To draw the Little Toe outwards.

Flexor Proximi Minimi Digiti.

Origin: Tendinous from the Os Cuboides, near the Groove for lodging the Tendon of the Peroneus Longus; and Fleishy, from the outer and back part of the Metatarsal Bone of this Toe.

Insertion: Into the anterior extremity of the Metatarsal Bone, and root of the first Bone of the Little Toe.

Action: To bend this Toe.

Transversalis Pedis.

Origin: Tendinous, from the under and fore-part of the Metatarsal Bone of the Great Toe, and from the internal Os Sesamoideum of the first Joint. It forms a Fleishy Belly, which runs transversely between the Metatarsal Bones and Flexor Muscles of the Toes, and has its

Insertion: Tendinous, into the under and outer part of the anterior extremity of the Metatarsal Bone of the Little Toe, and Ligament of the next Toe.

Action: To contract the Foot, by bringing the roots of the outer and inner Toes towards each other.

INTEROSSEI PEDIS.

The Interossei arise, Tendinous and Fleishy, from, and fill the spaces between, the Metatarsal Bones.—Three, called *Interni*, arise with single Heads, and are placed in the Sole; and four, termed *Externi* or *Bicipites*, arise with double Heads, and appear on both sides of the Foot.

The Insertion of all the Interossei is by slender Tendons, into the expansion sent off from the Tendons of the Lumbricales and Extensor Muscles of the Toes.

INTEROSSEI INTERNI.

PRIOR, or ABDUCTOR MEDII DIGITI.

Origin: From the inside of the Metatarsal Bone of the Middle Toe.

Insertion : Into the inside of the root of the first Bone of the Middle Toe.

Action : To pull the Middle Toe inwards.

Prior, or Abductor Tertii Digiti.

Origin : From the inner and under part of the Metatarsal Bone of the third Toe.

Insertion : Into the inside of the root of the first Bone of the third Toe.

Action : To pull the third Toe inwards.

Prior, or Adductor Minimi Digiti.

Origin : From the inside of the Metatarsal Bone of the Little Toe.

Insertion : Into the inside of the root of the first Bone of the Little Toe.

Action : To pull the Little Toe inwards.

INTEROSSEI EXTERNI, or BICIPITES.

PRIOR, or ABDUCTOR INDICIS.

Origin : From the corresponding sides of the Metatarsal Bones of the Great and Fore-Toes.

Insertion : Into the inside of the root of the first Bone of the Fore-Toe

Action : To pull the Fore-Toe inwards.

Posterior, or Adductor Indicis.

Origin : From the corresponding sides of the fore and second Toes.

Insertion : Into the outside of the root of the first Bone of the Fore-Toe.

Action : To pull the Fore-Toe outwards.

Posterior, or Adductor Medii Digiti.

Origin : From the corresponding sides of the Metatarsal Bones of the second and third Toes.

Insertion : Into the outside of the root of the first Bone of the second Toe.

Action : To pull the second Toe outwards.

Posterior, or Adductor Tertii Digiti.

Origin : From the corresponding sides of the Metatarsal Bones of the third and Little Toe.

Insertion : Into the outside of the root of the first Bone of the Little Toe

Action : To pull the third Toe outwards.

PART III.



OF THE

BURSÆ MUCOSÆ.

OF THE

STRUCTURE OF THE BONES.

OF THE

LIGAMENTS,

AND

OTHER PARTS OF THE JOINTS.



OF THE

BURSÆ MUCOSÆ.



THE BURSÆ belong to the Extremities, and are found between Tendons and Bones, where they play upon each other, as at the insertion of the Biceps Flexor Cubiti :

Or, where Tendons rub on each other; as between those of the Extensores Carpi Radiales and Extensores Pollicis :

Or, between Tendons and the external parts ; as in the Sheaths of the Tendons of the Flexors of the Fingers and Toes, where they furnish a lining to the Sheaths, without communicating with other parts :

Or, between Tendons and Ligaments of the Joints ; as between the Tendons of the Flexors of the Fingers, and Capsular Ligament of the Wrist.

They are found in a few places, where Processes play upon Ligaments ; as between the Acromion and Capsular Ligament of the Humerus :

Or, where Bones play on each other ; as between the Clavicle and Coracoid Process of the Scapula,

Some of the Bursæ of contiguous Tendons communicate with each other ; as between the Extensor Carpi Radialis, and Extensor Secundi Internodii Pollicis.

Others communicate not only in Adults, but often also in Children, with the Cavity of the Joints ; as behind the Tendon of the Extensors of the Leg, though this is more frequently the case in advanced age.

Their structure is the same with the inner Layer of the Capsular Ligament of the Joints.

Like that, they are formed of thin pellucid Membrane, possessing little sensibility, and joined to the surrounding parts by Cellular Substance, and many of them are covered with Fat.

Like the Capsul of the Joint, they have commonly a thin Layer of Cartilage, or of tough Membrane, between them and the Bone.

Like it too they have reddish coloured masses of Fat projecting into their Cavities, from the edges of which Fringes are sent off ; as behind the Ligament of the Patella, or at the insertion of the Tendo-Achillis.

Like it also, the inside of the Bursæ is remarkably smooth, being lubricated with the same kind of Gelatinous Mucus which is found in the Cavities of the Joints ;—the Mucus serving the same general purpose with that of the Joints, viz. to lessen the friction and prevent the consequences which would otherwise arise from it.

BURSÆ MUCOSÆ

OF THE

SUPERIOR EXTREMITY.

Bursæ about the Joint of the Shoulder.

A Bursa under the Calvicle, where it plays upon the Coracoid Process.

A large Bursa between the Acromion and Ligament, joining it to the Coracoid Process, and the Capsular Ligament of the Humerus.

A small Bursa, sometimes absent, between the point of the Coracoid Process and Capsular Ligament of the Humerus.

A Bursa between the Tendon of the Subscapularis Muscle and Capsular Ligament of the Humerus, frequently communicating with the Cavity of that Joint.

A Bursa, not constant, between the origin of the Coraco-Brachialis and short head of the Biceps Muscle, and Capsular Ligament of the Humerus.

A Bursa between the Tendon of the Teres Major and the Os Humeri, and upper part of the Tendon of the Latissimus Dorsi.

A small Bursa between the Tendon of the Lattissimus Dorsi, and Os Humeri.

A Bursa between the Tendon of the long head of the Biceps Flexior Cubiti and the Humerus.

Bursæ about the Joint of the Elbow.

A Bursa, with a *Peloton* of Fat, between the Tendon the Biceps and Tubercle of the Radius.

A small Bursa between the Tendon common to the Extensor Carpi Radialis Brevior, Extensor Digitorum, Communis, and round head of the Radius.

A small Bursa, between the Tendon of the Triceps Extensor Cubiti and Olecranon.

Bursæ upon the Under part of the Fore-Arm and Hand.

A very large Bursa surrounding the Tendon of the Flexor Pollicis Longus.

Four long Bursæ lining the sheaths which inclose the Tendons of the Flexors upon the Fingers.

Four short Bursæ on the fore-part of the Tendons of the Flexor Digitorum Sublimis in the Palm of the Hand.

A large Bursa between the Tendon of the Flexor Pollicis Longus, the fore-part of the Radius, and Capsular Ligament of the Os Trapezium

A large Bursa between the Tendons of the Flexor Digitorum Profundus, and the fore-part of the end of the Radius and Capsular Ligament of the Wrist.

These two last mentioned Bursæ are sometimes found to communicate with each other.

A Bursa between the Tendon of the Flexor Carpi Radialis and Os Trapezium.

A Bursa between the Tendon of the Flexor Carpi Ulnaris and Os Pisiforme.

A Bursa between the Tendon of the Extensor Ossis Metacarpi Pollicis and Radius.

A large Bursa common to the Extensores Carpi Radiales, where they cross behind the Extensor Ossis Metacarpi Pollicis.

Another Bursa common to the Extensores Carpi Radiales, where they cross behind the Extensor Secundi Internodii Pollicis.

A third Bursa at the Insertion of the tendon of the Extensor Carpi Radialis Brevior.

A Bursa for the Tendon of the Extensor Secundi Internodii Pollicis, which communicates with the second Bursa common to the Extensores Carpi Radiales.

Another Bursa between the Tendon of the Extensor Secundi Internodii Pollicis and Metacarpal Bone of the Thumb.

A Bursa between the Tendons of the Extensor of the Fore, Middle, and Ring Fingers, and Ligament of the Wrist.

A Bursa for the Tendons of the Extensor of the Little Finger.

A Bursa between the Tendon of the Extensor Carpi Ulnaris and Ligament of the Wrist.

BURSÆ MUCOSÆ

OF THE

INFERIOR EXTREMITY.

Bursæ upon the Pelvis and upper part of the Thigh.

A Very large Bursa between the Iliacus Internus and Psoas Magnus Muscle, and Capsular Ligament of the Thigh-Bone.

A Bursa between the Tendon of the Pectinalis Muscle and the Thigh-bone.

A small Bursa between the Gluteus Medius and Trochanter Major, and before the Insertion of the Tendon of the Pyliformis.

A Bursa between the Tendon of the Gluteus Minimus and Trochanter Major.

A Bursa between the Gluteus Maximus and Vastus xternus.

A Bursa between the Gluteus Medius and Pyliformis.

A Bursa between the Obturator Internus and Os Ischium.

An oblong Bursa continued a considerable way between the Obturator Internus, Gemini, and Capsular Ligament of the Thigh bone

A small Bursa at the Head of the Semimembranosus and Biceps Flexor Cruris.

A small Bursa between the origin of the Semitendinosus and that of the two former Muscles.

A large Bursa between the Tendon of the Gluteus Maximus and root of the Trochanter Major.

Two small Bursa between the Tendon of the Gluteus Maximus and Thigh bone.

Bursæ about the Joint of the Knee.

A large Bursa behind the Tendon of the Extensors of the Leg, frequently found to communicate with the Cavity of the Knee-Joint.

A Bursa behind the Ligament which joins the Patella to the Tibia, in the upper part of the Cavity of which a fatty substance projects.

A large Bursa between the Tendons of the Sartorius, Gracilis, Semitendinosus, and Tibia

A Bursa between the Tendons of the Semimembranosus and Gemellus, and Ligament of the Knee. This Bursa contains a small one within it, from which a passage leads into the Cavity of the Joint of the Knee.

A Bursa between the Tendon of the Semibranosus and the lateral internal Ligament of the Knee, from which also there is a passage leading into the Joint of the Knee.

A Bursa under the Popliteus Muscle, likewise communicating with the Cavity of the Knee-joint.

Bursæ about the Ankle.

A Bursa between the Tendon of the Tibialis Anticus, and under part of the Tibia and Ligament of the Ankle.

A Bursa between the Tendon of the Extensor Proprius Pollicis Pedis, and the Tibia and Capsular Ligament of the Ankle.

A Bursa between the Tendons of the Extensor Digitorum Longus and Ligament of the Ankle.

A large Bursa common to the Tendons of the Peronei Muscles.

A Bursa proper to the Tendon of the Peroneus Brevis.

A Bursa between the Tendo Achillis and Os Calcis, into the Cavity of which a *Peloton* or Mass of Fat projects.

A Bursa between the Os Calcis and Flexor Pollicis Longus.

A Bursa between the Flexor Digitorum Longus and the Tibia and Os Calcis.

A Bursa between the Tendon of the Tibialis Posticus and the Tibia and Astragalus.

Bursæ Mucosæ in the Sole of the Foot.

A second Bursa for the Tendon of the Peroneus Longus, with an oblong *Peloton* of fat within it.

A Bursa common to the Tendon of the Flexor Pollicis Longus, and that of the Flexor Digitorum Profundus, at the upper end of which a fatty substance projects.

A Bursa for the Tendon of the Tibialis Posticus.

Bursæ of the Tendons of the Flexors of the Toes.

OF THE

STRUCTURE OF THE BONES.

THE Bones derive their *Hardness* from the great quantity of *Earth* contained in their Substance.

They are more or less of a *white* or *red* colour, according to the proportions of *Earth* or *Blood* entering into their composition: and are therefore whitest in the Adult, and reddest in the Child, more *Earth* being found in the former, and more *Blood* in the latter.

Bones are composed of *Lamellæ*. or plates, which are formed of *Fibres* running longitudinally, or in a radiated manner, according to the natural figure of the Bone; as may be seen by exposing them to the heat, or to the weather, &c.

The *Plates* of Bones are originally formed by the *Vessels* of the *Periosteum Externum*, and *Membrana Medullaris*, and not, as has been supposed by some Authors, from *Layers* detached from the external *Periosteum*.

The *Plates* are connected by *Fibres*, which some have considered as *Clavicula* or *Nails*, which were called *Perpendicular*, *Oblique*, &c. according to their different directions.

The *outer Plates* of Bones are firmly compacted, so as to appear like one solid substance.

The *inner Parts* of Bones in general, whether long, round, or flat, have their plates and *Threads* running in various directions, intersecting each other, and forming the *Cancelli*, or *Spungy Substance* of the Bones; the *Cancelli* every where communicating freely among themselves.

The *Cancelli*, in the middle of the long Bones, are *Fibrous*, and form the *Reticular Substance* which divides the Bone into larger caverns.

Towards the extremities, the *Cancelli* are lamellated, and much more numerous than in the middle of long Bones.

Cancelli of a similar nature to those of the long Bones are also placed between the tables of flat, and inner parts of round Bones.

In some of the broad Bones, however, the solid parts are so much compressed, as to leave little or no room for Cancelli.

On the contrary, in the middle of the long Bones, the *Cavities* are so large as to give the appearance of a *hollow Cylinder*.

The Cancelli of Bones are formed by the internal Plates being sent inwards to decussate each other; and in the long Bones, the sides become gradually thinner towards the extremities while the Cancelli in proportion become more numerous.

The Cancelli exist in the most solid parts of the Bones, as can be readily seen by exposure to heat, or in Bones enlarged by disease. In either of these cases, small caverns may be observed, and are distinguishable from the Canals for containing the Vessels, the former being irregular, and the latter cylindrical.

The Cancelli support the Membranes containing the Marrow, as the Cellular Substance does the fat. They also furnish a wider surface for the dispersion of the arteries which secrete the Marrow.

Upon the *surface* of Bones there are numerous *Fissures*, for the more intimate connection of the Periosteum with the Bone, and for lodgement to Blood-vessels.

Many *Orifices* are observed upon the Surface, and particularly in the furrows of Bones, for the transmission of Blood-vessels into their substance.

Near the middle of most of the Bones, especially the long ones, there is a slanting *Canal* for the passage of the principal Medullary Vessels.

Numerous Orifices are also observed at the *Extremities of long Bones*, serving, some of them, for the transmission of Blood-vessels, and others giving attachment to the Fibres of the Ligaments of the Joints.

The principal Vessels pass into the Cancelli, internal Membranes, and Marrow, and return to the Substance of the Bone, where they meet those sent inwards from the Periosteum.

In some *flat Bones*, as those of the *Cranium*, the

Bones are entirely supplied by the vessels of the surrounding Membranes, and the Vascularity there is uniform

Bones, like other parts, have their *Lymphatics*, as appears by the absorption of madder found deposited in the Substance of the Bones of Animals which receive it with their food ;—by the absorption of part of the Bone itself, when in the diseased state and even by injection.

The *Nerves* of the Bones are small, but may be observed in certain parts of the Bones, and, it is presumed, exist in all.

From the minuteness of the Nerves, Bones are not *sensible* in the sound state ; and even in the diseased, the pain felt, may be owing to the Membranes within them.

The general *use* of Bones is,—to furnish attachment to Muscles and to perfect and support the Bowels.

Periosteum.

The Periosteum derives its name from its furnishing a general covering to the Bones.

In certain parts, however, it is *perforated* by Muscles, Ligaments, or Cartilages, which are fixed immediately to the surface of the Bones ; and at the joints it separates from the Bone to give a covering to the Capsular Ligaments.

It is *formed* of many Fibres, which, in certain parts, can be divided into Layers.

The *outer Surface* of this Membrane is connected to the surrounding parts by Cellular Substance

The *inner Surface* is more uniform than the outer, and its Fibres run, most frequently, in the same direction with those of the subjacent Bones.

The *inner part* of the Periosteum is connected to the surface of the bones by Blood-vessels and Ligamentous Fibres ; and this connection is much stronger in the Child than in the Adult.

The Periosteum, as well as other Membranes, must be supplied with *Nerves* ;—but these are too minute to be readily traced.

The *sensibility* of the Periosteum, like that of other

Membranes, is by no means acute, though found to possess a certain degree of it.

The *principal uses* of this Membrane are ;—To transmit the Vessels which are spread out upon its surface into the substance of the Bones ;—to give attachment to Muscles ;—to prevent the affects of friction between them and the Bones ;—to assist in binding the latter together, &c.

MEMBRANA MEDULLARIS,

Improperly called Periosteum Internum.

It is divided into numberless small parts which line the inner side of the Bones and all the Cancelli, and affords a large surface for the dispersion of the Secretory Vessels of the Marrow, which it incloses.

Marrow.

The *Marrow* may be considered as an *appendage* of the general Corpus Adiposum, and is deposited in the Cavities of the Bones, while nature is supplying fat to the rest of the Body.

Like the Fat, when viewed in a microscope, it resembles a cluster of Pearls ;—or it is contained in spherical sacs upon which Vessels are minutely dispersed, but from which no Excretory Ducts have yet been discovered.

It possesses little *sensibility* ; and what it does possess is considered by the latest authors, as belonging rather to its Membranes than to the Marrow itself.

Cartilages.

Cartilages are of a *white colour* and *elastic Substance*, and much *softer* than Bones, in consequence of the smaller quantity of *Earth* entering into their composition.

Their *Structure* is not so evidently fibrous as that of Bones, yet by long maceration, or by tearing them asunder a fibrous disposition is perceptible.

Their *Vessels* are extremely small, though they can be readily injected in Cartilages where Bone is beginning to form. The Vessels of the Cartilages of the Joints, however, seem entirely to exclude the red blood ; no Anatomist having yet been able to inject them.—

They have no Cancelli, nor internal Membranes, for lodging Marrow; no Nerves can be traced to them: nor do they possess any sensibility in the sound state.

Upon their Surface, there is a thin Membrane termed *Perichondrium*, which in Cartilages supplying the place of Bone, as in those of the Ribs, or at the ends of the long Bones in Children, is a continuation of the *Periosteum*, and serves the same general purposes to Cartilage as this does to Bone.

Upon the surface of Articular Cartilages, the *Perichondrium* is a *reflection* of the inner surface of the Capsular Ligament, and is so very thin, and adheres so closely, as to appear like part of the Cartilage itself.

One set of Cartilages supply the place of Bone;—or by their flexibility, admit of a certain degree of motion, while their elasticity recovers their natural position,—as in the *Nose, Larynx, Cartilages of the Ribs, &c.*

Another set, in Children, supply the place of Bone, until Bone can be formed, and afford a *Nidus* for the Osseous Fibres to shoot in;—as in the *long Bones of Children.*

A third set, and that the most extensive, by the smoothness and slipperiness of their surface, allow the Bones to move readily, without any abrasion;—as in the *Cartilages of the Joints.*

A fourth set supply the Office both of Cartilage and Ligament, giving the elasticity of the former and flexibility of the latter;—as in the *Bones of the Spine and Pelvis.*

Of the formation of Bone.

The generality of Bones, and particularly the *long ones*, are originally *formed in Cartilage*; some, as those of the *skull*, are formed between Membranes; and the *Teeth* in distinct bags.

When ossification is about to begin in a particular part of a Cartilage,—most frequently in the Centre,—the Arteries, which were formerly transparent, become dilated, and receive the red blood from which the Osseous matter is secreted. This matter retains, for some time, the form of the Vessels which give it origin, till more Arteries, being by degrees dilated, and more Osseous matter deposited, the Bone at length attains its complete form.

During the progress of Ossification, the surrounding Cartilage by degrees disappears, not by being changed into Bone, but by an absorption of its parts, the new-formed bone occupying its place.

The Ossification of *broad Bones*, as those of the *Head*, begins by one or more *points*, from which the Osseous Fibres issue in rays.

The Ossification of long Bones, as in those of the extremities, begins by *central Rings*, from which the Fibres extend towards the ends of the Bones.

The Ossification of *Spherical-shaped Bones* begins by one *Nucleus*, as in the *Wrist*; and that of *irregular-shaped Bones* by different *Nuclei*, as in the *Vertebrae*.

Some Bones are completely formed at the time of birth, as the *small Bones of the Ear*.

The generality of Bones are *incomplete* until the age of puberty, or between the fifteenth and twentieth year, and in some few instances not until a later period.

In Children, the greater number of parts in Bones are *Epiphysis* or *Appendices*, which, in Adults, become *Processes*.

The *Epiphysis* begin to appear after the Body of the Bone is ossified, and are themselves ossified at seven or eight years of age, though their external surface is still somewhat Cartilaginous.

In the early period of life, the Body and ends of long Bones make *three distinct parts*, which can readily be separated by boiling, or by maceration in water.

The Epiphyses are joined to the body of the Bone by Cartilages, which are thick in Children, but gradually become thinner as Ossification advances, till at last, in the Adult, the external marks of division are not to be seen; though frequently some mark of distinction may be observed in the *Cancelli*.

DIFFERENT KINDS

OF

CONNECTIONS OF THE BONES.

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Or Connection without inter-
mediate Substance.

SYNARTHROSIS,



Suture,
Like a seam.

Gomphosis,
Like a Nail in a board.

Schindelysis,
Or *Kürzwieg.*

{ The Bones of the Cranium, & greater part
of those of the Upper Jaw with each other

{ The teeth in the Alveoli.

{ Bones of the Septum Narium to each other

Or Connection by intermedi-
ate Substance.

SYMPHYISIS,



Synchondrosis,
Or Connection by Carti-
lage.

Syndesmosis,
Or Connection by Liga-
ment.

{ The Bodies of the Vertebrae to each other
the ribs to the Sternum: the *Ossa Iliaca*
to the *Os Sacrum*, or to each other

{ The lower jaw and *Os Hyoides* to the *Mandibula*
the Ribs to the Spine: the *Processus of the Vertebrae* and also Bones of the *Extremities* to each other.

DIFFERENT KINDS OF MOTION.

ARTHRDIA;

Where the flat ends of Bones are opposed to each other with little motion.

Between the clavicle and scapula. The bones in the second row of the carpus. The carpus and metacarpus. The tibia and fibula. The greater number of bones in the tarsus. The tarsus and metatarsus.

GINGLIMUS.

The bones mutually receiving each other; and the ligaments admitting of a hinge-like motion.

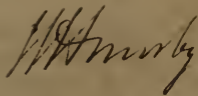
One bone in moving forming an angle with another. *Angular.* The lower jaw and head. The joint of the elbow. The first and second joints of the thumb and second and third of the fingers. The joint of the knee. Ankle. The two last joints of the toes.

Lateral or Circular. Between the first vertebrae and processus dentatus of the second. Between the radius and ulna. Between the occipital bone and atlas. Between the different vertebrae. And between the ribs and vertebrae.

ENARTHROSIS.

Or ball and socket, the ligaments allowing motion in all directions.

Inner end of the clavicle. Head of the os humeri. Between the forearm and wrist, and between the two rows of carpal bones. At the root of the metacarpal bone of the thumb, and root of the first phalanx of the fingers. At the head of the thigh-bone. Between the astragalus & os naviculare, at the root of the first phalanx of the toes.



OF THE

LIGAMENTS,

AND

OTHER PARTS OF THE JOINTS.

LIGAMENTS are *white, strong, flexible* bodies, of an intermediate firmness between Cartilage and common Membrane.

They are *composed* of Fibres variously disposed; the greater part of them, however running in a longitudinal direction.

The Ligaments, of moveable Joints arise, for the most part, from the *Cervix*, and beyond the edges of the articulating Cartilage of one Bone, and are fixed, in a similar manner, into the corresponding parts of the other.

The Ligaments thus fixed are called *Capsular*, from their forming a *purse* or *bag*, which includes the Joint.

Where *variety of motion* is allowed, the Capsular Ligament is nearly of equal strength round the whole circumference of the Joint; but, where the Joint is of the nature of a *hinge*, the Ligament is strongest at the sides of that hinge.

The *outer* part of the Capsular Ligament is formed of a continuation of the *Periosteum*, which is connected to the surrounding parts by Cellular Substance; while the *inner* Layer,—remarkably thin and dense,—is reflected over the Bones and Cartilages which the Ligament includes; one part of it thus forming *Periosteum*, and the other *Perichondrium*.

In certain parts of the Body there are, besides the Capsular Ligaments, others for the firmer connection

of the Bones, or for confining the motion to one particular side ; as the *round Ligament* of the Thigh, or *Crucial* or *Lateral Ligaments* of the Knee.

Wherever the Ligaments are few, long, and weak, the motions will be more extensive ; and, on the contrary, where the Ligaments are numerous, short, and strong, the motions will be more limited.

In some parts of the Body, Ligaments supply the place of Bones, as in the *Pelvis* : In others, they give origin to Muscles, as between the *Radius* and *Ulna* : In some parts they assist in connecting immoveable Bones ; as the *Os Sacrum* and *Os Innominatum* : In others, they form a Socket in which moveable Bones play, as where part of the *Astragalus* moves on the Ligament stretched between the *Os Calcis* and *Os Scaphoides*.

Ligaments have numerous *Blood Vessels* which can be readily injected.

Upon the inner side of the *Capsular Ligaments*, their *arteries* secrete a liquor which assists in the lubrication of the Joints.

The *Nerves* of Ligaments are small, though, in some parts, they can be easily traced upon their Surface.

The *Sensibility* of Ligaments, in the sound state, is inconsiderable ; when in a state of inflammation, however, they are found to occasion extreme pain.

Use of Ligaments.

The *Capsular Ligaments* connect Bones together, assist in the secretion of the *Synovia*, which they contain, and prevent the other parts from being pinched in the Joint.

The other Ligaments join Bones together, and preserve them in their proper situation. In many parts, they give attachment to *Tendons*, and in some to the *Fleshy parts* of Muscles.

MUCOUS SUBSTANCES,

Commonly called Glands of the Joints.

These are *Masses of Fat* found in most of the Joints, covered with a continuation of the inner Layer of the *Capsular Ligament*, and projecting in such a manner as to be gently pressed, but not bruised, by the action of the Joint ; and, in proportion as this motion is more

or less frequent, the liquor which they secrete is discharged in a greater or smaller quantity.

In some Joints, they have the same appearance with Fat in the other parts of the Body; in others, they are of a redder colour, from the great number of Blood-vessels dispersed upon them.

They have been commonly considered as *Glands* lodged within the masses of Fat; but, upon a minute inspection, no knotty or Glandular bodies are to be found in them, nor have they the appearance of Glands, farther than in being secreting substances; which circumstance alone assimilates them to the nature of Glands.

From the edges of these Fatty bodies, *Fimbriæ* hang loose, and convey a lubricating liquor, called *Synovia*, into the cavity of the Joints.

From the extremities of these *fringes*, the liquor can be readily squeezed out by pressure; but their cavities and orifices are so minute, or are otherwise of such a nature as to have hitherto eluded discovery.

The *Fimbriæ* have been generally considered as *Excretory Ducts of Glands* within the Joints. Dr. MONRO, however, in his Work upon the *Bursæ Mucosæ*, supposes them to be of the nature of the *Follicles of the Urethra*, which prepare a Mucilaginous Liquor, without the assistance of any knotty or Glandular Organ.

The *Arteries* which supply these bodies with blood for their secretions, and the *Veins* which return the blood after the secretion, can be readily seen; but no *Nerves* can be traced into them; nor does it appear that they possess a higher degree of sensibility than the other parts of the Joints already described; although, when they inflame and suppurate, they have in some instances been observed to occasion the most excruciating pain.

The *Synovia*, which is a thin Mucilaginous liquor, resembling the glair of an egg, appears to be furnished, not only by the substances already mentioned, but also by the inner surface of the Capsular Ligament in general, and serves for the lubrication of the Joints.

LIGAMENTS of the LOWER JAW.

The *Capsular Ligament*, which arises from the whole margin of the Articular Cavity of the Temporal Bone,

and is inserted, first into the edge of the Interarticular Cartilage, and afterwards round the cervix of the Lower Jaw. This Ligament like others which belong to Joints of the hinge kind, is thickest and strongest at the sides of the Joint, to confine the lateral motion of the Jaw.

By it the Jaw is allowed to move upwards, downwards, or a little forwards or backwards, or to a side, and the motions are rendered easier by the intervention of the Interarticular Cartilage, which follows the Condyle in its different motions.

The *Suspensory Ligament* of the Stylo-glossus Muscle, which is attached by one end to the Styloid Process, and to a Ligament running from that Process to the *Os Hyoides*; and by the other end to the angle of the Lower Jaw, serving to support the Stylo-glossus Muscle, and give origin to part of it.

The *Lateral Ligament*, which arises from the margin of the Articular Cavity of the Temporal Bone, and is inserted into the inner Surface of the angle of the Lower Jaw, near its posterior Foramen—assisting to keep the Jaw in situ, and to prevent the inferior Maxillary Vessels and Nerves from being injured by the action of the Pterygoid Muscle.

LIGAMENTS connecting the Head with the first and second Vertebrae of the Neck, and these two Vertebrae with each other.

The *two Capsular Ligaments*, which arise from near the margin of the superior articulating Processes of the Atlas, and are inserted into the Base of the Condyles of the Occipital Bone, where the Head has its flexion and extension without rotation.

The *Circular Ligament*, which arises from the edge of the Spinal hole of the first Vertebra, is connected with the Capsular Ligament of the superior Articulating Processes of the Atlas, and is inserted into the edge of the Foramen Magnum of the Occipital Bone.

The *two Capsular Ligaments* which fix the inferior oblique Processes of the Atlas, to the superior oblique of the Vertebra Dentata and admit of the rotation of the Head, with a small degree of motion to either side.

The *perpendicular Ligament*, which fixes the Proces-

suis Dentatus of the second Vertebra to the edge of the anterior part of the Foramen Magnum, between the Condyles

The two *Lateral*, or *Moderator Ligaments*, which arise each from the side of the *Processus Dentatus*, and run outwards and upwards to be fixed to the inner part of the side of the Atlas, and to the inner edge of the Foramen Magnum; they are short but of great strength, and they prevent the Head from turning too far round.

The *Transverse Ligament*, which arises from the inner side of the Atlas, and going across behind the *Processus Dentatus*, is fixed to the opposite side

The edges of this Ligament extend upwards and downwards, and form two Processes, called its *Appendices*, which are fixed to the Foramen Magnum and *Processus Dentatus*. The middle of the Ligament is remarkably firm where that Process plays upon it. It keeps the *Processus Dentatus* in its place, and prevents it from injuring the Spinal Marrow in the different motions of the Head.

LIGAMENTS of the other Vertebrae.

The *Anterior Common Ligament* of the Vertebrae, which is a strong Tendinous Band, embracing the convex or fore-part of the Vertebrae, from the upper to the under region of the Spine.—It is much thicker upon the fore-part than on the sides of the Vertebrae, by which the Bones are more firmly united, and is thinner in the Neck and Loins, where the motions of the Spine are greatest, than it is on the Back. Through its whole course, it sends off small Processes to be fixed to the bodies of the Vertebrae, by which their connection is made more secure. It prevents the Spine from being stretched too much backwards.

The *Capsular Ligaments*, which join the articulating Processes to each other.

The *Crucial Intervertebral Ligaments*, which join the bodies of the Vertebrae together, upon the outer edges of the intervertebral Substances, to which also they firmly adhere.

The *Intervertebral Substances* (already described along with the Bones) which join the bodies of the Vertebrae

together, and allow an yielding motion in all directions.

These Substances are so compressible as to yield to the weight of the upper part of the Body ; so that, after having been in the erect posture through the course of the day, the height of a person is diminished in the evening, but, after a night's rest in the usual attitude, it is found to be restored.

The *Ligaments* which run from the edge of the Spinal hole of one Vertebra to that of the next, so as to assist in filling up the interstices, and in fixing the Vertebrae together.

A *Ligamentous Cord* which fixes the point of the Spinous Processes together.

Ligaments between the Transverse Processes of the Vertebrae of the back, fixing these Processes to each other.

The *Posterior* or *Internal Common Ligament* of the Vertebrae somewhat similar to the anterior one.

It begins at the anterior edge of the Foramen Magnum, and after passing along the inner or concave part of the bodies of the Vertebrae and adhering firmly to their upper and under edges, terminates at the lower part of the Os Sacrum.—It prevents the Spine from being too much bent forwards.

LIGAMENTS of the Ribs.

The *Capsular Ligaments of the Heads of the Ribs*, which arise from these Heads, and are fixed to the circumference of the Pits on the sides of the bodies of the Vertebrae and Intervertebral Cartilages ;—the outer part of each Ligament sending off, or being connected with radiated Fibres which are spread out upon the sides of the Vertebrae.

The *Capsular Ligaments of the Tubercles of the Ribs*, which arise round the Articular Pits on the points of the Transverse Processes of the Vertebrae of the back, and are fixed round the Tubercles of the Ribs.

The *Internal Ligaments of the Back of the Ribs*, called *Ligamenta Transversaria Interna*, which arise from the inferior Surface of the Transverse Processes, and are fixed to the superior margin of the Neck of the nearest Ribs.

The *External Ligaments of the Neck of the Ribs*, call-

ed *Ligamenta Transversaria Externa*. They arise from the point of all the Transverse Processes externally, and are fixed to the back-part of the Neck of the Ribs.

Ligamenta Cervicis Costarum Externa, or *External Ligaments of the Neck of the Ribs*, which arise from the external margin of the inferior oblique Processes, and descend obliquely outwards, to be fixed to the upper and outer part of the Neck of all the Ribs.

The Ligaments at this end of the Ribs, together with the situation of the Transverse Processes, admit of their motion upwards and downwards, but prevent them from moving in any other direction.

Short Ligamentous Fibres, which run from the margin of the anterior extremity of the Ribs to the margin of their corresponding Cartilages; the Cartilage and Rib being joined by an union of Substance.

Radiated Ligaments, which go from the anterior Surface of the Capsular Ligaments upon the external Surface of the Sternum.

Many of the Fibres of these Ligaments intermixing with their fellows on the opposite side.

The *Capsular Ligaments of the Cartilages of the Ribs*, which arise from the margin of the Articula: Cavities of the Sternum, and are fixed round the extremities of the seven true Ribs.

Membrane proper to the Sternum. This is a firm expansion composed of Tendinous Fibres running in different directions, but chiefly in a longitudinal one, and covering the anterior and posterior Surfaces of the Bone, being confounded with the Periosteum.

Ligaments of the Cartilago Ensiformis. They are part of the proper Membrane of the Sternum, divided into strong bands which run obliquely from the under and fore-part of the second Bone of the Sternum, and from the Cartilages of the seventh pair of Ribs, to be fixed to the Cartilago Ensiformis.—The Ligaments covering the Sternum, serve considerably to strengthen that Bone.

Thin Tendinous Expansions, which run over the Intercostal Muscles at the fore-part of the Thorax, and connect the Cartilages of the Ribs to each other.

LIGAMENTS

OF THE

BONES OF THE PELVIS.

THE *two Transverse Ligaments of the Pelvis*, which arise from the posterior part of the Spine of the Os Ilium, and run transversely. The *superior* is fixed to the Transverse Process of the last Vertebrae of the Loins; the *inferior* to the first Transverse Process of the Os Sacrum.

The *Ileo Sacral Ligaments*, which arise from the posterior Spinous Process of the Os Ilium, descend obliquely, and are fixed to the first, third, and fourth spurious Transverse Processes of the Os Sacrum.

These, with the two Transverse Ligaments, assist in binding the Bones together, to which they are connected.

The *Capsular Ligament of the Symphysis of the Os Ilium and Sacrum*, which surrounds the Joint, and assists in connecting the two Bones to each other.

A *very thin Cartilage* within this Joint, which cements the two Bones strongly together, and which constantly adheres to the Os Sacrum, when the Joint is opened.

The back-part of the Joint, formed of a *Ligamentous and Cellular Substance*, containing *Mucus*, which also assists in fixing the two Bones to each other, in such a manner as to allow no motion. The Joint, however, along with its fellow, and that between the Ossa Pubis, are useful in diminishing the effects which might result from concussion.

The *two Sacro-Ischiatic Ligaments* situated in the under and back-part of the Pelvis. They arise in common from the Transverse Processes of the Os Sacrum, and likewise from the under and lateral part of that Bone, and from the upper part of the Os Coccygis. The first, called the *Large External, or Posterior*, descends obliquely, to be fixed to the tuberosity of the Os Ischium. These two Ligaments assist in binding the Bones of the Pelvis, in supporting its contents, and in giving origin to part of its Muscles.

There are *two Membranous Productions* which are connected with the large Sacro-Ischiatic Ligament, termed by WEIGBRECHT, its *Superior* and *Inferior Appendices*.

The *Superior Appendix*, which is Tendinous, arises from the back-part of the Spine of the Os Ilium, and is fixed along the outer edge of the Ligament, which it increases in breadth.

The *Inferior*, or *Falciform Appendix*, situated within the cavity of the Pelvis, the back-part of which is connected with the middle of the large External Ligament, and the rest of it is extended round the Curvature of the Os Ischium.

These two productions assist the large sacro-Ischiatic Ligament in furnishing a more commodious situation for, and insertion of part of the Gluteus Maximus and Obturator Internus Muscles.

Besides the *Ileo Sacro*, and *Sacro Ischiatio* Ligaments, several other *Slips* are observed upon the back of the Os Sacrum, which descend in an irregular manner, and strengthens the connection between that Bone and the Os Ilium.

The large holes upon the back part of the Os Sacrum are also surrounded with various *Ligamentous Expansions*, projecting from one Tubercle to another, and giving origin to Muscular Fibres, and protection to small Vessels and Nerves which creep under them.

A *General Covering* sent down from the Ligaments of the Os Sacrum, which spreads over and connects the different pieces of the Os Coccygis together, allowing considerable motion, as already mentioned in the description of this Bone.

Longitudinal Ligaments of the Os Coccygis, which descend from those upon the Dorsum of the Os Sacrum, to be fixed to the back part of the Os Coccygis. The Ligaments of this Bone prevent it from being pulled too much forwards by the action of the Coccygens Muscle, and they restore the Bone to its natural situation, after the Muscle has ceased to act.

The *Inguinal Ligament*, or *Poupart's*, or *Fallopian's Ligament* which runs transversely from the anterior superior Spinous Process of the Os Ilium to the crest or angle of the Os Pubis. It has been formerly described as the under margin of the Tendon of the external ob-

lique Muscle of the Abdomen. By WEITBRECHT and some others, it is regarded as a distinct Ligament. It contributes to the support of the Viscera at the under end of the Abdomen, and furnishes a passage to the Muscles, Vessels, and Nerves, which go behind it from the Pelvis to the Thigh.

The *Capsular Ligament of the Symphysis of the Ossa Pubis*, which joins the two Bones to each other externally.

The *Ligamentous Cartilage*, which unites the two Ossa Pubis so firmly together as to admit of no motion; excepting in the state of Pregnancy, when this Ligamentous Cartilage is frequently found to be so much thickened as to yield a little in the time of delivery.

The *Obturator Membrane, or Ligament of the Foramen Thyroideum*. It adheres to the margin of the Foramen Thyroideum, and fills the whole of that opening, excepting the oblique notch at its upper part, for the passage of the Obturator Vessels and Nerve. It assists in supporting the contents of the Pelvis, and in giving origin to the Obturator Muscles.



LIGAMENTS

OF THE

SUPERIOR EXTREMITY.



CONNECTION of the INNER END of the CLAVICLE.

Radiated Ligaments, which arise from the Surface of the inner end of the Clavicle, and are fixed round the edge of the corresponding Articular Cavity of the Sternum.

The *Capsular Ligament* which lies within the former.

The *Inter-articular Cartilage*, which divides the Joint into two distinct Cavities, and accommodates the articulating Surfaces of the Clavicle and Sternum.

The *Inter-clavicular Ligament*, joining the Clavicles together behind the top of the Sternum, and partly formed by a continuation of the radiated Ligaments.

The *Ligamentum Rhomboideum*, which arises from the inferior rough Surface at the anterior extremity of the Clavicle, and is fixed to the Cartilage of the first Rib.

By the Ligaments of this Joint, with the assistance of the intervening Cartilage, the shoulder is allowed to move in different directions, as upon a center.

The *Ligaments* which join the posterior extremity of the Clavicle to the Acromion, and have a Capsular Ligament within, and sometimes an inter-articular Cartilage.

The *Ligamentum Trapezoideum*, which arises from the point of the Coracoid Process, and is fixed to the under edge of the Clavicle.

A *thin Ligamentous Slip* which comes from the Tendon of the Subclavian Muscle, or from the Clavicle, and joins the Trapezoid Ligament.

The Ligaments fixing the Clavicle to the Scapula are of such strength, as to allow only a small degree of motion, and that chiefly of a rolling or twisting nature.

LIGAMENTS *proper to the Scapula.*

The *Proper Anterior Triangular Ligament of the Scapula*, which arises broad from the external Surface of the Coracoid Process, and becomes narrower where it is fixed to the posterior margin of the Acromion.

This Ligament forms one continued Surface. It is thickest, however, on each side, and these thicker parts are united by a thin intermediate Ligamentous Membrane, which, when removed, gives to the Ligament the appearance of being double.—It confines the Tendon of the Supra Spinatus Muscle, and assists in protecting the upper and inner part of the Joint of the Humerus.

The *Posterior Ligament of the Scapula*, which is sometimes double, and is stretched across the semilunar notch of the Scapula, forming that notch into one or two holes for the passage of the superior posterior Scapular Vessels and Nerves. It also gives rise to part of the *Omo Hyoidens Muscle*.

LIGAMENTS, &c. of the Joint of the Shoulders.

The *Capsular Ligament*, which arises from the Cervix of the Scapula, behind the margin of the Glenoid Cavity, and is fixed round the Neck of the Os Humeri, loosely inclosing the Ball of that Bone.

A *Fimbriated Organ* within the Capsular Ligament, for the secretion of the Synovia.

A *Sheath* sent down from the fore-part of the Capsular Ligament between the Tuberosities of the Os Humeri, which encloses the Tendon of the Long Head of the Biceps Flexor Cubiti Muscle.

Additional Ligamentous Bands of the Capsular Ligament, which adhere to its anterior Surface.—That which gives most strength to this Joint, as well as to several other Joints of the Body, is the covering from the surrounding Muscles.

From the shallowness of the Glenoid Cavity, from the extent and looseness of the Capsular Ligament, and from the Structure of the other parts of the Joint, more extensive motion is allowed to the Os Humeri than to any other Bone of the Body; as it cannot only move freely to every side, but possesses a considerable degree of motion upon its own axis.

LIGAMENTS, &c. of the Joint of the Elbow.

The *Capsular Ligament*, which arises round the margin of the Articular Surface, at the lower end of the Os Humeri, and is fixed about the edge of the Articular Surface of the Ulna, and also to the Coronary Ligament of the Radius.

The sides of the Elbow-Joint are strengthened by *two Ligamentous Bands*, which adhere so firmly to the Capsular Ligament, that they appear to be part of its Substance, viz.

The *Brachio Cubital* or *Internal Lateral Ligament*, which arises from the fore-part of the inner Condyle of the Os Humeri, and spreads out, in a radiated manner, to be fixed to the inside of the Coronoid Process of the Ulna, and

The *Brachio-Radial*, or *External Lateral Ligament*, which is like the former, but larger. It arises from the external Condyle of the Os Humeri, and spreads out upon the Coronary Ligament, to which it is inserted.

The *Coronary, Annular, or Orbicular Ligament* of the *Radius*, which arises from one side of the small *Semilunar Cavity* of the *Ulna*, and after surrounding the *Neck* of the *Radius*, is fixed to the other side of that *Cavity*. The upper edge of it is incorporated with, and may be considered as a part of the *Capsular Ligament*, while its under edge is fixed round the neck of the *Radius*, allowing that *Bone* to move freely round its own axis, upon the *Articular Surface* of the *Os Humeri*, and in the small *Semilunar Cavity* of the *Ulna*.

Besides the *Ligaments* already described, there are others which run in various directions upon the fore and back-parts of the *Joint*, contributing to its strength, and having the names of *Anterior* and *Posterior Accessory Ligaments*.

The *Ligaments* of the *Bones* of the *Joint* of the *Elbow* form a complete hinge, which allows the fore-arm to have free flexion and extension upon the *Os Humeri*, but no rotation when the *Arm* is in the extended state, though a small degree of it is perceptible when the *Joint* is moderately bent, and the *Ligaments* thereby relaxed.

Within the *Capsular Ligament*, and chiefly in the upper part of the pits of the *Os Humeri*, in which the *Olecranon* and *Coronoid Process* of the *Ulna* play, the *Fatty Substance* is lodged for the lubrication of the joint.

LIGAMENTS between the Bodies and Under Ends of the *Radius* and *Ulna*.

The *Interosseous Ligament*, which extends between the sharp ridges of the *Radius* and *Ulna*, filling up the greater part of the space between these two *Bones*, and composed of small *Fasciculi*, or *Fibrous Slips*, which run obliquely downwards and inwards. Two or three of these, however, go in the opposite direction; and one of them, termed *Oblique Ligament*, and *Chorda Transversalis Cubiti*, is stretched between the *Tubercle* of the *Ulna* and under part of the *Tubercle* of the *Radius*.—In different parts of the *Ligament* there are perforations for the passage of *Blood-vessels* from the fore to the back-part of the *Bone*, and a large opening is found at the upper part of it, which is filled up by *Muscles*. It prevents the *Radius* from rolling too much

outwards, and furnishes a commodious attachment for Muscles.

The *Capsular* or *Sacciform Ligament*, which arises from the edges of the Glenoid Cavity of the under end of the Radius, and surrounds the head of the Ulna, allowing the Radius to turn upon the Ulna in performing the different motions of pronation and supination of the Hand.

LIGAMENTS, &c. *between the FORE-ARM and WRIST.*

The *Capsular Ligament*, which arises from the margin of the extremity of the Radius, and from the edge of the moveable Cartilage at the head of the Ulna, and is fixed to the Cartilaginous edge of the three first bones of the Carpus.

The *Inter-articular Cartilage* placed between the head of the Ulna and Os Cuneiforme, and which is a continuation of the Cartilage covering the end of the Radius.

The *Two lateral Ligaments* which arise from the Styloid Process of the Radius and Ulna, and are fixed to the Bones of the Carpus nearest them.

The Ligaments of this joint allow extensive motion forwards and backwards, and a considerable degree of it to either side.

The *Mucous Ligament* which lives within the joint. It extends from the groove between the two first Bones of the Carpus, to the corresponding part of the Radius, and is supposed to regulate the Mucous Organ connected with it.

LIGAMENTS *of the CARPUS.*

The *Anterior, Annular, or Transverse Ligament*, which is stretched across from the projecting points of the Pisiforme and Unciforme Bones, to the Os Scaphoides and Trapezium, and forms an arch which covers and preserves in their places the Tendons of the Flexor Muscles of the Fingers.

The *Capsular Ligament* which arises from the Cartilaginous edges of the upper row, and is fixed in a similar manner to those of the under row of the Carpus, admitting chiefly of flexion and extension, and that in a smaller degree than in the former joint.

The *short Ligaments* of the bones of the Carpus, which are *small ligamentous Slips* running in various directions,

joining the different Bones of the Carpus,—first of the same row, then of the two rows together. They are termed *Oblique, Transverse, Capsular, and Proper Ligaments* of the Bones of the Wrist, and admit only of a small degree of yielding between the different bones in the same row.

LIGAMENTS *between the Carpal and Metacarpal Bones.*

The *Articular Ligaments*, which arise from the margins of the second row of the Carpal Bones, and are fixed to the margins of the bases of those of the Metacarpus. *Other Ligaments* run in a radiated manner from the Carpal to the Metacarpal Bones; the whole getting the names of *Articular, Lateral, Straight, Perpendicular, &c.* according to their different directions.

From the Flatness of the Articular Surfaces, and strength of the connecting Ligaments, very little motion is allowed between the Carpus and Metacarpus.

LIGAMENTS *between extremities of the Metacarpal Bones.*

The *Interosseous Ligaments* at the *Bases* of the Metacarpal Bones. They are short slips, which run transversely, and join these Bones to each other, obtaining the names of *Dorsal, Lateral, or Palmar*, according to their different situations.

The *Interosseous Ligaments* at the *Heads* of the Metacarpal Bones, which run transversely in the Palm, and connect the heads of these bones to each other.

LIGAMENTS *at the Base of the Metacarpal Bone of the THUMB, and of the first joint of the FINGERS.*

These consist of the *Capsular Ligaments*, which inclose the joints, and the *Lateral Ligaments* which are situated at the sides of the former, adhering to, and strengthening them; the whole admitting of Flexion, extension, and lateral motion.

LIGAMENTS *of the first and second joints of the THUMB, and second and third joints of the FINGERS.*

The *Capsular Ligaments* inclosing the Joints.

The *Lateral Ligaments* placed at the sides of the joints, and adhering to the Capsular Ligaments, confining the motion to flexion and extension.

LIGAMENTS retaining the Tendons of the Muscles of
the HANDS and FINGERS in situ.

The *Anterior, Transverse, or Annular Ligament* of the Wrist,—already described.

The *Vaginal Ligaments* of the Flexor Tendons, which are fine Membranous Webs connecting the Tendons of the Sublimis, first to each other, then to those of the Profundus, and forming at the same time, Bursæ Mucosæ, which surround the Tendons.

The *Vaginal, or Crucial Ligaments of the Phalanges*, which arise from the ridges on the concave side of the Phalanges, and run over the Tendons of the Flexor Muscles of the Fingers. Upon the body of the Phalanges, they are thick and strong, to bind down the Tendons; but over the joints they are thin, and have, in some parts, a Crucial appearance, to allow the ready motion of the Joints.

The *Accessory Ligaments of the Flexor Tendons of the Fingers*, which are *small Tendinous Fræna*, arising from the first and second Phalanges of the Fingers. They run obliquely forwards within the Vaginal Ligaments, terminate in the Tendons of the two Flexor Muscles of the Fingers, and assist in keeping them in their places.

The *External Transverse Ligaments of the Wrist*, which is part of the Aponeurosis of the Fore-Arm, extending across the back of the Wrist, from the extremity of the Ulna and Os Pisiforme to the extremity of the Radius. It is connected with the small Annular Ligaments which tie down the Tendons of the Extensores Ossis Metacarpi et primi Internodii Pollicis, and the Extensor Carpi Ulnaris.

The *Vaginal Ligaments* which adhere to the former Ligaments, and serve as sheaths and Bursæ Mucosæ to the Extensor Tendons of the Hand and Fingers.

The *Transverse Ligaments*, of the Extensor Tendons, which are Aponeurotic Slips running between the Tendons, near the heads of the Metacarpal Bones, and retaining them in their places.

LIGAMENTS

OF THE

INFERIOR EXTREMITY.

LIGAMENTS *connecting* OS FEMORIS *with* OS INNOMINATUM.

THE *Capsular Ligament*, which is the largest and strongest of the Body, arises round the outside of the Brim of the Acetabulum, embraces the head of the Thigh-bone, and incloses the whole of its Cervix to the root or outer extremity, round which it is firmly connected.

The *outer part* of the Capsular Ligament is extended farther down than the *inner*, which is reflected back upon the neck of the Bone, and in certain parts forms *Fetinaacula*.

It is every where of the same strength. It is thickest anteriorly; thinner where it is covered by the internal Iliac Muscle; and thinnest posteriorly, where the adjacent Quadratus Muscle is opposed to it.

It is strengthened on its outer Surface by various *accessory* or *additional slips*, which run down from the Fascia Lata and surrounding Muscles; but the strongest of these slips arises with diverging Fibres from the interior anterior Spinous Process of the Os Ilium.—The Capsular Ligament allows the Thigh-bone to be moved to every side, and to have a small degree of rotation.

The *Internal*, commonly called the *Round Ligament*, which arises by a broad flat beginning from the under and inner part of the Cavity of the Acetabulum, and is connected with the Substance termed *Gland of the Joint*. From this it runs backwards and a little upwards, becoming gradually narrower and rounder, to be fixed to the Pit upon the inner Surface of the Ball of the Os Femoris.

The round Ligament prevents the bone from being dislocated upwards, and assists in agitating the Mucous Substance within the Joint.

A *Cartilaginous Ligament* surrounding the Brim of the Acetabulum, and thereby increasing the depth of that cavity for the reception of the head of the Thigh-bone.

A *double Cartilaginous Ligament*, stretched from one end of the breach, in the under and fore-part of the Acetabulum, to the other, but leaving a hole behind it for containing part of the Substance called *Gland of the Joint*, and for the passage of the Vessels of that Substance.

This Ligament allows the Thigh-bone to be moved inwards, and the Glandular-looking Substance to be agitated with safety.

The Substance called *Gland of the Joint*, covered with a Vascular Membrane, and lodged in a depression in the under and inner part of the Acetabulum.

At the edges of this Substance, *Fringes* are sent out, which furnish part of the Synovia for the lubrication of the Joint.

The edges of this substance are fixed to those of the Pit in the Acetabulum, by small Ligamentous Bridles, termed *Ligamenta Mucosa*, or *Ligamentula Massæ Adiposo-Glandulosæ*.

Ligaments, &c. of the Joint of the Knee.

The *Lateral Ligaments* which lie at the sides of the Joint, and adhere to the outer Surface of the Capsular Ligament

The *Internal Laternal Ligament*, which is of considerable breadth, arises from the upper part and Tubercle of the internal Condyle of the Os Femoris, and is inserted into the upper and inner part of the Tibia.

The *long External Lateral Ligament*, which is narrower, but thicker and stronger than the former, arises from the Tubercle above the external Condyle of the Os Femoris, and is fixed to the Fibula, a little below its head.

Behind the long external Lateral Ligament, there is an *Expansion* attached nearly in the same manner as

this Ligament, and has been termed the *external short Lateral Ligament*.

These Ligaments prevent lateral motion, and the rolling of the Leg in the extended state, but admit of a small degree of both these motions when the Limb is bent.

The *Posterior Ligament* of WINSLOW, formed of irregular bands which arise from the upper and back-part of the external Condyle of the Os Femoris, and descend obliquely over the Capsular Ligament, to be fixed under the inner and back-part of the head of the Tibia,—preventing the Leg from being pulled farther forwards than to a straight line with the Thigh. It also furnishes a convenient situation to the beginnings of the *Gastrenemius* the *Plantaris* Muscles.

When this Ligament is wanting, which is sometimes the case, its place is then supplied by a *Membraneous Expansion*.

The Ligament of the Patella, which arises from a depression behind the Apex of the Bone, and is fixed to the Tuberosity of the Tibia. By the intervention of this Ligament, the Muscles fixed to the Patella are enabled to extend the Leg.

The *Capsular Ligament* which arises from the whole circumference of the under end of the Thigh-bone, some way above the margin of the articulating Cartilage, and above the posterior part of the great notch between the Condyles. From this it descends to be fixed round the head of the Tibia, and into the whole margin of the Articulating Surface of the Patella, in such a manner that this Bone forms part of the Capsule of the Joint.

The Capsular Ligament is of itself remarkably thin, but so covered by the Ligaments already mentioned, by the general Aponeurosis, and by the Tendons of Muscles which surround the Joint, as to acquire a considerable degree of strength.

The Capsular Ligament along with the other Ligaments of this Joint, admit of the flexion and extension of the Leg, but of no lateral nor rotatory motion in the extended state, though of a small degree of each when the Limb is fully bent.

Ligamentum Alare, majus et minus, which are folds of the Capsular Ligament. running like wings at the

sides of the Patella, to which, and to the Fatty Substance of the Joint, they are attached

Ligamentum Mucosum, which is continued from the joining of the Alar Ligaments to be fixed to the Os Femoris immediately above the anterior Crucial Ligament, and which preserves the Fatty Substance of the Joint in its proper place, in the various motions of the Joint.

The *two Crucial, or internal Ligaments* which arise from the hollow between the Condyles of the Os Femoris, and decussate each other within the cavity of the Joint.

The *anterior Crucial Ligament*, which runs downwards and forwards, to be fixed to a Pit before the rough Protuberance in the middle of the Articulating Surface of the head of the Tibia.

The *posterior Crucial Ligament*, which runs downwards, to be fixed to a Pit behind the above mentioned rough Protuberance.

These Ligaments, in the extended state of the Leg, prevent it from going forwards beyond a straight Line. When the knee is bent, they admit the Foot to be turned outwards, but not inwards.

The *two Inter-articular Cartilages*, called Semilunar from their shape, placed upon the top of the Tibia.

The outer convex edge of each of these Cartilages is thick, while the inner concave edge becomes gradually thinner, whereby the Sockets for the Condyles of the Os Femoris are rendered deeper, and this Bone and the Tibia more accurately adapted to each other.

Each of these Cartilages is broad in the middle, and their extremities become narrower and thinner as they approach each other. These extremities are termed *Cornuá*, and are fixed by Ligaments to the Protuberance of the Tibia. The anterior Cornua are joined to each other by a *Transverse Ligament*.

The convex edge of these Cartilages is fixed to the Capsular and other Ligaments, in such a manner as to allow them to play a little upon the Cartilaginous Surface of the Tibia, by which the motions of that Bone upon the Condyles of the Os Femoris are facilitated.

The *Mucous or Fatty Substances* of the Joint, which

are the most considerable of any in the Body, and are situated in the different interstices of the Joint, but chiefly round the edges of the Patella.

The *Fimbriæ*, which discharge Synovia for the lubrication of the Joint, projecting from the edges of the Fatty Substance.

Ligaments connecting the Fibula to the Tibia.

The *Capsular Ligament* of the superior extremity of the Fibula, which ties it to the outer part of the head of the Tibia, and which is strengthened by the external Lateral Ligament of the Knee, and by the Tendon of the Biceps Muscle which is fixed to the Fibula.

The *Interosseus Ligament* which fills the space between the Tibia and Fibula, like the Interosseous Ligament of the Fore-arm, and is of a similar structure, being formed of oblique Fibres, and perforated in various places for the passage of Vessels and Nerves.

At the upper part of it there is a large opening, where the Muscles of the opposite sides are in contact, and where Vessels and Nerves pass to the fore part of the Leg.

It serves chiefly for the origin of part of the Muscles which belong to the Foot.

The *Ligaments* of the inferior extremity of the Fibula, which are called *Anterior superior* and *Posterior superior*, according to their situations. They arise from the edges of the Semilunar cavity of the Tibia, and are fixed to the Malleolus Externus of the Fibula.

The Ligaments between the ends of the Tibia, and Fibula, fix the two Bones so firmly together as to admit of no sensible motion.

LIGAMENTS connecting the BONES of the TARSUS with those of the LEG.

The *Anterior Ligaments of the Fibula*, which arises from the anterior part of the Malleolus Externus, and passes obliquely forwards, to be fixed to the upper and outer part of the Astragalus.

The *middle or Perpendicular Ligament* of the Fibula, which arises from the point of the Malleolus Externus, and descends almost perpendicularly, to be fixed to the outside of the Os Calcis.

The *Posterior Ligament of the Fibula*, which arises from the under and posterior part of the Malleolus Externus, and runs backwards, to be fixed to the outer and posterior part of the Astragalus.

The *Ligamentum Deltoides* of the Tibia, which arises from the Malleolus Internus, and descends in a radiated form, to be fixed to the Astragalus, Os Calcis, and Os Naviculare.

The *Capsular Ligament*, which lies within the former Ligaments, and is remarkably thin, especially before and behind, for the readier motion of the Joint. It arises from the margin of the Articular Cavity of the Tibia and Fibula, and is fixed round the edge of the Articular Surface of the Astragalus.

The ligaments and other parts of the structure of the Ankle-Joint form it into a complete hinge, which allows flexion and extension, but no rotation or lateral motion, in the bended state of the Foot, though a small degree of each when it is fully extended.

Ligaments of the Tarsus.

The *Capsular Ligament*, which fixes the Articular Surface of the Os Calcis to that of the Astragalus:

A number of *short Ligaments* lying in the Fossa of the Astragalus and of the Os Calcis, and forming the *Ligamentous apparatus* of the Sinuous Cavity, which assists in fixing the two Bones strongly together

The *Capsular*, the *broad Superior*, and the *internal Lateral Ligaments*, connecting the Astragalus to the Os Naviculare, and admitting of the lateral and rotatory motion of the Foot.

The *superior*, the *lateral* and the *inferior Ligaments*, fixing the Os Calcis to the Os Cuboides, where a small degree of motion is allowed to every side. The inferior Ligaments consist of a *long* and *oblique*, and a *Rhomboid Ligament*, which are the longest and strongest of the Sole.

The *superior-superficial*, the *Interosseous*, and the *Inferior Transverse Ligaments*, which fix the Os Naviculare and Os Cuboides to each other

The *superior-lateral*, and *Plantar Ligaments*, which fix the Os Naviculare to the Os Cuneiforme.

The *superior-superficial*, and the *Plantar Ligaments*,

which connect the Os Cuboides to the Os Cuneiforme Externum.

The *Dorsal* and *Plantar Ligaments*, which unite the Ossa Cuneiformia to each other.

Besides the *Capsular Ligaments* of the Tarsus already mentioned, each of the other Joints of these Bones is furnished with its *proper Capsular Ligament*.

From the strength of the *Ligaments* which unite these Bones to each other, and from the plainness of their *Articulating Surfaces*, no more motion is allowed than to prevent the effects of concussion in walking, leaping, &c.

Ligaments between the Tarsus and Metatarsus.

The Bones of the *Metatarsus* fixed to those of the *Tarsus* by *Capsular*, and numerous *other Ligaments*, which, are called *Dorsal*, *Plantar*, *Lateral*, according to their situations; and *Straight*, *Oblique*, or *Transverse*, according to their directions. The nature of this Joint is the same with that between the *Carpus* and *Metacarpus*.

Ligaments connecting the Metatarsal Bones to each other.

The *Dorsal*, *Plantar*, and *Lateral Ligaments*, which connect the bases of the *Metatarsal Bones* with each other.

The *Transverse Ligaments*, which Join the heads of these Bones together.

LIGAMENTS of the PHALANGES of the TOES.

The *Capsular* and *Lateral Ligaments*, as in the *Fingers*.

LIGAMENTS and SHEATHS retaining the TENDONS of the MUSCLES of the FOOT and TOES, in situ.

The *Annular Ligament of the Tarsus*, which is a thickened part of the *Aponeurosis* of the *Leg*, splitting into superior and inferior portions, which bind down the *Tendons* of the *Extensors* of the *Toes*, upon the forepart of the *Ankle*.

The *Vaginal Ligament of the Tendon of the Peronei Muscles*, which, behind the *Ankle*, is common to both, but, at the outer part of the *Foot*, becomes proper to each. They preserve the *Tendons* in their places, and are the *Bursæ* of these *Tendons*.

The *Lacinated Ligament* which arises from the inner

Ankle, and spreads in a radiated manner, to be fixed partly in the Cellular Substance and Fat, and partly to the Os Calcis, at the inner side of the heel. It incloses the Tibialis Posticus and Flexor Digitorum Longus.

The *Vaginal Ligament of the Tendon of the Extensor Proprius Pollicis*, which runs in a Crucial direction.

The *Vaginal Ligament of the Tendon of the Flexor Longus Pollicis*, which surrounds this Tendon in the hollow of the Os Calcis.

The *Vaginal and Crucial Ligaments of the Tendons of the Flexors of the Toes*, which inclose these Tendons on the Surfaces of the Phalanges, and form their Bursæ Mucosæ.

The *Accessory Ligaments of the Flexor Tendons of the Toes*, which,—as in the Fingers,—arise from the Phalanges, and are included in the Sheaths of the Tendons in which they terminate.

The *Transverse Ligaments of the Extensor Tendons*, which run between them, and preserve them in their places behind the roots of the Toes.

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TO THE

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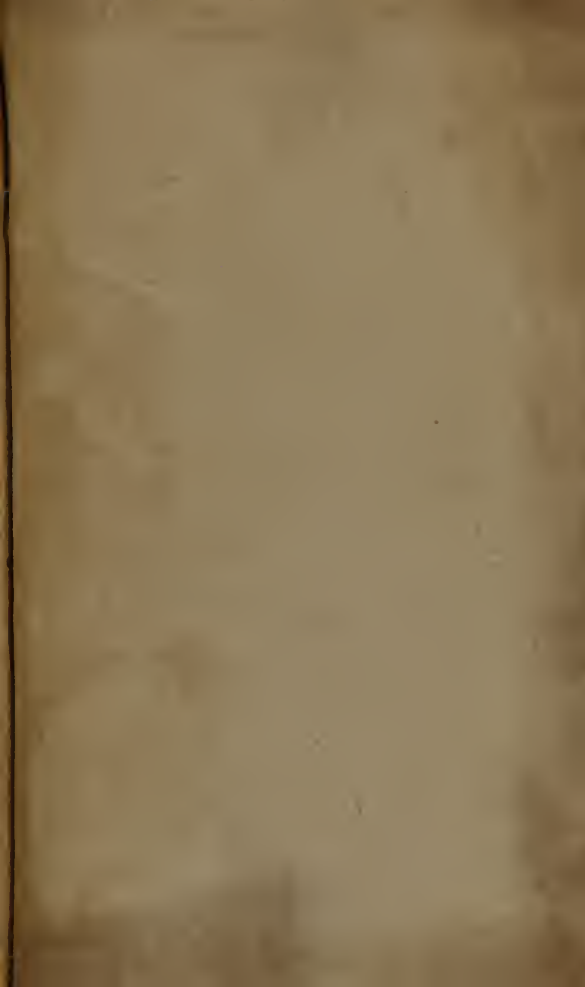
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