

New London surgical pocket-book : (medical, operative, and mechanical,) founded on the popular lectures and works of Mr. Abernethy, Sir Astley Cooper, Mr. Lawrence, and other distinguished surgeons ... including an adapted pharmacopoeia.

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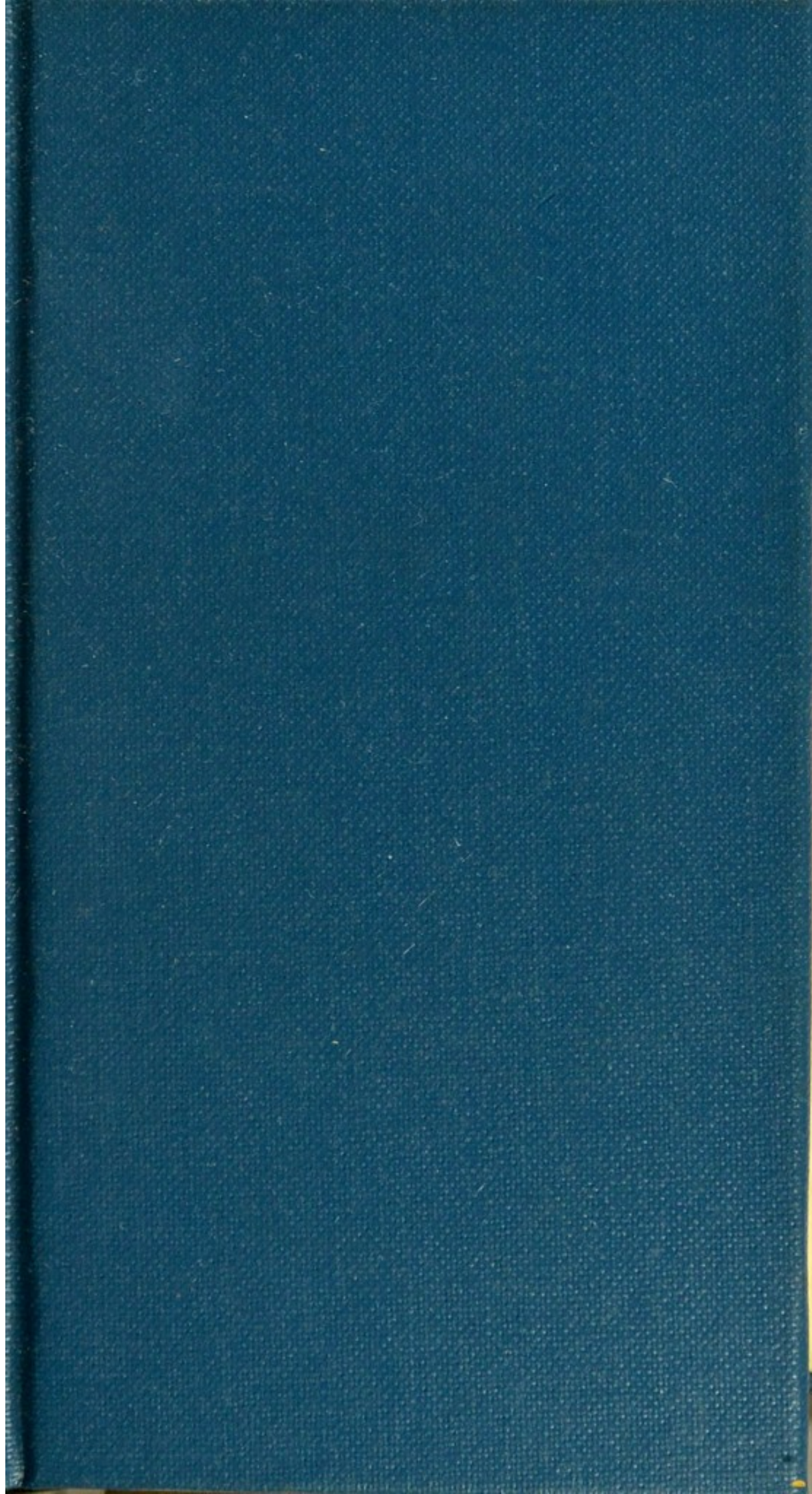
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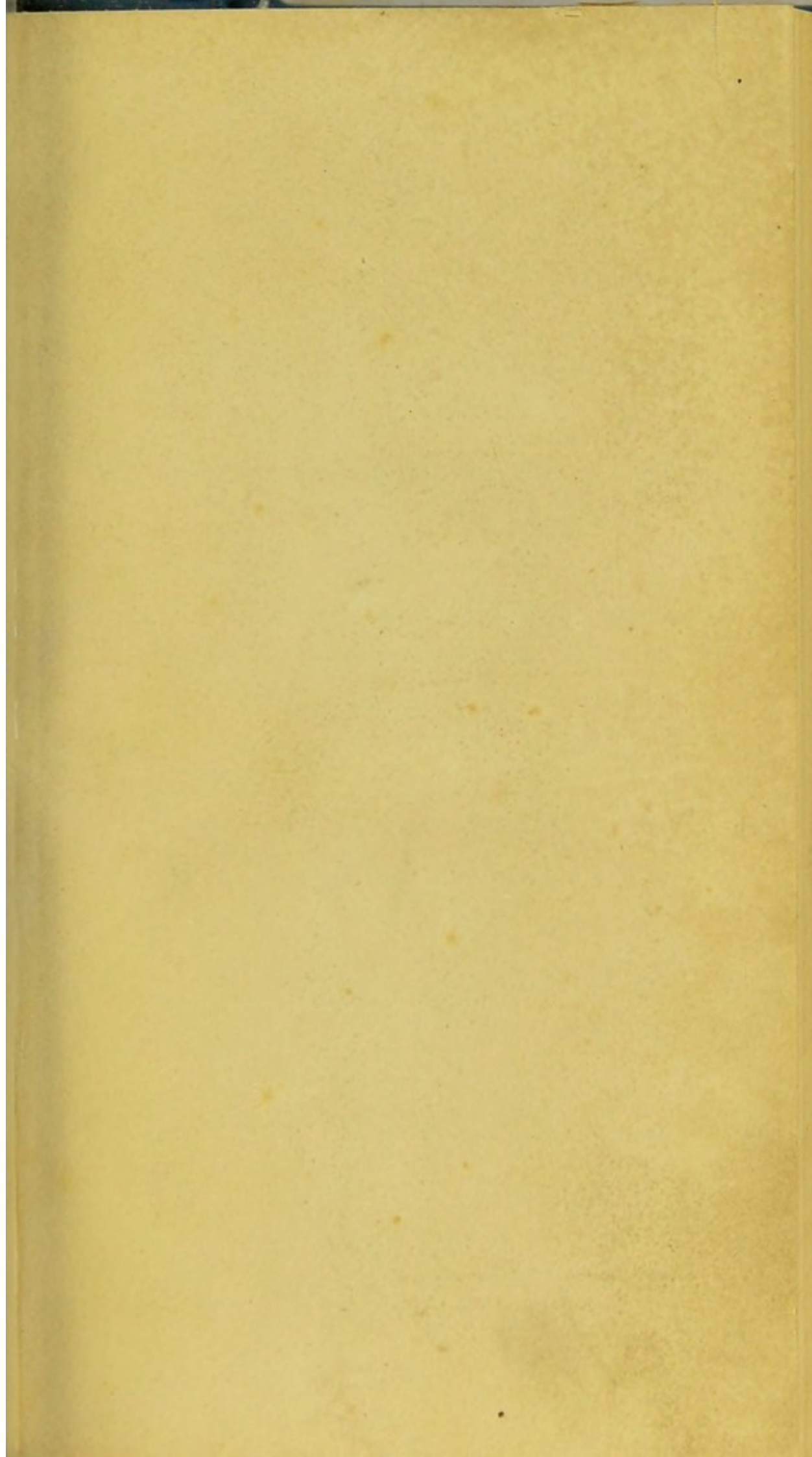
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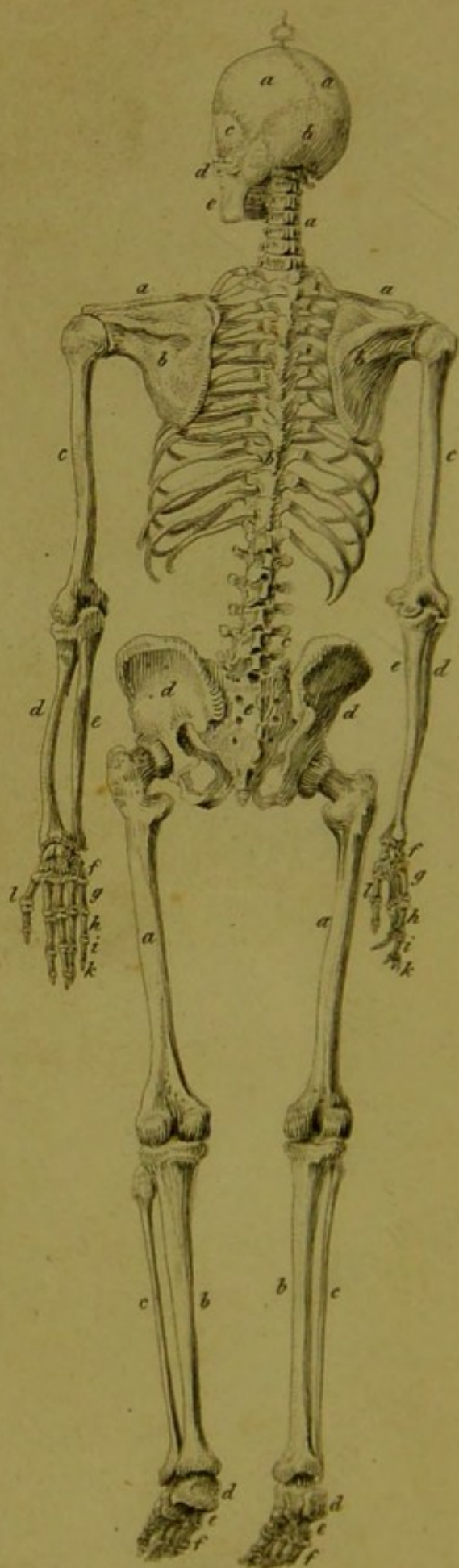
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NEW
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LONDON SURGICAL POCKET-BOOK

(MEDICAL, OPERATIVE, AND MECHANICAL,)

founded on the

POPULAR LECTURES AND WORKS

OF

MR. ABERNETHY, SIR ASTLEY COOPER, MR. LAWRENCE
AND OTHER DISTINGUISHED SURGEONS;

sub-digested in the order of

CAUSES, SYMPTOMS, CHIRURGICAL AND MEDICAL TREATMENT;
DIAGNOSES, PROGNoses, MODES OF OPERATION, AND
OTHER AGENTS EMPLOYED

IN HOSPITAL AND PRIVATE PRACTICE;

INCLUDING

AN ADAPTED PHARMACOPŒIA;

WITH CONNECTED INTERMEDIATE

PRACTICAL QUESTIONS AND ANSWERS,

PREPARATORY TO EXAMINATION BEFORE THE ROYAL COLLEGE OF SURGEONS;

Anatomical Tables, Notes, References, Glossary, &c.

FOR THE CONVENIENCE OF THE

JUNIOR BRANCHES OF THE PROFESSION, STUDENTS, &c.

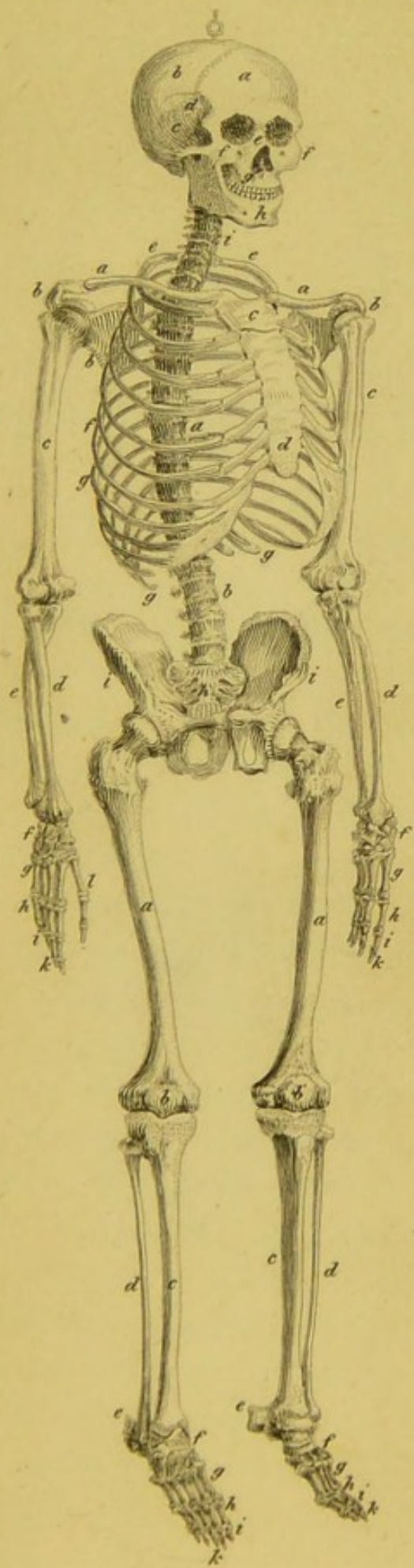
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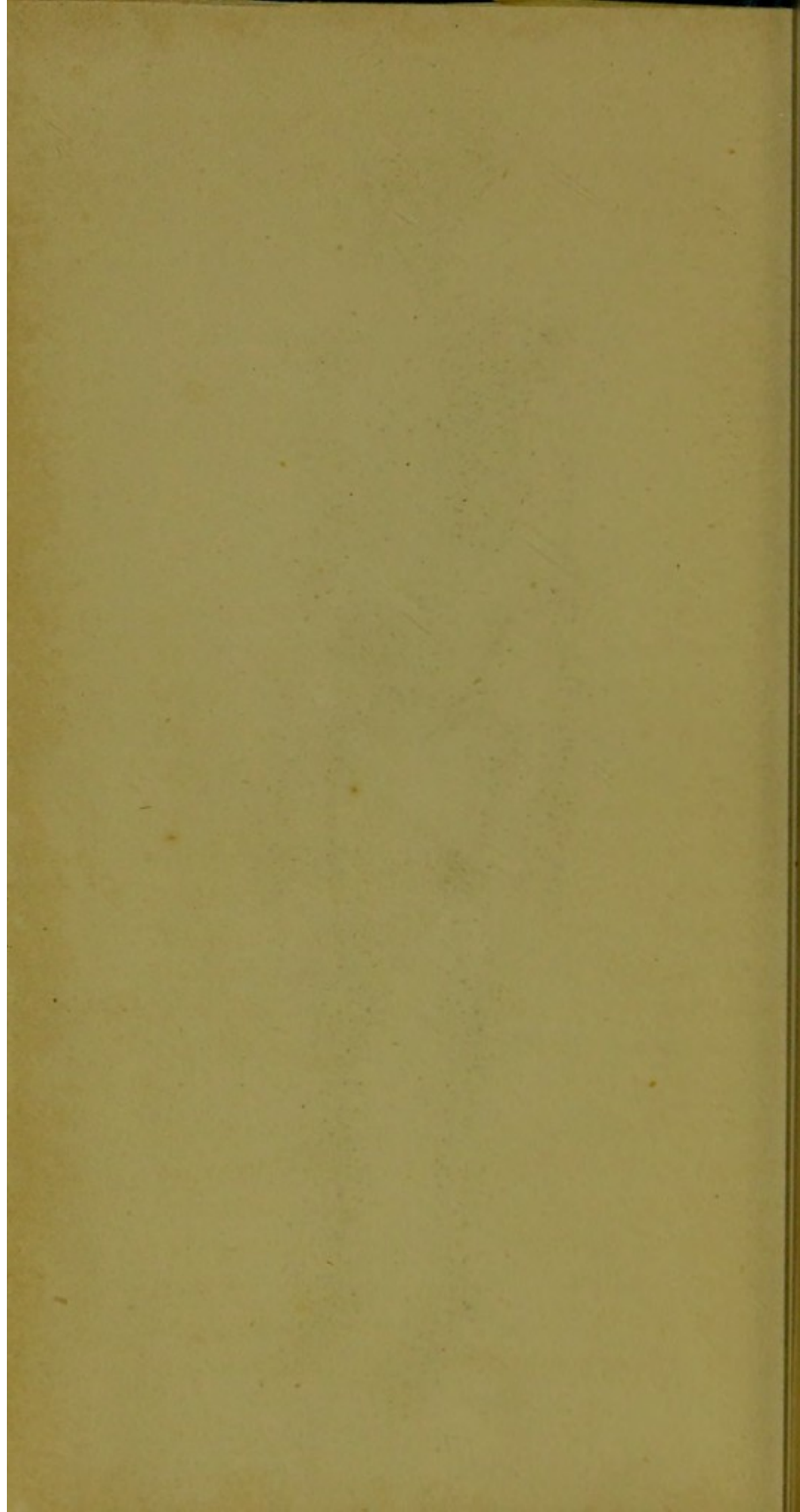
SHERWOOD, GILBERT, AND PIPER,

PATERNOSTER ROW.

1836.

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INTRODUCTORY OBSERVATIONS.

“SURGERY and Medicine,” says Mr. Abernethy, “are essentially what the French republic was declared to be, ‘one and indivisible.’” Custom, however, has separated them into two parts, consequently in the following pages are introduced those diseases only of which surgeons undertake the management. Surgery, considered according to the derivation of the word, means manual operations. Galen, speaking of the treatment of diseases, divides it into three parts, according as it is to be accomplished by diet, by remedies, or by manual operations, and these he calls respectively, *Dietetica*, *Pharmaceutica*, and *Chirurgica*. Hence, he uses the word surgery, not to denote a separate science, not a distinct branch of practice, but merely to designate one mode of treating disease. Custom has allotted to the care of the surgeon all injuries; most external diseases, and such internal ones as produce changes recognisable externally; operations, and all cases requiring their performance. Thus instituted, surgery is a large division of the art and science which relate to disease; and if that science,

which may be called in one word medicine, be divided into surgery and physic, the former will at least equal the latter in extent and importance. External diseases, however, will often arise from constitutional causes, and where a disease arises from the state of the general health, the cause must be removed before it can be cured. Again, when it is the consequence of accident, local disease will disturb the whole constitution.

The good sense of mankind has at length discovered that surgery is deserving of an eminent rank among such arts as ought to be cultivated for the general benefit of society. The surgeon, in fine, is no longer the subordinate agent of the physician, since the latter, who is not accustomed to the performance of operations, cannot be the best judge of their safety and necessity ; and, in every point of view, the surgical practitioner merits as much favour and independence in the exercise of his profession, as he whose avocation is solely confined to physic. The surgeon, consequently, is now exclusively consulted about many of the most important diseases to which the human frame is liable ; he prescribes whatever medicines the case may require, internal as well as external, and under the encouragement of an enlightened age, he sees his profession daily advancing, and becoming more scientific, more respected, and more exclusively useful.

Within the last forty years great and essential improvements have been made in almost every branch of surgery. Before the time of Mr. John Hunter, that immortal luminary of British Surgery, our ideas of the venereal disease were surrounded with absurdities : neither before his time were strictures in the urethra, an equally com-

mon and distressing disorder, well treated of. In modern times, hernial diseases, those common afflictions in every country, have received highly interesting elucidations from the labours of Pott, Camper, Richter, Sir Astley Cooper, Hey, Gimbernat, Hesselbach, Scarpa, Lawrence, Langenbeck, Cloquet, and others. The treatment of injuries of the head has been materially improved by Quesnay, Le Dran, Pott, Hill, Dessault, and Mr. Abernethy. The disease of the vertebræ, which occasions paralysis of the limbs, and which, at one time invariably baffled the practitioner, is now frequently capable of being considerably relieved, and sometimes partially cured by the method proposed by Mr. Pott; and the diseases of the joints are much better understood, and consequently more successfully treated. The almost infallible plan of curing hydrocele, by means of an injection, as described by Sir James Earle, may be enumerated a high and laudable acquisition to modern surgery; while the diseases of the eyes, cases to which British surgeons at one time seemed to pay much less attention than was bestowed by foreign surgeons, now obtain every attention. The able writings of Daviël, the Wenzels, and Ware, are now familiarly consulted by practitioners; and the observations of Scarpa, Richter, Beer, Schmidt, Hemly, Wardrop, Travers, Saunders, and Guthrie, have an immense effect in spreading in the profession a due knowledge of the numerous diseases to which the organs of sight are liable. In the treatment of aneurismal diseases, English surgeons have much to be proud of; since all the oldest operations in this branch of surgery have been

devised by the genius, and executed by the spirit and skill of British surgeons; while, in every other corresponding department of the healing art, and throughout the practice of modern surgery generally, old prejudices are gradually vanishing, and giving way to new improvements founded on experience and observation; while new instruments, different modes of operations, the discovery of various new and active remedies, or improved forms of medicine, rank among the perfections of which modern surgery has to boast, as the results of that cultivated genius, talent and penetration, hitherto unprecedented in the history of the healing art.

London, March, 1833.

ERRATUM.

Page 366—for *congenus* read *congeries*.



ANATOMICAL TABLES.



I. THE BONES.

THE bones are the hardest parts of animal bodies; they constitute a firm and common basis on which the moving powers are fixed; they form a frame-work for protecting the vital organs, as the heart, or lungs, or make complete cases where the more delicate parts of our organization, as the brain and spinal marrow, are securely lodged. They also constitute a series of levers, by means of which, through the agency of the muscles, locomotion and various and numerous offices of life are performed.

THE SKELETON.

A complete assemblage of conjoined bones form the skeleton: if it be united by its natural ligaments, it is denominated a natural skeleton; if by wires, it is called, though incorrectly, an artificial skeleton, signifying at the same time that it is artificially articulated, which indeed is the most useful mode of connecting bones; for by this means, the joints can be moved and examined at pleasure; on the contrary, bones united by their ligaments have the joints rigid and concealed. The appearance of the skeleton is different in different subjects, according to the period of life and sex, and consists of about 252 bones, (the exact number, however, is variable) which are divided into those of the *head*, *trunk*, and *extremities*; some of them are single, and others are in pairs. There are fifty-five bones of the head,* e. g.

* The precise number of bones in the human frame varies: the sesamoid bones, and ossa wormiana are not constant; and in reckoning, the bones of the ear are usually omitted.

<i>Os frontis</i>	The Frontal	
<i>Ossa parietalia</i>	Parietals	
<i>Os occipitis</i>	Occipital	
<i>Ossa temporum</i>	Temporal	
<i>Os sphenoides</i>	Sphenoidal	
<i>Os Ethmoides</i>	Ethmoid	
<i>Ossa nasi</i>	Nasal	
<i>Ossa malarum</i>	Malar	
<i>Ossa lachrymalia</i>	Lachrymal	
<i>Ossa maxillaria superiora</i>	Upper jaw-bones	
<i>Ossa turbinata</i>	Inferior turbinated	
<i>Ossa palatina</i>	Palate bones	
	Vomer	
<i>Os maxillare inferius</i>	Lower jaw	
<i>Dentes</i>	Teeth	3
<i>Os hyoideus</i>	Tongue bone	

5

To these may be added the proper bones of the ear contained in the temporal bones; 8 in number:

<i>Mallei</i>	2
<i>Incudes</i>	2
<i>Stapedes</i>	2
<i>Orbicularia</i>	2
	8

The back bone or spine consists of

<i>Vertebræ</i>	24	
<i>Costæ</i>	Ribs	24
<i>Sternum</i>	Breast bones	2
<i>Ossa innominata</i>	Hip bones	2
<i>Os sacrum</i>	Rump bone	1
<i>Ossa coccygis</i>	Coccygeal bones	4

57

The bones of the extremities,	
<i>claviculæ</i>	Collar bones 2
<i>scapulæ</i>	Blade bones 2
<i>ossa humeri</i>	Arm bones 2
<i>radii et ulnæ</i>	Fore arm bones 4
<i>ossa carpi</i>	Wrist bones 16
<i>ossa metacarpi</i>	Hand bones 8
<i>phalanges digitorum manus</i>	Finger bones 24
<i>ossa pollicis</i>	Thumb bones 6
<i>ossa sesamoidea</i>	Sesamoid bones 4
<i>ossa femoris</i>	Thigh bones 2
<i>patellæ</i>	Knee pans 2
<i>tibiae</i>	Shin bones 2
<i>fibulæ</i>	Small bones of the legs 2
<i>ossa tarsi</i>	Tarsal 14
<i>ossa metatarsi</i>	Metatarsal 10
<i>phalanges digitorum pedis</i>	Toe bones 28
<i>ossa sesamoidea</i>	Sesamoid bones 4

132

* * * In describing the relative position, or the relation which one part bears to another in the subsequent chapters, the anatomist supposes the body erect. By *superior* and *inferior* are signified higher and lower with respect to the erect position. By *anterior* and *posterior* are denoted the situation of the parts as nearer to the fore or hinder surface of the body; and by *laterally* is to be understood, that the parts so described approach the one side or the other. *Inner* and *outer*, and *external* and *internal*, express the relation of any given part or portion of the body to the middle line of the body, or to an imaginary plane bisecting the body, into lateral halves, passing through the head and trunk, and continued between the lower extremities.

FIG. I.

Represents a front view of the male skeleton.

(See Plate.)

HEAD AND NECK.

- | | |
|--|--------------------------------------|
| <i>a</i> , The frontal bone. | <i>f</i> . The malar or cheek bones. |
| <i>b</i> , The parietal bone. | <i>g</i> . The superior maxillary or |
| <i>c</i> , The temporal bone. | upper jaw bone. |
| <i>d</i> , A portion of the sphenoid bone. | <i>h</i> . The lower jaw. |
| <i>e</i> , The nasal bone. | <i>i</i> . The bones of the neck. |

TRUNK.

- | | |
|--|--|
| <i>a</i> , The twelve bones of the back. | <i>c, d</i> , The breast bone composed |
| <i>b</i> , The five bones of the loins. | of two pieces. |
| <i>e, f</i> , The seven true ribs. | <i>h</i> , The rump bone, or sacrum. |
| <i>g, g</i> , The five false ribs. | <i>i</i> , The hip bones. |

UPPER EXTREMITY.

- | | |
|---------------------------------|--|
| <i>a</i> , The collar bone. | <i>g</i> , The bones of the hand. |
| <i>b</i> , The shoulder blade. | <i>h</i> , The first row of finger bones. |
| <i>c</i> , The upper arm bone. | <i>i</i> , The second row of finger bones. |
| <i>d</i> , The radius. | <i>k</i> , The third row of finger bones. |
| <i>e</i> , The ulna. | <i>l</i> , The bones of the thumb. |
| <i>f</i> , The carpus or wrist. | |

LOWER EXTREMITY.

- | | |
|---|---|
| <i>a</i> , The thigh bone. | <i>e</i> , The heel bone. |
| <i>b</i> , The knee pan. | <i>f</i> , The bones of the instep. |
| <i>c</i> , The tibia, or large bone of | <i>g</i> , The bones of the foot. |
| the leg. | <i>h</i> , The first row of toe bones. |
| <i>d</i> , The fibula, or small bone of | <i>i</i> , The second row of toe bones. |
| the leg. | <i>k</i> , The third row of toe bones. |

FIG. II.

Represents a back view of the male skeleton.

(See Plate.)

THE HEAD.

- | | |
|--------------------------------|--------------------------------|
| <i>a</i> , The parietal bone. | <i>d</i> , The cheek bone. |
| <i>b</i> , The occipital bone. | <i>e</i> , The lower jaw bone. |
| <i>c</i> , The temporal bone. | |

NECK AND TRUNK.

- | | |
|---------------------------|--------------------------|
| , The bones of the neck. | <i>d</i> , The hip bone. |
| , The bones of the back. | <i>e</i> , The sacrum. |
| , The bones of the loins. | |

UPPER EXTREMITY.

- | | |
|------------------------------|--|
| , The collar bone. | <i>g</i> , The bones of the hand. |
| , The blade bone. | <i>h</i> , The first row of finger bones. |
| , The upper bone of the arm. | <i>i</i> , The second row of finger bones. |
| , The radius. | <i>k</i> , The third row of finger bones. |
| , The ulna. | <i>l</i> , The bones of the thumb. |
| , The bones of the wrist. | |

LOWER EXTREMITY.

- | | |
|------------------------------|-------------------------------------|
| , The thigh bone. | <i>d</i> , The heel bone. |
| , The large bone of the leg. | <i>e</i> , The bones of the instep. |
| , The small bone of the leg. | <i>f</i> , The bones of the toes. |

II. LIGAMENTS.

A **LIGAMENT** is a strong elastic membrane, connecting the extremities of the moveable bones.

Ligaments are divided into *capsular*, which surround joints like a bag, and *connecting ligaments*. The use of the former is to connect the extremities of the moveable bones, and prevent the efflux of synovia; the latter (external and internal connecting ligaments) strengthen the union of the extremities of the moveable bones. The following are the principal ligaments:

1. *Ligamentum Annulare*. Annular or ring-like ligament: a term applied to a strong ligament on each ankle, and each wrist.

2. *Ligamentum Arteriosum*. The ductus arteriosus of the foetus, which becomes a ligament after birth, is thus named.

3. *Ligamentum Brachio-cubitale*. The brachio-cubital ligament. The expansion of the lateral ligament, which is fixed in the inner condyle of the os humeri, runs over the capsular, to which it closely adheres, and is inserted like radii on the side of the great sigmoid cavity of the ulna; it is covered on the inside by several tendons, which adhere closely to it, and seem to strengthen it very considerably.

4. *Ligamentum Brachio-Radiale*. The brachio radial ligament.

The expansion of the lateral ligament which runs over the external condyle of the os humeri, is inserted round the coronal ligament, from thence all the way down to the neck of the radius and also in the neighbouring parts of the ulna. Through all the passage it covers the capsular ligament, and is covered by several tendons adhering closely to both.

5. *Ligamentum Ciliare*. The ciliary ligament. Behind the uvea of the human eye, there arise out of the choroid membrane from the ciliary circle, white complicated striæ, covered with black matter. The fluctuating extremities of these striæ are spread abroad even to the crystalline lens, upon which they lie but are not affixed. Taken together they are called *ligamentum ciliare*.

6. *Ligamentum Denticulatum*. Denticulate ligament. A small ligament supporting the spinal marrow.

7. *Ligamentum Fallopii*. Fallopius's ligament. A name given to the round ligament of the uterus. See also *Lig. Pouparti*.

8. *Ligamentum Interosseum*. Interosseus ligament. The ligament uniting the radius and ulna, and also that between the tibia and fibula.

9. *Ligamentum Latum*. The broad ligament of the liver, and that of the uterus.

10. *Ligamentum Nuchæ*. A strong ligament of the neck, which proceeds from one spinous process to another.

11. *Ligamentum Ovarii*. Ligament of the ovarium. The thick round portion of the broad ligament of the uterus, by which the ovarium is connected with the uterus.

12. *Ligamentum Pouparti*. Fallopian ligament. Poupart's ligament. A ligament which extends from the anterior superior spinous process of the ilium to the crista of the os pubis.

13. *Ligamentum Rotundum*. The round ligament of the uterus is thus called.

III. CARTILAGE.

By cartilage is understood a white, elastic, glistening substance, growing to bones, and commonly called *gristle*. Anatomically, cartilages are divided into *abducent*, which cover the movable ar-

articulations of bones, *inter-articular*, which are situated between the articulations, and *uniting* cartilages, which unite one bone with another. Their use is to facilitate the motions of bones, or to connect them together. By chemical analysis, cartilage yields one-third of the weight of the bone, when the calcareous salts are removed by digestion in dilute muriatic acid. It resembles coagulated albumen. It is converted by nitric acid into gelatine, and with alkalies it forms soap.

Cartilage, in fine, is the primitive paste into which the calcareous salts are deposited in the young animal. In rachitis, the earthy matter is withdrawn by morbid absorption, and the bones return into the state nearly of flexible cartilage; hence the distortions characteristic of this disease.

IV. BURSÆ MUCOSÆ, OR MUCOUS BAGS.

THE structures we are here about to describe not only enter into the composition of joints, but are placed between the tendons and bones exposed to much friction, and therefore may be considered as auxiliaries to the moving powers. The bursæ mucosæ are intended for the same purpose as the synovial membranes, viz. to produce or secrete a fluid similar to the synovia, which lubricates contiguous surfaces: their structure and anatomical arrangement are nearly the same, both being shut sacs: Dr. Monro discovered and described 140 of them, and since which several other bursæ have been described by Dr. Rosenmüller of Leipsic: they perform the office of friction-wheels in machinery, and take off too severe pressure or friction from the bone or tendon. Bursæ vary considerably in size as well as in form, some being oval or circular, others elongated, so as to form sheaths which enclose tendons. Thus, where tendons are retained *in situ* by fibrous sheaths, the contiguous surfaces are invested by a bursal membrane reflected over them, as the different flexor and extensor tendons in both extremities; and also where a muscle has to slide over a bony prominence, as where the gluteus maximus passes over the great trochanter, a bursa is interposed; or where processes of bone play on fibrous structures, as between the acromion and the

capsule of the shoulder joint. These instances will suffice to point out the operation of the general principle which determines the formation of synovial or mucous bursæ. The following enumeration of these bursæ is from Mr. Bell, and constitute the principal ones of the human body.

A. In connection with the shoulder joint :

1st. A very large bursa under the acromion, and betwixt it and the head of the humerus.

2nd. Between the head of the clavicle and the coracoid process of the scapula.

3rd. Upon the capsule of the shoulder-joint and under the tendon of the subscapularis muscle.

4th. Under the deltoid muscle.

5th. Under the tendon of the latissimus dorsi.

B. The principal bursæ around the elbow joint are,

1st. Between the tendon of the biceps flexor cubiti and the radius.

2nd. Over the round head of the radius and the extensor muscles.

3rd. On the olecranon and under the triceps tendon.

C. About the wrist,

1st. A large bursa between the flexor tendon and the carpus.

2nd. On the trapezium.

3rd. On the pisiforme.

4th. On the back of the carpus and under the extensor carpi radialis.

5th. Between the ligament of the wrist and the tendon of the extensor carpi ulnaris.

Besides these sacs or proper bursæ, sheaths surround the tendons of almost all the muscles of the wrist-joint.

D. On the pelvis,

1st. A large bursa between the gluteus maximus and the vastus externus.

2nd. Between the capsule of the hip-joint and the psoas magnus and iliacus internus.

3rd. Under the pectinalis.

4th. A large one on the surface of the trochanter major, under the gluteus minimus.

5th. On the os ischii and under the origin of the biceps.

6th. Under the tendons of the rotators of the thigh bone.

E. In the thigh and around the knee-joint,

1st. Under the tendon of the extensors of the leg, and communicating with the knee-joint.

2nd. Under the ligament of the patella.

3rd. Between the insertion of the semi-membranosus and the origin of the gastrocnemius.

4th. Over the internal lateral ligament of the knee-joint.

5th. Under the popliteus.

Several irregular bursæ are found around those tendons which are inserted into the tibia and fibula.

F. Around the ankle-joint.

All the principal tendons which cross the ankle-joint have bursæ under or around them, as the tendon of the tibialis anticus, the tensor proprius, the extensor digitorum, the peroneus longus and brevis. There is also a proper bursa between the tendo-achillis and the os calcis, another under the flexor longus pollicis; and also under the flexor longus digitorum, and the tibialis anticus.

It is necessary for the surgeon to know these bursæ; because after sprain and injuries effusion takes place in them, and they present a puffy swelling over the joint not easily understood without the recollection of the natural anatomical structure. *See p. 110.*

V. MUSCULAR SYSTEM.

THE organs distinguished by the name muscles are composed of that substance commonly known by the name of flesh. The muscles are instruments or active agents, in producing the various movements of the body, by means of which man is endowed with the power of moving from place to place, and of performing every manual exercise or bodily exertion. Not only are the prime moving powers in locomotion, but speech, singing, dancing, and the acts of chewing, swallowing, &c. are performed by them;

in fine, by means of the muscles the blood is circulated, the stomach and intestines urge on their contents, and the different ducts of the glands send forwards their fluids. The most characteristic property of muscles are contractility and irritability: as an instance of the first, in whatever position the limbs may repose, requires muscular action to produce their action. Muscular contractility is also displayed in the amputation of a limb; for immediately the muscles are divided, the two ends contract in opposite directions, leaving behind them a space proportionate to the retraction; and this retraction is more or less according to the length of the muscular fibres. Irritability of muscles (*the vis insensibilis* of Haller) is the latent power inherent in the muscular fibres, producing that tremulous motion which is often felt in various parts of the body, without any evident cause, and independent of the will. It is to be distinguished from contractility by being more permanent, and by occurring on the application of chemical or mechanical stimuli*.

The division of muscles into voluntary and involuntary is sufficiently accurate to convey a distinct idea of the two classes and their exciting causes. In ordinary circumstances, those under the influence of the will must be *voluntary muscles*, such as the muscles of locomotion; *the involuntary*, or those over which the will has no control, may be exemplified in the vital organs, of which the heart, stomach, and intestines, are sufficient illustrations. There is another class of muscles termed *mixed*, as the diaphragm, and other muscles of respiration, the orbicularis oculi, &c. of the action of which we are not sensible, unless the mind be directed to them. Yet we have the power of increasing or suspending their action for a certain length of time. The muscles are li-

* A muscle may be separated from the limb, or the heart removed from the body, and for some time afterwards, on pricking it with a needle, or passing the electric shock through it, there will be seen convulsive twitching of the fibres. The irritability of a muscle is present after death; and, though doubtless a phenomenon worthy of study, is not confounded with the muscular contraction above described.

ally inclosed with nerves and blood-vessels; also with tendons which are parts of muscles, resembling a fibrous cord, which conduct their motions to the bone. These tendons are again supplied with sheaths, which in general form a semi-circular canal, completed by the bone in the opposite part, in such a manner, that the tendon slides in a canal, which is partly bony and partly fibrous, and lined with a synovial membrane.

TABLE OF THE MUSCLES.

THE total number of the muscles amount to 527, of which 257 are pairs, and lie on either side of the body: there are four single muscles situated on the middle line, independent of those muscles which perform the internal vital functions.

MUSCLES OF THE HEAD.

Cranial region.	Occipito-frontalis.
Auricular region.	{ Attollens auris. Attrahens auris. Retrahens auris.

MUSCLES OF THE FACE.

Palpebral region.	{ Orbicularis palpebrarum. Corrugator supercilii. Levator palpebræ superioris.
Ocular region.	{ Rectus superior. Rectus inferior. Rectus internus. Rectus externus. Obliquus superior. Obliquus inferior.
Nasal region.	{ Pyramidalis nasi. Compressor nasi. Levator labii superioris, alæque nasi. Depressor alæ nasi.
Superior maxillary region.	{ Levator labii superioris. Levator anguli oris. Zygomaticus major. Zygomaticus minor. Orbicularis oris.

5. Inferior maxillary region.	{ Depressor anguli oris. Depressor labii superioris. Depressor labii inferioris. Buccinator. Levator menti. Masseter.
6. Temporo maxillary region.	Temporalis.
7. Pterygo maxillary region.	{ Pterygoideus externus. Pterygoideus internus.
8. Lingual region.	{ Hyo-glossus. Genio-glossus. Stylo-glossus. Lingualis.
9. Palatine region.	{ Circumflexus palati. Levator palati. Levator uvulæ. Palato pharyngeus. Constrictor isthucium.

MUSCLES OF THE NECK.

1. Anterior cervical region.	{ Platysma myoides. Sterno-cleido mastoideus.
2. Superior hyoidean region.	{ Digastricus. Stylo-hyoideus. Mylo-hyoideus. Genio-hyoideus.
3. Inferior hyoidean region.	{ Omo-hyoideus. Sterno-hyoideus. Sterno-thyrioideus. Thyro-hyoideus.
4. Pharyngeal region.	{ Constrictor pharyngeus inferior. Constrictor pharyngeus medius. Constrictor pharyngeus superior. Stylo-pharyngeus.
5. Deep cervical region.	{ Rectus capitis anticus major. Rectus capitis anticus minor. Longus colli.

- | | | |
|-----------------------------|---|---------------------------|
| 1. Lateral cervical region. | { | Scalenus anticus. |
| | | Scalenus posticus. |
| | | Rectus capitis lateralis. |

MUSCLES OF THE TRUNK.

- | | | |
|------------------------------|---|------------------------|
| 2. Anterior thoracic region. | { | Pectoralis major. |
| | | Pectoralis minor. |
| | | Subclavius. |
| 3. Lateral thoracic region. | | Serratus magnus. |
| 4. Intercoastal region. | { | Intercostales externi. |
| | | Intercostales interni. |
| | | Triangulares sterni. |
| | | Levatores costarum. |
| 5. Diaphragmatic region. | | Diaphragma. |

MUSCLES OF THE ABDOMEN.

- | | | |
|----------------------|---|-------------------------------|
| 1. Abdominal region. | { | Obliquus abdominis externus. |
| | | Obliquus abdominis internus. |
| | | Transversalis abdominis. |
| | | Rectus abdominis. |
| | | Pyramidalis. |
| 2. Lumbar region. | { | Psoas magnus. |
| | | Psoas parvus. |
| | | Iliacus internus. |
| | | Quadratus lumborum. |
| 3. Anal region. | { | Levator ani. |
| | | Coccygeus. |
| | | Sphincter ani. |
| 4. Genital region. | { | 1st. (In the male.) Cremaster |
| | | Ischio-cavernosus. |
| | | Bulbo-cavernosus. |
| | | Transversus perinei. |
| | | 2nd. (In the female.) Ischio |
| | | cavernosus. |
| | | Constrictor vaginæ. |

MUSCLES OF THE POSTERIOR PART OF THE TRUNK.

- | | | |
|-------------------------|---|-------------------|
| 1. Lumbo-dorsal region. | { | Trapezius. |
| | | Latissimus dorsi. |

- | | |
|--|---|
| | { Rhomboideus. |
| | { Levator anguli scapulæ. |
| 2. Dorso-cervical region. | { Serratus posticus superior. |
| | { Serratus posticus inferior. |
| | { Splenius. |
| | { Complexus. |
| | { Trachelo-mastoideus. |
| | { Rectus capitis posticus major. |
| 3. Posterior occipito-cervical region. | { Rectus capitis posticus minor. |
| | { Obliquus capitis superior. |
| | { Obliquus capitis inferior. |
| | { Interspinalis cervicis. |
| | { Longissimus dorsi. |
| 4. Vertebral region. | { Sacro-lumbalis. |
| | { Transversus colli. |
| | { Multifidus spinæ. |
| | { Inter-transversales colli, et lumborum. |

MUSCLES OF THE EXTREMITIES.

Muscles of the Superior Extremities.

MUSCLES OF THE SHOULDER.

- | | |
|-------------------------------|-------------------|
| 1. Posterior scapular region. | { Supra-spinatus. |
| | { Infra-spinatus. |
| | { Teres minor. |
| | { Teres major. |
| 2. Anterior scapular region. | Subscapularis. |
| 3. External scapular region. | Deltoides. |

MUSCLES OF THE ARM.

- | | |
|------------------------------|----------------------------|
| 1. Anterior brachial region. | { Coraco-brachialis. |
| | { Biceps flexor cubiti. |
| | { Brachialis internus. |
| | { Triceps extensor cubiti. |

MUSCLES OF THE FORE-ARM.

- | | |
|-------------------------------------|---|
| 1. Anterior region of the fore-arm. | { Pronator teres. |
| | { Flexor carpi radialis. |
| | { Palmaris longus. |
| | { Flexor carpi ulnaris. |
| | { Flexor digitorum sublimis vel perforatus. |

- | | | |
|--|---|--|
| 2. Anterior deep region of the fore-arm. | { | Flexor digitorum profundus vel perforans.
Flexor longus pollicis manus.
Pronator quadratus. |
| 3. Posterior superficial region of the fore-arm. | { | Extensor digitorum communis.
Extensor proprius minimi digiti.
Extensor carpi ulnaris.
Anconeus. |
| 4. Posterior deep region of the fore-arm. | { | Extensor ossis metacarpi pollicis.
Extensor primi et secundi internodii pollicis manus.
Indicator. |

MUSCLES OF THE HAND.

- | | | |
|--|---|--|
| 1. External palmar region. | { | Abductor brevis pollicis manus.
Opponens pollicis.
Flexor brevis pollicis manus.
Adductor pollicis manus. |
| 2. Internal palmar region. | { | Palmaris brevis.
Abductor minimi digiti.
Flexor proprius minimi digiti.
Adductor ossis metacarpi minimi digiti.
Lumbricales. |
| 3. Middle palmar region .. Interossei. | { | 1. Abductor indicis.
2. Adductor indicis.
3. Abductor digiti medii
4. Adductor digiti medii
5. Abductor digiti annularis.
6. Adductor digiti annularis.
7. Abductor minimi digiti. |

MUSCLES OF THE INFERIOR EXTREMITY.

MUSCLES OF THE HAUNCH AND THIGH.

- | | | |
|-----------------------|---|---|
| 1. Region of the hip. | { | Gluteus maximus.
Gluteus medius.
Gluteus minimus. |
|-----------------------|---|---|

2. Pelvi-trochantric region.	{	Pyriformis.
		Obturator internus.
		Obturator externus.
		Gemellus superior.
		Gemellus inferior.
3. Anterior femoral region.	{	Quadratus femoris.
		Sartorius.
		Rectus femoris.
4. Internal femoral region.	{	Triceps extensor cruris.
		Pectineus.
		Gracilis.
		Adductor longus.
		Adductor brevis.
5. Posterior femoral region.	{	Adductor magnus.
		Biceps femoris.
		Semitendinosus.
		Semimembranosus.

MUSCLES OF THE LEG.

1. Anterior region of the leg.	{	Tibialis anticus.
		Peroneus tertius.
		Extensor longus digitorum pedis.
		Extensor proprius pollicis pedis.
2. Peroneal region.	{	Peroneus longus.
		Peroneus brevis.
3. Posterior region of the leg.	{	Gastrocnemius externus.
		Gastrocnemius internus.
		Soleus.
		Plantaris.
		Popliteus.
		Flexor longus digitorum pedis.
		Tibialis posticus.
		Flexor longus pollicis pedis.

MUSCLES OF THE FOOT.

1. Dorsal region.	{	Extensor brevis digitorum pedis.
		Interossei externi.

Plantar region.

Flexor brevis digitorum pedis.
 Abductor pollicis pedis.
 Abductor minimi digiti pedis.
 Flexor digitorum accessorius.
 Lumbricalis pedis.
 Flexor brevis pollicis pedis.
 Adductor pollicis pedis.
 Flexor brevis minimi digiti
 pedis.
 Transversus pedis.
 Interossei interni.

The natural strength of muscles, in all probability, depends on the number of fibres which enter into their composition; but the effect of habit and exercise of the muscles in giving strength, mobility, and dexterity, is truly astonishing. The muscles grow stronger in proportion to their being used, provided they be well used, and not exhausted by violence or over exertion. Under particular excitement the muscular efforts may be carried to an amazing extent, as is frequently witnessed in the strength of an enraged person, of maniacs, and of persons in convulsions; but such violent contractions cannot be carried beyond a certain time, after which a painful feeling of weakness takes place, which goes on increasing until the muscle refuses to act; by rest, however, the feeling of fatigue subsides, and the muscles recover their wonted energies.

VI. TENDONS AND THEIR SHEATHS.

THE tendons are a part of the muscles, a kind of fibrous cord conducting the motions of the muscle to the bone, particularly where there is not room for the insertion of the muscular fibres which are necessary for the motion of the joints; they frequently concentrate the whole power of a very large muscle on a small bony surface.

The tendons are composed of small white fibres, closely united to each other, having a beautiful shining silvery appearance: they differ from ligaments chiefly in this particular, that one of their extremities is attached to the muscle. Tendons possess very little elasticity or sensibility; they have few blood-vessels, in fine, none

are observed in their ordinary state, nor have nerves or lymphatics been traced into them. The sheaths of tendons generally form a semi-cylindrical canal, completed by the bone in the opposite part, in such a manner, that the tendon slides in a canal, which is partly bony and partly fibrous; this canal is lined with a synovial membrane. On their external surface the fibrous sheaths correspond to the adjacent parts with which they are united, and adhere to them by loose cellular tissue. All the sheaths are composed of dense and strong fibres, some of them, as those of the wrist and on the instep, contain the united tendons of several muscles; these bear the name of *annular ligaments*; the tendons of the hand and the foot having to pass a narrow space, it was indispensably necessary they should be there maintained. Other sheaths, as those of the fingers, are intended for a single tendon, or for two only. Besides these uses, the sheaths in some cases change the direction of the tendon, as is observed in the trochlea or pulley of the eye, and the sheaths of the tendons of the thumb.

APONEUROSES OF MUSCLES.—Aponeuroses are precisely similar to tendons; frequently they seem to result from the expansion of a tendon. They may be divided into two classes.

1st. *Aponeuroses of insertion*, those fibrous expansions which receive fleshy fibres, so as to afford the greatest advantage in multiplying prodigiously the points of insertion without increasing the extent of bony surface, as the *tensor vagina femoris*; others collect the muscular power into a line of attachment, as in the oblique and transverse muscles of the abdomen.

2nd. *Enveloping aponeuroses* are found round the limbs, where they maintain the muscles in their respective situations, so that in great exertions the muscles are not liable to displacement; their inner surface often sends between the muscles fibrous partitions, which extend to the periosteum of the neighbouring bones, and at the same time that they retain the muscular fibres in their situation, they give points for their insertion. Like the tendons, their hue is of a resplendent white; in a healthy state they have little vascularity, and may be considered as destitute of sensibility. In fine, all the fibrous organs are absolutely of a similar nature, and the same fibres contribute to the composition of all the forms.

in their arrangement, they vary in an astonishing degree; and the variety in their form, situation, and office, that has caused them to be denominated and designated by the names of tendons, nerves, ligaments, &c. See *ANATOMY*, p. 98.

GLANDS, see page 315.

VII. THE ARTERIES.

THE arteries are those tubes by which the blood is distributed to every part of the body; during life they may be distinguished by their pulsation, and if wounded by the loss of colour of the blood, by its escaping per os, or by jets: after death they may be distinguished by their thick whitish coats, which are elastic, for though they preserve a circular office; and lastly, by their being so united except at their union with the heart, which represents a root, the arteries forming as it were, two highly ramified trees, of which the principal trunk is the aorta, commencing at the ventricle of the heart, branching out through all parts of the body, limbs, and internal organs. The other arterial trunk arises from the right ventricle, and is extended through the lungs: very frequently the arteries communicate so that the blood can pass from the one to the other: sometimes such communication takes place between trunks of an equal size, as in the vertebral arteries, which unite to form the basilar. More frequently a small artery joins a more voluminous trunk, or a transverse branch unites two separate trunks, as in the anterior cerebral arteries; or lastly, two trunks by their union form an arch, as is observable in the carotid arteries*. The further the arteries are removed from the heart, the more numerous are their communications. In the more branches their union is so extremely multiplied, as to form an intricate network, ramifying as infusion, and from which veins and exhalants seem to originate.

The arteries are composed of three membranes or coats, which these other minute arteries (*vasa vasorum*) forming complicated

*The communication of arteries with each other is termed anastomosis, anastomoses.

meshes on their surface, and which pass into venules, terminating in the trunk of the neighbouring veins *. No lymphatics have been traced to them; but their nerves are very apparent, and are supplied chiefly from the nerves of the ganglia.

TABLE OF THE ARTERIES.

1. PULMONARY ARTERY.

2. AORTA.

ARTERIES FURNISHED BY THE AORTA AT ITS ORIGIN.

1. ANTERIOR AND POSTERIOR CORONARY.

2. ARTERIES FURNISHED BY THE ARCH OF THE AORTA.

Primitive carotid.	{ Divided into external and internal carotids.	
		Furnishes
	{	1. Superior thyroid.
	{	2. Lingual, which { gives the dorsal and sublingual.
	{	3. External maxillary furnishes { 1. The inferior palatine.
	{	2. submental.
	{	3. coronary arteries the lips.
External carotid.	{	4. Occipital which { gives the posterior mastoid.
	{	5. Posterior auricular, which { the stylo-mastoid.
	{	furnishes
	{	6. Inferior pharyngeal.
	{	The external carotid terminates in dividing into the temporal and internal maxillary.

* The blood which flows through the artery being incapable of supplying nourishment to it, these small vessels support its vitality.

- | | | |
|------------------|---|---------------------------------------|
| Temporal artery. | { | Furnishes, |
| | | 1. The transverse artery of the face. |
| | | 2. The anterior articular. |
| | | 3. The middle temporal. |

- | | | |
|----------------------------|---|------------------------------|
| Internal maxillary artery. | { | Furnishes thirteen branches, |
| | | 1. Middle meningeal. |
| | | 2. Inferior dental. |
| | | 3. Deep posterior temporal. |
| | | 4. Masseteric. |
| | | 5. Pterygoidean. |
| | | 6. Buccal. |
| | | 7. Anterior deep temporal. |
| | | 8. Alveolar. |
| | | 9. Infra-orbital. |
| | | 10. Vidian. |
| | | 11. Superior pharyngeal. |
| | | 12. Superior palatine. |
| | | 13. Spheno-palatine. |

- | | | | | |
|-------------------|---|---|---|--|
| Internal carotid. | { | Furnishes,
1. Ophthalmic,
which gives | { | 1. The lachrymal. |
| | | | | 2. Central artery of the retina. |
| | | | | 3. Supra-orbital. |
| | | | | 4. Posterior ciliary. |
| | | | | 5. Long ciliary. |
| | | | | 6. Superior and inferior muscular. |
| | | | | 7. Posterior and anterior ethmoidal. |
| | | | | 8. Superior and inferior palpebral. |
| | | | | 9. Nasal. |
| | | | | 10. Frontal. |
| | | 2. The communicating artery of Willis. | { | 2. The communicating artery of Willis. |
| | | | | 3. Choroid artery. |
| | | | | 4. Anterior cerebral. |
| | | | | 5. Middle cerebral. |
| | | | | 6. Posterior cerebral. |

Subclavian artery.	Furnishes,	1. The vertebral, which gives	1. The anterior and posterior spinal. 2. Inferior cerebellar. 3. The basilar, divided into	1. The posterior cerebellar. 2. The anterior cerebellar.
Subclavian artery.	Furnishes,	2. Inferior thyroid, which gives the ascending cervical	3. Internal mammary, which gives	1. The anterior mediastinal. 2. Superior diaphragmatic.
Subclavian artery.	Furnishes,	3. Superior intercostal. 4. Transverse cervical. 5. Superior scapular. 6. Deep cervical. Continuing its course, subclavian takes the name of axillary.		

Axillary artery.	Furnishes,	1. Acromial. 2. Superior thoracic. 3. Inferior thoracic, or external mammary 4. Inferior scapular. 5. Posterior circumflex. 6. Anterior circumflex. In continuing it takes the name of brachial

Brachial artery.	Furnishes,	1. Deep humeral or external collateral. 2. Internal collateral. It divides afterwards into the radial and ulnar

1. Radial artery.	Furnishes,	1. The radial recurrent. 2. Dorsal artery of the carpus. 3. Dorsal artery of the carpus. 4. Dorsal artery of the thumb, and terminates in forming the deep palmar arch.

2. Ulnar artery.	Furnishes,	1. The anterior and posterior ulnar recurrent. 2. The anterior and posterior interosseal, which furnishes the posterior radial recurrent. It terminates in forming the superficial palmar arch, which gives the collateral arteries of the fingers.

ARTERIES FURNISHED BY THE AORTA IN THE THORAX.

- . The right and left bronchial.
- . Esophageal (four, five, or six in number).
- . Posterior mediastinal.
- . Inferior intercostals (eight, nine, or ten in number).

ARTERIES FURNISHED BY THE AORTA IN THE ABDOMEN.

- . Inferior right and left diaphragmatic arteries.

Cœliac artery.	Divided into three branches.	
	1. Coronary of the stomach.	
	2. The Hepatic, which gives.	1. The pyloric. 2. The gastro-epiploica dextra. 3. The cystic.
	3. The Splenic, which gives	1. The gastro-epiploica sinistra. 2. The vasa brevia.
Superior mesenteric artery.	Furnishes from its concavity,	1. The superior, middle, and inferior right cholic. 2. From fifteen to twenty intestinal branches.
	Furnishes	
Inferior mesenteric artery.	1. The superior. 2. The middle. 3. The left cholic; and divides into the superior hæmorrhoidal arteries.	

- . The middle capsular arteries (two on either side).
- . Renal or emulgent.
- . Spermatic.
- . Lumbar (four or five on either side).

ARTERIES RESULTING FROM THE BIFURCATION OF THE AORTA.

The aorta furnishes a little before its bifurcation.	1. The middle sacral, and divides into the primitive iliacs, which are divided into	
		1. The internal. 2. The external iliac artery.

Internal iliac artery.	{	Furnishes	
		1.	The ilio-lumbar.
		2.	Lateral sacral.
		3.	Gluteal.
		4.	Umbilical.
		5.	Vesical.
		6.	Obturator.
		7.	Middle hæmorrhoidal.
		8.	Uterine.
		9.	Vaginal.
		10.	Ischiatic.
		11.	Internal pudic, which gives off
	{	1.	Inferior hæmorrhoidal
2.		Artery of septum scro	
3.		Transversu perinei.	
4.		Artery of corpus ca nosum.	
5.		Dorsalis p	

External iliac artery.	Furnishes	
	1.	The epigastric.
	2.	Circumflexa ilii, and continues downward under the name of the femoral artery.

			Furnishes	
Femoral artery.	{	1.	External epigastric	
		2.	External superficial and deeply seated pudics.	1. The external internal circ flex.
		3.	Profunda, which gives	2. The super middle and rior perfor arteries.
			In continuing its course it takes the name of	
			popliteal.	

			Furnishes
	{	1.	The superior middle, external and internal articular arteries.
		2.	The inferior internal and external articular arteries.
		3.	The anterior tibial; its continuation called the dorsal artery of the foot, which furnishes
Popliteal artery.		{	The popliteal is divided into the peroneal, and posterior tibial arteries.
	1.		Tarsal.
		2.	Metatarsal.
		3.	Interosseous.
		4.	Dorsal artery of the great toe.

- Peroneal artery. { Divided into the anterior and posterior fibular.
- Posterior tibial artery. { Divided into internal and external plantar. It forms in anastomosing with the continuation of the anterior tibial, the plantar arch, from which the superior, posterior, inferior, and anterior branches are given off.

VIII. VEINS.

By a vein is understood, anatomically speaking, a long membranous canal, which continually becomes wider, does not pulsate, and returns the blood from the arteries to the heart.

All veins take their origin from the extremities of arteries only, anastomosis, and terminate in the auricles of the heart—namely, the *venæ cavæ* in the right, and the pulmonary veins in the left auricle. Like arteries they are composed of three tunics or coats, which are much more slender than in the arteries, and are supplied internally with semilunar membranes or folds called valves. Their use is to return the blood to the heart.

The blood is returned from every part of the body except the lungs, into the right auricle from the three following sources:—

1. The *vena cava superior*, which brings it from the head, neck, thorax, and superior extremities. 2. The *vena cava inferior*, from the abdomen and inferior extremities. 3. The *coronary vein*, receives it from the coronary arteries of the heart.

THE VENA CAVA SUPERIOR.

This vein terminates in the superior part of the right auricle, into which it evacuates the blood from the right and left *subclavian vein*, and the *vena azygos*. The right and left subclavian veins receive the blood from the head and upper extremities, in the following manner:—The veins of the fingers called digitals, receive the blood from digital arteries, and empty it into the *cephalic of the thumb*, which runs on the back of the hand along the thumb, and evacuates itself into the external radial.

The *salvatella*, which runs along the little finger, unites with the former, and empties its blood into the internal and external cubital veins. At the end of the fore-arm are three veins, called the great cephalic, the basilic, and the median. The *great cephalic*

runs along the superior part of the fore-arm, and receives the blood from the external radial. The *basilic* ascends on the under side, and receives the blood from the *external* and *internal cubital veins*, and some branches which accompany the brachial artery called *venæ satellites*. The median is situated in the middle of the fore-arm, and arises from the union of several branches. These three veins all unite above the bend of the arm, and form

THE BRACHIAL VEIN,

Which receives all their blood, and is continued into the axilla where it is called the *axillary vein*, which also receives the blood from the scapula, and superior and inferior parts of the chest, the *superior and inferior thoracic vein*, the *vena muscularis*, and the *scapularis*. The axillary vein then passes under the clavicle where it is called the *subclavian*, which unites with the external and internal jugular veins, and the vertebral vein, which brings the blood from the vertebral sinuses; it receives also the blood from the *mediastinal, pericardiac, diaphragmatic, thymic, internal mammary, and laryngeal veins*, and then unites with its fellow to form the *vena cava superior*, or as it is sometimes called the *vena cava descendens*.

The blood from the external and internal parts of the head and face, is returned in the following manner into the external and internal jugulars, which terminate in the subclavians;—the *frontal, angular, temporal, auricular, sublingual, and occipital veins* receive the blood from the parts after which they are named; they all converge to each side of the neck, and form a trunk, called the *external jugular vein*.

The blood from the brain, cerebellum, medulla oblongata, and membranes of these parts, is received into the lateral sinuses, or veins of the dura mater, one of which empties its blood through the foramen lacerium in basii cranii on each side into the *internal jugular*, which descend in the neck by the carotid arteries, receives the blood from the *thyroideal* and *internal maxillary veins*, and empties itself into the subclavians within the thorax.

The *vena azygos** receives the blood from the branchial superior œsophageal, vertebral, and intercostal veins, and empties itself into the superior cava.

* *Sine pari*, having no equal.—See p. 640.

VENA CAVA INFERIOR.

The vena cava inferior is the trunk of all the abdominal veins, and those of the lower extremities, from which parts the blood is returned in the following manner:—the veins of the toes called the *digital veins*, receive the blood from the digital arteries, and form on the back of the foot three branches, one on the great toe, called the *cephalic*, another which runs along the little toe, called the *vena saphena*, and a third on the back of the foot, *vena dorsalis pedis*; and those on the sole of the foot evacuate themselves into the *plantar veins*. The three veins on the upper part of the foot coming together above the ankle, form the *anterior tibial*; and the plantar veins with a branch form the calf of the leg, called the *crural vein*, form the *posterior tibial*; a branch also ascends in the direction of the fibula called the *peroneal vein*. These three branches unite before the ham, into one branch, the *subpopliteal vein*, which ascends through the ham, carrying all the blood from the foot: it then proceeds upon the anterior part of the thigh, where it is termed the *crural* or *femoral vein*, receives several muscular branches, and passes under Poupart's into the cavity of the pelvis, where it is called the external iliac. The arteries which are distributed about the pelvis evacuate their blood into the *external hemorrhoidal veins*, the *hypogastric veins*, the *internal pudendal*, the *vena magna ipsius penis*, and *obturator veins*, all of which unite in the pelvis, and form the *internal iliac vein*.

EXTERNAL ILIAC VEIN.

This vein receives the blood from the external pudendal veins, and then unites with the internal iliac at the last vertebræ of the loins; after which it forms with its fellow the *vena cava inferior*, or *ascendens*, which ascends on the right side of the spine, receiving the blood from the *sacral, lumbar, emulgent, right spermatic veins*, and the *vena cava hepatica*; and having arrived at the diaphragm, it passes through the right foramen, and enters the right auricle of the heart, into which it evacuates all the blood from the abdominal viscera and lower extremities.

VENA CAVA HEPATICA.

The *vena cava hepatica* ramifies in the substance of the liver, and brings the blood into the vena cava inferior from the branches of

the *vena portæ*, a great vein which carries the blood from the abdominal viscera into the substance of the liver. The trunk of the vein, about the fissure of the liver in which it is situated, is divided into the hepatic and abdominal portions. The *abdominal portion* is composed of the *splenic*, *mesaraic*, and *internal hemorrhoidal veins*. These three venous branches carry all the blood from the stomach, spleen, pancreas, omentum, mesentery, gall bladder, and the small and large intestines into the *sinus* of the *vena portæ*. The *hepatic portion* of the *vena portæ* enters the substance of the liver, divides into innumerable ramifications which secrete the bile, and the superfluous blood passes into corresponding branches of the *vena cava hepatica*.

ACTION OF THE VEINS.

Veins do not pulsate; the blood which they receive from the arteries flows through them very slowly, and is conveyed to the right auricle of the heart by the contractility of their coats, the pressure of the blood from the arteries, called the *vis a tergo*, the contraction of the muscles, and respiration; and it is prevented from going backwards in the vein by the valves, of which there are a great number. The

CIRCULATION OF THE BLOOD,

in fine is carried on as follows:—the blood is returned from the upper parts of the body by the superior vena cava, from the inferior parts by the inferior vena cava, and from the heart itself by the coronary vein to the right auricle. The right auricle contracts and discharges its contents into the right ventricle; when the latter is completely filled it also contracts; by that contraction the tricuspid valve of the right ventricle is shut, and its contents propelled through the pulmonary artery and its ramifications to the lungs. From the lungs the blood is returned by the four pulmonary veins to the left auricle, which, being distended, now contracts, and throws the blood into the left ventricle. The left ventricle then contracts, its mitral valve shuts, and all the blood propelled through the aorta into the capillary system, to be again returned to the veins. The aorta and pulmonary artery are each guarded by three semilunar or sigmoid valves, which prevent the blood returning into the ventricles.

IX. THE NERVES.

NERVES are long white medullary cords that serve for sensation. They originate from the brain and spinal marrow; hence they are distinguished into cerebral and spinal nerves, and distributed upon the organs of sense, the viscera, vessels, muscles and every part that is endowed with sensibility. The cerebral nerves are the

- | | |
|--------------------------------|--------------------------|
| 1. Olfactory. | f. Abducent. |
| 2. Optic. | g. Auditory or Acoustic. |
| 3. Motores Oculorum. | h. Par Vagum. |
| 4. Pathetici or Trochleatores. | i. Lingual. |
| 5. Trigemini, or Divisi. | |

The spinal nerves are thirty pairs, and are divided into eight cervical, twelve pair of dorsal, five pair of lumbar, and five of sacral nerves. In the course of the nerves there are a number of knots called ganglia, commonly of an oblong shape and of a grey-colour, somewhat inclining to red, probably owing to their being extremely vascular. Like the blood vessels, the nerves in their course throughout the body, communicate with each other, and each of these communications constitute what is called a plexus, from whence branches are again detached to various parts of the body. The use of the nerves is to convey impressions to the brain from all parts of the system, and the principles of motion and sensibility to every part of the system. The manner, however, in which the latter operations are effected is not yet satisfactorily determined.

TABLE OF THE NERVES.

The following table of the nerves will amply illustrate their distribution and connexion.

CEREBRAL NERVES.

1. The first pair called *Olfactory*.
2. The second pair or *optic nerves*.
3. The third pair or *oculorum motores*.
4. The fourth pair or *pathetici*.
5. The fifth pair or *trigemini*, which gives off
 - a. The *ophthalmic* or *orbital nerve*, which sends
 1. A branch to unite with one from the sixth pair, and from the great intercostal nerve.

2. The *frontal nerve*.
3. The *lachrymal*.
4. The *nasal*.
- b. The *superior maxillary*, which divides into
 1. The *Spheno-palatine nerve*.
 2. The *posterior Alveolar*.
 3. The *Infra Orbital*.
- c. The *inferior maxillary nerve*, from which arise
 1. The *internal lingual*.
 2. The *inferior maxillary*, properly so called.
6. The *sixth pair* or *abducentes*, which send off
A branch to unite with one from the fifth, and from the
great intercostal.
7. The *seventh pair* or *auditory nerves* : these arise by two separate beginnings, viz.
The *portio dura*, a nerve going to the face.
The *portio mollis*, which is distributed on the ear.
The *portio dura* or *facial nerve*, gives off the *chorda tympani* and then proceeds to the face.
8. The *eighth pair* or *par vagum*, arise from the medulla oblongata, and join with the accessory of Willis. The *par vagum* gives
 1. The *right and left recurrent nerves*.
 2. Several branches in the chest to form the *cardiac plexus*.
 3. Several branches to form the *pulmonic plexus*.
 4. Several branches to form the *Œsophageal plexus*.
 5. It then forms in the abdomen the *stomachic plexus*.
 6. The *hepatic plexus*.
 7. The *splenic plexus*.
 8. The *renal plexus*, receiving several branches from the great intercostal, which assists in their formation.
 9. The *ninth pair*, or *lingual nerves*, which go from the medulla oblongata to the tongue.

SPINAL NERVES.

Those nerves are called *spinal* which pass out through the lateral or intervertebral foramina of the spine. They are divided into *cervical*, *dorsal*, *lumbar*, and *sacral* nerves.

CERVICAL NERVES.

The cervical nerves are eight pairs.

The *first* are called the *occipital*: they arise from the beginning of the spinal marrow, pass out between the margin of the occipital foramen and atlas, form a ganglion on its transverse process, and are distributed about the occiput and neck.

The *second* pair of cervical nerves send a branch to the accessory nerve of Willis, and proceed to the parotid gland and external ear.

The *third* cervical pair supply the integuments of the scapula, cucullaris, and triangularis muscles, and send a branch to join with the others the diaphragmatic nerve.

The *fourth, fifth, sixth, and eighth*, all converge to form the *brachial plexus*, from which arise the six following nerves of the upper extremities.

1. The *axillary nerve*, which sometimes arises from the radial nerve. It runs backwards and outwards around the neck of the humerus, and ramifies in the muscles of the scapula.

2. The *external cutaneous*, which perforates the coraco-brachialis muscle, to the bend of the arm, where it accompanies the median nerve as far as the thumb, and is lost in its integuments.

3. The *internal cutaneous*, which descends on the inside of the arm, where it bifurcates. From the bend of the arm the anterior branch accompanies the basilic vein, to be inserted into the skin of the palm of the hand; the posterior branch runs down the internal part of the fore-arm, to vanish in the skin of the little finger.

4. The *median nerve*, which accompanies the brachial artery to the cubit, then passes between the brachialis intermus, pronator quadratus, and the perforatus and perforans, under the ligament of the wrist to the palm of the hand, where it sends off branches in every direction to the muscles of the hand, and then supplies the digital nerves, which go to the extremities of the thumb, fore, and middle fingers.

5. The *ulna nerve*, which descends between the brachial artery and the basilic vein, between the internal condyle of the humerus, and the olecranon, and divides in the fore-arm into an internal and external branch. The former passes over the ligament of the wrist and sesamoid bone, to the hand, where it divides into three branches, two of which go to the ring and little finger, and the

third forms an arch towards the thumb, in the palm of the hand and is lost in the contiguous muscles. The latter passes over the tendon of the extensor carpi ulnaris and back of the hand, and supply also the two last fingers.

6. *The radial nerve*, which sometimes gives off the axillary nerve. It passes backwards, about the os humeri, descends on the outer side of the arm, between the brachialis externus and internus muscles to the cubit, then proceeds between the supinator longus and brevis, of the superior extremity of the radius, giving off various branches to adjacent muscles. At this place it divides into two branches; one goes along the radius, between the supinator longus and radialis intermus to the back of the hand, and terminates in the thumb and three first fingers; the other passes between the supinator brevis and head of the radius, and is lost in the muscles of the fore-arm.

DORSAL NERVES.

The dorsal nerves are twelve pairs in number. The first pair gives off a branch to the brachial plexus. All the dorsal nerves are distributed to the muscles of the back, intercostals, serrati, pectoral abdominal muscles, and diaphragm. The five inferior pairs go to the cartilages of the ribs, and are called costal.

LUMBAR NERVES.

The five pair of lumbar nerves are bestowed about the loins and muscles, skin of the abdomen and loins, scrotum, ovaria, and Diaphragm. The second, third, and fifth pair unite and form the *obturator nerve*, which descends over the psoas muscle into the pelvis, and passes through the foramen thyroideum to the obturator muscle, triceps, pectineus, &c. The third and fourth, with some branches of the second pair, form the *crural nerve*, which passes under Poupart's ligament with the femoral artery, sends off branches to the adjacent parts, and descends in the direction of the sartorius muscle to the internal condyle of the femur, from whence it accompanies the saphena vein to the internal ankle, where it is lost in the skin of the great toe. The fifth pair are joined to the first pair of the sacral nerves.

SACRAL NERVES.

All of the sacral nerves, five pairs in number, arise from the *cauda equina*, or termination of the medulla spinalis, so called from

nerves resembling the tail of a horse. The four first pairs give branches to the pelvic viscera, and are afterwards united to the lumbar, to form a larger plexus, which gives off the eschiatic nerve, the largest in the body; and which, immediately at its origin, sends off branches to the bladder, rectum, and parts of generation; proceeds from the cavity of the pelvis through the ischiatic notch, between the tuberosity of the ischium and great ischianter, to the ham, where it is called the *popliteal nerve*. In the ham it divides into two branches.

First, the *peroneal*, which descends on the fibula, and distributes many branches to the muscles of the leg and back of the foot.

Second, the *tibial*, which penetrates the gastrocnemic muscles to the internal ankle, passes through a notch in the os calcis to the sole of the foot, where it divides into an *internal* and *external* plantar nerve, which supply the muscles and aponeurosis of the foot and toes.

X. ABSORBENTS.

THE small, delicate, transparent vessels which take up substances from the surface of the body, or from any cavity, and carry them to the blood, are termed absorbents or absorbing vessels. They are denominated, according to the liquids which they convey, lacteals and lymphatics: *e. g.*

Those absorbents which take up the chyle in the intestines are called lacteals. They are most numerous in the jejunum. The lacteals of the small intestines, and part of the glands, convey the chyle to the mesenteric glands, where it is supposed to undergo some change. Passing from one trunk to another, they form one or two large trunks. These accompany the superior mesenteric artery to the right side of the aorta, and there join the thoracic duct*. The vessels of the absorbent system anastomose more

* *Ques.* How is the thoracic duct formed?

Ans. The thoracic duct is formed by the union of the lacteals with the lymphatics of the pelvis and lower extremities. It commences on the third lumbar vertebra, and here swells out into an oval sac called *receptaculum chyl.* Proceeding upwards on the right side of the aorta, it passes through the aortic opening of the diaphragm into the posterior mediastinum. On the fourth dorsal vertebræ it crosses behind the aorta to reach the left side of the neck, and terminates at the angle of the union of the subclavian and jugular veins.

frequently than either the veins or the arteries ; for it is a general law of nature that the smaller the vessels of every kind, the more freely they communicate and unite with each other. These orifices are no more to be traced, excepting, indeed, those of the lacteals, than we can trace the orifices of the exhalants ; but the united branches can be traced from an early junction, and they can be followed up singly, or in the confederated form of conglomerate glands, till, with the exception of a few that enter the right subclavian vein, they all terminate in the common trunk of the thoracic duct, which receives also the tributary streams, the anastomosing lacteals, or the absorbents which drink up the subacted food from the alvine canal, whose orifices are capable of being traced, and pours the whole of this complicated fluid, steadily and slowly, by means of a valve † placed for this purpose at its opening, into the subclavian vein of the left side.

Absorbents accompany every part of the fabric so closely associated with so much minuteness of structure, that they have been proved by Cruikshank to exist very numerous in the coats of small arteries and veins ; he also suspects them to be attendants on the vasa vasorum, and equally to enter into their substance. Whenever they exist, they are peculiarly distinguished by the very numerous valves, with which they are supplied considerably more than any set of vessels. In the absorbents we likewise meet with glands, the form of which is most oval, one end being turned towards the thoracic duct, and the other from it ; but we are just as uncertain of their use, and in some measure, concerning their organization, as in respect to those of the secreting system.

† A lymphatic valve is a semi-circular membrane, or rather a membrane of a parabolic shape, attached to the inside of the lymphatic vessels by its circular edge, corresponding to the diameter, loose or floating in the cavity. In consequence of this contrivance, fluids passing in one direction cause the valve to lie close to the side of the vessel, and leave the passage free, but attempting to pass in the opposite direction, raise the valve from the side of the vessel, and push its loose edge towards the centre of the cavity. But as this would shut up little more than one half of the cavity, the valves are disposed in pairs exactly opposite to each other, by which means the whole cavity is accurately closed.—*Cruikshank*.

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ABDOMEN.

The abdomen or belly, the largest cavity in the body, is bounded anteriorly by the diaphragm, by which it is separated from the thorax; inferiorly, by the bones of the pubes, and ischium; on the sides by various muscles, the short ribs, and ossa ilii; anteriorly, by the abdominal muscles, and posteriorly, by the vertebrae of the loins, the os sacrum and os coccygis. Internally, it is lined by a smooth membrane called *peritoneum*; and externally, by muscles and common integuments. This large cavity is divided by anatomists into different regions; the terms appropriated to each, are very frequently met with in surgical writings: *e. g.*

- The epigastric region,
- right and left hypochondriac regions,
- umbilical region,
- hypogastric region,
- ilii or flanks,
- inguinal region or groin,
- lumbar region or loins, &c.—(*See plates.*)

In the cavity of the abdomen are contained, *anteriorly and laterally*,—

- | | |
|-------------------------------|------------------------------|
| The epiploon, | 5 The lacteal vessels, |
| — stomach, | 6 — pancreas, |
| — large and small intestines, | 7 — spleen, |
| — mesentery, | 8 — liver, and gall-bladder. |

When a surgeon speaks of the abdomen, his meaning is confined to the space included within the bag of the peritoneum, including the above viscera only. Hence neither the kidneys nor the pelvic viscera are, strictly speaking, parts of the abdomen.

The viscera *posteriorly* without the peritoneum are—

- | | |
|-------------------------|---------------------------|
| 1 The kidneys, | 4 The receptaculum chyli, |
| 2 — supra renal glands, | 5 — descending aorta, |
| 3 — ureters, | 6 — ascending vena cava. |

Inferiorly, in the pelvis, and without the peritoneum, in men,

- 1 The urinary bladder,
- 2 — spermatic vessels,
- 3 — rectum.

In females, besides the urinary bladder and rectum, are—

- 1 The uterus, and its four ligaments,
- 2 — two ovaria,
- 3 — two fallopian tubes,
- 4 — vagina.

The particular attention of every practical surgeon ought to be directed to the abdomen, from its being frequently the seat of several of the most important diseases which require surgical treatment. In hernia and dropsical cases, the skill of the operator is often directed to the abdomen, hence a perfect and minute acquaintance with the anatomy of this department is indispensable.—See ABSCESS, ANEURISM, HERNIA, PARACENTESIS, WOUNDS, &c.

ABSCESS.

DEFINITION.—An abscess is a collection of matter in a cavity, the consequence of inflammation.

CAUSES AND FORMATION.—Inflammation of the adhesive kind takes place in the cellular tissue, by which the different cells of the cellular membrane become filled with adhesive matter. A slight ulcerative process takes place, the inflammation still continuing, and a little cavity is formed by absorption; a space being left for the effusion of pus, the result of the second stage of inflammation. A drop of matter is secreted in the cavity, and as soon as it is poured out, the pressure on the side occasions an increase of

erative process, which adds to the cavity previously formed. More matter is then produced, and the surrounding solids having tendency to the ulcerative process, it is accumulated so as to add to the absorption of the neighbouring parts. In the formation of abscess, the matter does not produce absorption of all the parts around equally, but it excavates chiefly on the side towards the skin, and very little in the opposite direction; a circumstance which led to the reflection, that matter had no power of eroding, formerly supposed, when it was thought that matter acted chemically on the solids, like an acid, or caustic alkali.

PROGNOSIS.—Abscesses are dangerous from their size. It is not, however, the quantity of matter produced which renders them dangerous, but the difficulty which nature has to encounter in repairing the devastation made by excavation of the sockets, from the pressure of the matter. An abscess may discharge a quart of matter, and the constitution may have been scarcely affected by it; but very soon after it is opened the constitution begins to suffer. It is not, therefore, the quantity of matter, but the process of restoration after the evacuation of the matter which affects the constitution. The largest abscesses which occur in the body are those of the liver; in which large quantities of matter form, and patients will sometimes recover from them.

The next circumstance rendering abscesses dangerous is their number. For example, the great number of little abscesses on the surface of the body, in small pox, frequently destroy life. Here nature performs the suppurative process; the pustules die away, and the cuticle is separated from the edge of the body. But nature has not the power always of repairing the destruction of the cutis; the exposure of the skin occasions great constitutional irritation, and the patient dies as if destroyed by a burn or scald. Abscesses are also dangerous from their being situated in vitally important parts, such as the brain, heart, or lungs; or, when they are not seated in parts of vital importance, from their pressure on essential organs. Another danger is, when they occur between bones, and the covering of bones. Whenever bones form the boundary of abscesses, such abscesses are exceed-

ingly tedious, and, in most cases, dangerous.—See ABSCESS, Psoas.

Abscesses are divided into *acute* and *chronic*.

1. ABSCESS, ACUTE.—The common course an acute abscess takes is three weeks. The adhesive inflammation first begins and is succeeded by the suppurative; and lastly, the ulcerative process comes in. It is generally three weeks from its commencement before matter is discharged.—See ADHESION, SUPURATION, &c.

TREATMENT.—In the treatment of acute abscesses, the best medicine that can be given is the following:—

Take	Acetated liquor of ammonia.....	℥ij.
	Sulphate of magnesia	℥j.
	Tincture of opium.....	℥j.

SIR A. COOPER

Mix.—Dose, three or four table-spoonsful three times a day.

By this medicine you lessen irritation, and expedite the suppurative and ulcerative processes. “No medicine,” observes the authority we have just quoted, “under such circumstances, gives so much relief. The sulphate of magnesia prevents any costiveness from the opium, and the opium tranquillizes the nervous system, and lessens pain.” The local treatment of abscess consists in the assiduous application of fomentations and poultices the objects of which are, that by promoting heat and moisture a greater quantity of blood is sent to the part, and a relaxation of the vessels takes place, which expedites the suppurative process and this being done, the ulcerative process follows with more ease. The poultice to be applied to the part is of little importance; linseed meal and water, bread and water, &c. No stimulating application would do; the object is to preserve the heat and moisture of the part, and to prevent evaporation; the part therefore, should be covered with oil skin, for, by this envelope the heat of a part is preserved, and evaporation prevented; and since it is desirable, in the suppurative process, to prevent evaporation, oil skin, generally used in private practice, is the best for this purpose; it is clean, agreeable to the patient, and most conducive to his comfort.

OPENING OF ABSCESES.—If an acute abscess seems disposed to go through its different stages without any interruption, the best practice is, to leave it undisturbed. Acute abscesses, beginning under aponeurotic fasciæ, ought to be opened as early as possible; the earlier the better. The moment one drop of matter may be felt to fluctuate, it is advisable to make a free opening, both as it regards the constitution and the part. Whenever the matter can be felt close to the bone, it will be right to open it, excepting in cases where it may occur from severe courses of mercury, between the cranium and pericranium. Mercury will inflame the periosteum, (and the pericranium is a part of the periosteum) to a greater degree than the venereal disease itself; and in those cases where a fluid exists between the pericranium and bone, unattended with any blush, do not open it; it will be removed by purging, and giving copiously the decoction of sarsaparilla. But when matter is formed, and there is a blush, it will not be absorbed; consequently an opening must be made, exfoliation will often take place; but when there is no blush, beware of opening the tumour.—*Sir A. Cooper.*

II. ABSCESS, CHRONIC.—Chronic abscesses have thin capsules, do not alter the structure of the surrounding parts, nor produce any constitutional disturbance. They excite very little adhesion in the surrounding parts; matter makes its way in all directions, and continues to do so until the distension which such large accumulations will produce, excites irritation and ulceration in some part, for their removal. The state of the general health is very much inflamed by these abscesses. The cysts of chronic abscesses are *secreting* and *absorbing* surfaces. If secretion goes on more briskly than absorption, the abscess increases; but if absorption be more active than secretion, it diminishes; and if secretion and absorption be equal, the abscess remains stationary and frequently is so for years.

TREATMENT.—The treatment of chronic abscesses is different from those of the acute kind. In the latter, the object is to diminish the cause of excitement in the constitution; and in the former, every thing is done to give it additional powers, by allowing generous diet, and giving the patient bark and ammonia: the

ammonia is, indeed, the principal medicine on which reliance has to be placed. Bark assists the suppurative process; generous diet to increase the action of the parts, by giving tone to the constitution. Stimulant poultices should be applied to the part, and the best is common salt and water, (a table spoonful of the former to a pint of the latter,) thickened with oatmeal, or linseed meal, yeast and oatmeal, vinegar and flour, each of which expedite, by their stimulating properties, the process of suppuration. In indolent cases, it is customary to employ stimulant plasters; and the best, according to Sir A. Cooper, is the emplastr. galb. comp. it is stimulating, and accordingly excites the action of the part. The emplastr. ammon. c. hydrarg. and the emplastr. thuris comp. are also used; they are, however, more tranquillizing, and, in general, excite slight perspiration over the part, similar in its operation to the soap cerate, which is also of use.

The treatment of chronic abscesses, when it becomes necessary to open them, consists in making an incision, and squeezing out as much of the matter as possible. Suppose it to be a case where there is a collection of matter under the fascia lata of the thigh (the largest in the body) extending, as it often does, from just above the knee to the trochanter major, this would be the first step; after which a roller is to be applied, making the turns all over the thigh, with the exception of the opening. The result of this, in many instances is, that adhesive inflammation is excited, and thus the sides of the cavities are often readily united. The same directions are to be attended to in collections of matter when met with under the tendinous expansion which covers the muscles of the leg and fore-arm. Another reason for the early discharge of matter is the prevention of scars, particularly in exposed parts of the body. In abscesses of the neck, the opening should be made transversely, and not in the axis; for, when the wound heals, the cicatrice will be scarcely observable among the creases or folds of the neck. It is strictly enjoined not to open these tumours when they have a blush on them, like the hue of a ripe grape; the veins are then in a dilated state, and if, in this condition, the abscess be opened, the operator will bring discredit upon himself. At the commencement, when resolution is at-

empted, aperients, with calomel and rhubarb should be given, and evaporating lotions used. Strict attention to diet and regimen is necessary; for, though the patient be debilitated, he must still be made weaker. The best mode to be adopted is, to open the tumours before the skin is much affected, and before a blush has appeared, and scars will, in general, be prevented.

* In opening tumours, it is desirable to use a very fine knife, for two reasons:—1. A small opening is made. 2. It does not alarm the person.—In pressing the sides of the wound, care must be taken to squeeze out all the solid flakes of matter to be met with in scrofulous tumours. If this be not attended to, they will at last slough; but if, on the contrary, attention is paid not to leave any of that unorganized substance behind, adhesion will take place, and the wound heal up. Every thing here depends on getting rid of the solid matter. Bread poultices, wetted with a lotion of the sulphate of zinc and spirits of wine, may be used afterwards. If the edges of the wound should not unite in any part, a little injection of the sulphate of zinc, or copper may be thrown in.—See GRANULATION, HECTIC.

ABSCESS, LUMBAR. PSOAS ABSCESS.

Chronic collections of matter, which form in the cellular substance of the loins, behind the peritoneum, and descend in the course of the psoas muscle.

A lumbar abscess is the most important species known of chronic abscess in general, though such abscesses are not necessarily of the chronic kind. They may be formed with considerable inflammation; but even if they were phlegmonous in their origin, and they are so in general, yet they become of the nature of chronic abscesses in their progress, and they are chronic abscesses in their termination.—*Abernethy*.

The matter forming in the loins may be attended with considerable inflammation; the matter falls down into the lower part of the loins, but then it does not produce much irritation. It is in the language of Mr. Hunter, "An abscess in a part, and not an abscess of a part." The surrounding parts, in which

matter is found, have no participation in the disease, but the abscess which arises from mere distension—this is generally allowed: the matter accumulates to a considerable extent, the parts are very much distended, the integuments become inflamed and ulcerated, and in this way vent is given to the contents of the abscess.

The general opinion is, that lumbar abscesses are frequently connected with, and produced by, disease of the vertebral column, and when such a lumbar abscess becomes open, it is something more than an abscess, it is a chronic abscess, but is leading into a pile of diseased bones.—*See VERTEBRAL DISEASES.*

TREATMENT.—On the belief that lumbar abscess is connected with a diseased state of the vertebral column, gentle pressure is to be made on the abscess, and then punctured with an abscess lancet. The pressure is to be continued as long as the matter flows; the opening is afterwards to be closed with sticking plaster. The patient should be confined to bed, and not allow the diseased parts to move about. “In addition to preserving the parts in a quiet and undisturbed state,” says Mr. Abernethy, “and where the abscess is connected with a diseased state of the vertebral column, I would employ counteraction; it is a safe, and frequently a useful method, and tends to diminish the disease action in the parts beneath; but, at the same time, I would sedulously apply myself to the regulation of the patient’s health, and to the state of the functions of the digestive organs. This is saying in brief, what explains a great deal. Try to improve the health, and I say that *lumbar abscesses may sometimes be dispersed*. If it should, notwithstanding your endeavours to improve the general health, continue to increase, and if it should so increase as to show any disposition to burst, then I would rather puncture it than allow it to burst of itself. But there are numerous instances recorded in professional books of lumbar abscesses dispersing by the observance of rest, and attention to the general health.”

Even in some cases, where the abscess was connected with a diseased vertebral column, Mr. Abernethy says he should entertain hopes, not sanguine hopes, that, by proper management, the abscess might be dispersed without breaking; but if it should

crease in spite of all our attempts, the parts becoming more and more distended, almost on the point of inflaming the skin, then it would be opened.

OPER.—In opening a lumbar abscess, an assistant is directed to make gentle pressure upon the upper part of it, so as to distend the lower part; it is to be punctured with an abscess lancet, by carrying it in as far as the shoulder, in an oblique direction, though that is of little importance. The puncture, through the teguments, will be about three-fourths of an inch in length, and that through the fascia, about half an inch. The matter being evacuated, the cavity of the abscess is allowed to contract, and it does so to a certain extent; but the matter accumulates again. The patient should be kept from going about, as a state of rest is necessary for the restoration of the parts: he should be placed in an easy position, and remain in his bed. The wound is usually dressed, after carefully closing the opening, by laying a piece of lint over it, retaining it by a strap of adhesive plaster, and a few straps may be put on the part to make gentle pressure, without any further bandaging. The wound is to be dressed every second day, and by this management, no more inflammation will ensue than if it had never been opened.

* * When these abscesses are allowed to break of themselves, such a degree of irritation is produced in the cyst that it causes a high irritative fever; the pulse is 130 in a minute; the patient gets no sleep; the mind is in the greatest state of agitation, approaching almost to delirium, and the patient generally dies. When matter forms beneath the fascia, there is no opportunity allowed for the cavity of that abscess to contract, because, as the matter distends the fascia, it separates it from the surrounding parts, and therefore it must yield to the distension; but what ought to be done, is to puncture the abscess while it is small, if it be found to increase, and not suffer the distension of the fascia to proceed to such an extent. Lumbar abscesses have got well after they have been once opened. The old surgeons used to be greatly afraid of air getting into the cavity of an abscess; but the air does not appear to be the cause of the great irritation, for we see air escaping into the cellular mem-

brane when the lungs are wounded, without producing inflammation there. Air has been blown into the different cavities of the body without producing any such effect. Lumbar abscesses sometimes produce fistulæ, in consequence of the cysts of the abscesses with which they communicate being in an unhealthy state; the constitution is also deranged; and there are no healthy granulations produced to fill up the cavity. "The state of the fistulæ being dependent on the state of the cyst of the abscess, and the state of the abscess on the state of the general health, all that is necessary to be done is to lay bread and water poultice on the part, allow a little time, and restore the disturbed state of the digestive organs."—*Abernethey*

The distinction between lumbar and psoas abscess is, that the abscess forms on the side of the vertebræ, instead of the former part, it is then termed lumbar, instead of psoas, abscess. Disease of the ligaments of the spine commences between the ligaments on the surface of the intervertebral substance. It is very often nothing more than an abscess from the disease, having its origin in inflammation of the spine and the intervertebral substance. The matter spreads till it reaches the origin of the psoas muscle, which passes into ulceration and forms a bag, surrounded by a complete ring. The abscess proceeds as far as the tendon of the muscle, by Poupart's ligaments, and its further progress is restrained by the tendon. When it passes under Poupart's ligament, and the symphysis pubis, it has generally attained considerable magnitude, and has the appearance of femoral hernia, from which it may be known by the following marks:—In the first place, when the patient is asked, whether he has for a long time had continued pains in the loins, if he has psoas abscess, I will reply, "Yes, for five or six months." You will find that he has a difficulty in extending the thigh; if he put his legs together he feels pain and tightness in the groin; and he has increased pain in attempting to exert the limb, in consequence of the psoas muscle being then on the stretch; hence the pain in the loin and the great constitutional disturbance which the patient suffers in the progress of the disease, distinguish psoas abscess from femoral hernia.

ACID, ACETIC. (*Distilled Vinegar.*)

There are four varieties of acetic acid known in commerce:—

- | | |
|-----------------|------------------|
| 1 Wine vinegar, | 3 Sugar vinegar, |
| 2 Malt vinegar, | 4 Wood vinegar. |

USE.—Externally applied, vinegar proves highly beneficial, as surgical application, when combined with farinaceous substances, and applied in the cold state, as a cataplasm to sprained joints. It also forms an eligible lotion for inflammations of the face, when mixed with alcohol and water, in about equal proportions. Applied to burns and scalds, it is said to be highly efficacious, whether there be a loss of substance or not; and to accelerate the exfoliation of carious bone. Mixed with an infusion of sage, or with water, it forms a popular and excellent ggle for inflammation of the throat; and is also used for an injection to moderate the leucorrhœa. Applied cold to the nose in cases of hæmorrhage, and also to the loins and abdomen in menorrhagia, particularly after parturition, it is of great service. It is the menstruum of Goulard's extract, and other preparations.

OBS.—Vinegar taken internally to too great an extent is not without danger; large and frequent doses injure the stomach, regulate the chyles, and produce not only thinness, but anophy or wasting of the body. When taken to excess by females to reduce a corpulent habit, tubercles of the lungs, and a consumption have been known to be the consequence.

ADHESION.

DEFIN.—Adhesive inflammation is the process by which diseased parts become united; and for the knowledge of which the profession is indebted to the late Mr. John Hunter.

ILLUSTRATIONS.—Inflammation has a disposition to separate blood into more parts than usually occur when drawn from a person in health. In health, it merely separates into serum and particles; but, when in a state of inflammation, if, after it be drawn, it be allowed to remain undisturbed, it will separate into serum, red particles, and fibrin. The red particles, together with the fibrin, will be found at the bottom of the vessel; the fibrin

immediately on the top of the red particles, forming what is called the buff of the blood; and the serum will occupy the surrounding space.—The fibrin having lost the red particles, contracts with great firmness, and when taken out nearly resembles a piece of leather. It has been stated that the adhesive matter is albumen but this has not been proved*. Some surfaces of the body are serous, others are mucous. The cellular membrane is one of the former, and usually exhales a fluid somewhat resembling serum but containing much less albumen†. This membrane is vulnerable to the adhesive inflammation. The vessels that usually secrete the fluid just mentioned, when the part is inflamed, pour out fibrin, which, becoming coagulated, produces the hardness usually formed in inflamed parts. The peritoneum, a membrane which doubly incloses the intestines, is a serous surface, often affected by the adhesive inflammation, which occasions the two surfaces of this membrane to be glued together. But the part of all others most subject to this kind of inflammation is the pleura, and a post mortem examination is seldom made without finding

* Dr. Bostock, who was many years at Guy's hospital, took considerable pains to investigate the nature of this substance, and published several papers on the subject in the *Medico Chirurgical Transactions*, named it *fibrin*. John Hunter called it coagulated lymph, certainly not a good term to be applied to such a substance, for lymph is expressive of, and relates to, water, whereas fibrin is not only a solid, but an exceedingly firm one.—SIR J. COOPER, *Lect. on Adhesive Inflammation*.—Fibrin is solid, white, and odorous.—It is somewhat elastic when moist, but on drying it becomes hard, brittle, and semi-transparent. In a moist situation it readily putrefies. It is insoluble in water at common temperatures, and is dissolved in very small quantity by the continued action of boiling water. Alcohol, of density 0.8, converts it into a fatty adipoceros substance, which is soluble in alcohol and æther, but precipitated by water. The action of acids on fibrin has been particularly described by Berzelius. See *Med. Chirurg. Trans.* Vol. 1. p. 201. *et seq.*

† Like fibrin, albumen is neither an acid nor an oleaginous substance. It enters largely into the composition of animal fluids and solids. Dissolved in water it forms an essential constituent of the serum of the blood, the liquor of the serous cavities, and the fluid of dropsy; and, in a solid state, it is contained in several textures of the body, such as the cellular membrane, skin, glands, and vessels. Hence it appears that albumen exists under two forms, liquid and solid.

on the surface of this membrane many unnatural adhesions.—The heart, in like manner, is often glued to the pericardium, so that the space usually found between the two portions of membrane is obliterated.

OBS.—[It is seen above, that the serous membranes readily give on the adhesive inflammation, by which they become permanently attached to each other, or to the adjacent parts; a most beautiful and wise provision of nature, for if the membranes of cavities, such as the pleura and peritoneum, instead of the adhesive, were to receive and support the suppurative inflammation, sepsis and death would be the inevitable consequences.]

The membranes affected by the suppurative inflammation, are those termed mucous, the urethra, for example, is of this class. This is another wise and benevolent purpose of nature; for had these membranes been subject to the adhesive instead of the mucous inflammation, the outlets of the body would have become closed, and life destroyed. Sometimes, however, where inflammation of a mucous membrane is exceedingly violent, it passes into the adhesive inflammation, glues the parts together, and, unless relieved by an operation, would terminate in the loss of life.

Common gonorrhœa, were it not so arranged by nature that the mucous membranes are more readily influenced by the suppurative than by adhesive inflammation, would destroy life.

Appearances under adhesive inflammation.—When an incision is made into a part affected with adhesive inflammation, into the cellular membrane, for instance, a quantity of serum is found collected round the part, and, in the part itself, a yellow and semi-transparent substance, having the appearance of jelly, though differing widely from it in composition. The best opportunity of observing the adhesive inflammation is on the skin under the formation of a blister; the blister produces the same effects as those produced in the operation of hydrocele. If a blister be applied for twenty-four hours, till the cuticle is raised, and an incision made into the vesicles, a quantity of serum will escape; and if the surface be examined, a yellow substance will be found on it, existing in a lesser or greater degree, according to the length of time the blister has been applied; which is the same as the ad-

hesive matter thrown out as under the adhesive process of inflammation. The time required for the adhesive inflammation to commence differs according to the structure of the part and the nature of the constitution. In the cavity of the abdomen, the intestines will be glued together in nineteen hours after the adhesive inflammation has commenced; this occurred in the case of Mr. Blight, who was shot by Patch some years ago, a case to which Sir A. Cooper was called, and who thus, in his lecture on adhesive inflammation, adduces this circumstance in corroboration of the specified time here mentioned, which, however, may eventually occur sooner or later. On the surfaces of wounds, the process of adhesion takes place rapidly; for if a piece of lint be applied to a newly made wound, in twelve hours it will be glued to the spot: in a dog the adhesive process commences in six hours.

Adhesive matter, when effused on a thin membrane, coagulates into a thin net-work, assuming the character of cellular membrane. When it has formed, blood-vessels soon enter it, and in a short time it becomes organized; the *vasa vasorum* are elongated by the force of the circulation; they enter the newly formed substance and send minute ramifications throughout it. On cutting it in adhesive inflammation within twenty-four hours after it has been deposited, small bloody spots may be seen, which mark the future situation of the vessels which nourish it; but it is not until ten days after it has been formed that adhesive matter becomes completely organised; for it will be found that an injection will enter adhesive matter sooner than the tenth or eleventh day after its formation. When vessels elongate, they have not the character of arteries. They in general take a serpentine or tortuous course.

But how do these vessels originate?—It was thought at the time, and Mr. Hunter was of the same opinion, that the vessels originated in the newly formed substance; this, however, does not turn out to be the case; but that they are formed by the elongation of the *vasa vasorum* of the surrounding arteries, which become dilated, lengthened and tortuous; and their degree of vascularity will be in proportion to that of the part subjected to the adhesive process. In tendons, for instance, it will be much less than in muscles. A knowledge of this process is of the utmost

importance in surgery; since without it no operation could be attended with success; its absence, even after bleeding, would destroy life. To effect adhesion is the first thing to be attended to. Recalled, for instance, to a compound fracture, the surgeon should endeavour to bring the parts together to make it as soon as possible a simple fracture. The same is also the plan in great operations; the cæsarean section, for instance, which consists in making an incision in the course of the linea alba, for the purpose of extracting a foetus from the womb, would not be dangerous, did the adhesive process take place; though from hæmorrhage and exhaustion, it frequently proves fatal; but in cases where the adhesive union takes place, the danger is comparatively slight.

The adhesive inflammation may be also exemplified in the operation for cataract where a wound is made in the eye, more than half of the cornea being cut. If the adhesive process take place within twelve hours, the flaps begin to adhere, and in twenty-four they are consolidated; but if the contrary occurs, violent inflammation ensues, and the loss of the eye is the consequence. In this instance, the success of the operation depends on the adhesive process. In a person who had previously been in health the inflammatory action might be too weak, and in another individual it might be too strong; in both cases suppuration would be the consequence, though produced by very different causes.—In the operation for strangulated hernia, also, an opening is made into the hernial sac, which communicates with the cavity of the abdomen, and here, again, if the parts are not united by the adhesive process, the patient dies. In the operation for aneurism, it is adhesive inflammation that saves life. A ligature is applied to the artery, a coagulum of blood forms, the adhesive process commences, fibrin is poured out, and the internal coats, were it not for the adhesive process here, when the ligature came away, hæmorrhage would be the consequence. The operation for the radical cure of hydrocele presents another beautiful illustration of the effects of the adhesive inflammation, as well as the treatment of a stump after amputation; also in wounds of the joints, which, after weeks, or even months, have elapsed, gradually heal by granulation, with the motion either entirely or greatly impeded,

for the want of having attempted adhesion by bringing the lips of the wound together in the first instance of their occurrence. In the operation for hare-lip, the wound becomes united, and the deformity removed by the adhesive inflammation. In fine, the effusion of adhesive matter by unloading the vessels of the part, has the effect of reducing inflammation, so that the process generally terminates as soon as this effect is produced.—See SUPPURATION.

AMAUROSIS.

DEFINITION.—Partial or total loss of vision, arising from paralysis of the optic nerve or retina; and this is produced by congestion of the vessels of the part, or minute alteration of its structure. *Sir A. Cooper*.—That diminution or total loss of sight which immediately depends upon a morbid state of the retina and optic nerve, whether this morbid state exist as the only defect, or be complicated with other mischief (*see Beer, in Journ. Foreign Med. and Surgery, Vol. IV. p. 166.*) Amaurosis, according to Mr. Travers (see *Synop. of the Diseases of the Eye, p. 293*), comprehends all those imperfections of vision which depend upon a morbid condition, *whether affecting structure or function*, of the sentient apparatus proper to the organ.

CAUSES.—The abuse of bitter substances, as chicory, coffee, bitter malt liquors, and bitter medicines, as quassia, is, according to the generality of writers on this subject, unquestionably a predisposing cause of amaurosis. Immoderate doses of narcotic substances, as opium, henbane, deadly nightshade; lead will produce the same effect. A case is mentioned by Beer, in which the only assignable cause was the exhibition of pills containing the extractum cynoglossi* (extract of hounds' tongue). Among other causes are enumerated hysteria and amaurosis, infarction generally, and induration of one or more of the abdominal viscera,

* *Cynoglossum officinale*: the systematic name for hounds' tongue; called also *cynoglossum*, and *lingua canina*. *Cynoglossum staminibus; foliis lanceolatis, tomentosis, sessilibus*, of Linnæus. It possesses narcotic properties, but is seldom employed medicinally. Acids are said to counteract the ill effects from an over-dose more speedily than any thing else, after clearing the stomach.

especially the liver.—See Beer's *Lehre von den Augenkrankheiten*, t. 2, pp. 444—46.

Richter divides the remote causes of amaurosis into three principal classes, the differences of which indicate three general modes of treatment. Among these classes are, extraordinary plethora, and turgidity of the blood-vessels of the brain, or of the optic nerves and retina; suppression of some habitual discharge, great bodily exertion, pregnancy, and a violent fit of vomiting, have been known to produce loss of sight. And Schmucker, another German physician, informs us, that it is not uncommon for soldiers, on long marches in hot weather, to become blind all on a sudden. The local causes which operate in weakening the eyes are various; and there is none more injurious than keeping them long and attentively fixed upon minute objects. Amongst the occupations detailed by Mr. Travers as particularly exposing persons to amaurosis, are those of needle-workers, writers, draftsmen, inspectors of linen and scarlet cloths, stokers in iron-furnaces and glass-houses, tavern cooks, watchmakers, engravers, philosophical instrument makers, sea-officers.—*Synopsis*, p. 144. *Op. cit.*

SYMPTOMS.—The symptoms distinguishing this complaint are few, and, therefore, require to be well known. The pupil is generally dilated and motionless; the iris is nearly immoveable, acts very little, and vision is completely lost. There is also slight strabismus. There is frequently the sensation as if a cloud was before the eyes, which is termed *caligo*; and there is often a greenish appearance of the humours, which is named *glaucoma*.* Persons affected with amaurosis, are frequently troubled with false appearances, as flashes of light or balls of fire before their eyes. Amaurosis generally commences in one eye, and, after proceeding to a certain extent, shows itself in the opposite eye, unless means are taken to arrest its progress. It attacks subjects of all ages, and under all circumstances. It occurs at all periods of life, from childhood to old age.

TREATMENT.—The employment of ordinary antiphlogistic means, according to age and constitution, namely, the abstraction

* This disease (*glaucoma*) has often been mistaken for cataract.—See GLAUCOMA.

of blood generally and locally, with the employment of the other part of the antiphlogistic treatment; and afterwards the use of mercury, so as to affect the system, and to keep up its action for several weeks. Plummer's pill, tonics, aperients, and changes of air. Counter-irritation is sometimes beneficial in these cases, and it may be found necessary, in conjunction with other treatment, to apply a blister behind the neck, perhaps every five, six, or seven days, during the time the other treatment is being employed. Scarpa, and some of the German physicians, as Schmucker, Richter, and Beer, have particularly recommended the employment of emetics, for the purpose of removing irritating substances from the stomach, which may tend to aggravate this disease. Where amaurosis arises from suppression of the menses, Scarpa recommends leeches to the pudenda, bathing the feet in warm water, afterwards exhibiting an emetic, and pills made of rhubarb and tartrate of antimony, combined with gummy and saponaceous substances. For that which is the consequence of the stoppage of some habitual discharge, as copious bleeding from piles, he recommends leeches and fomentations to the hemorrhoidal veins, then an emetic, and afterwards the same opening pills. In the majority of cases, the chief indications are, we are assured, to empty the alimentary canal from all irritating matter, improve the state of the chylopoietic viscera, and invigorate the nervous system in general, and the nerves of the eye in particular. The stomach having been cleared out, as here directed, Schmucker's resolvent pills (in which, if the surgeon thinks proper, emetic tartar may be exhibited,) are directed to be taken every morning and evening for a month or two, viz.:

℞ G. Galbani	} singulorum 3j.
Sagapenum	
Sapo venet.	
Rhei opt.	3iss.
Antim. tart.	grs. xvi.
Succ. liquorit	3j.

M. F. Pilul. Pond. gr. v. sum. iij.; maneque nocte, as above directed.

When the state of the stomach has been improved, and the

might partly restored, remedies to strengthen the digestive organs and to excite the vigour of the nervous system in general, and of the nerves of the eye in particular, are to be exhibited. Scarpa, with this intention, prescribes bark, acids valerian in powder, and recommends a diet of a tender and nutritious kind, wholesome broths, a moderate quantity of wine, and proper exercise in a healthy atmosphere. To excite the action of the nerves of the eye, Scarpa says that the vapour of liquor ammoniæ, properly directed against the eye, is of the greatest service, and is applied by holding a small vessel containing it sufficiently near the eye to cause a smarting from the penetrating vapours, and copious secretion of tears is brought out, and a redness, in less than half an hour after the commencement of the application. This plan must be followed up till the incomplete amaurosis is quite cured.

AMMONIA, MURIATE OF.

(*Murias Ammoniaë. Ammonia Muriata. Sal Ammoniaë.*)

A saline concrete substance, formed by the combination of the muriatic acid, with ammonia. Its chief use in surgery is as an external discutient application in the form of a lotion. The following application, containing muriate of ammonia, is recommended by Mr. Justamond in milk abscesses:

Take Ammoniaë muriatæ..... ʒj.
 Sp. rorismarini lb. j.

Misce.

Linen rags wetted in this are directed to be continually applied to the part affected.

OBS.—In the indurations left after mammary abscesses, this lotion is not without its utility; but during the inflammatory stage of these mammary affections, emollient poultices and fomentations are decidedly preferable; and in this instance, and before matter is formed, an evaporating lotion is superior to both.

AMPUTATION.

In consequence of the great improvements in modern surgery, operations are now much less frequently performed than in

former times. Many of the diseases which our ancestors considered incurable, can now be easily remedied by modes of treatment corresponding with our increased pathological knowledge. Many accidents, for instance, where the parts are much lacerated and for which the ancients would have operated, we leave to nature, by whose influence the different reparative processes will be set in action, and the injured limb restored to health and utility. When amputation is necessary, nature will occasionally even perform this operation unassisted by art: in mortification of the feet it often happens that the leg will be amputated by nature as effectually as though it had been accomplished by the knife.

A.—Diseased joints used very frequently to lead to the performance of amputation, in young persons as well as in old; but amputation is much less frequently performed at the present day in consequence of such disease, than some years ago: even diseases of the joints of the upper extremities of children give rise to amputation much less frequently than formerly; but in chronic diseases of the ankle and knee, amputation is still very commonly performed.

B.—For compound fractures, amputation is seldom performed directly: they are not often so severe as to require immediate amputation; and it is not until gangrene or disease of the bone has taken place, that it is deemed necessary to amputate. Compound fractures, however, from the superior manner in which they are now treated, do much better than formerly, and very severe injuries of this description will often terminate most favourably. Upon the whole, therefore, amputations are much less frequently performed at the present day than formerly. The reason for amputating, in a case of compound fracture, is the danger that would accrue to the life of the patient, in consequence of the injury, if the limb were not removed. In the very serious injuries of this kind which sometimes occur, traumatic gangrene, mortification of the limb, may generally be expected to come on, and violent inflammation, with a corresponding febrile disturbance of the system, which rises to such a height as to endanger life; then there is a more remote degree of danger from repeated suppurations, from the drains on the system which take place when these

wounds get into the chronic stage, and when there is a thin discharge, accompanied with hectic fever.

2.—The very imperfect, and sometimes useless, state of the limb, after the patient may be said to have recovered from the injury, is another consideration by which the surgeon ought to be influenced in his determination. The injury which the soft parts in the neighbourhood of the fractured bone have sustained, is so considerable; and the repeated inflammations and suppurations have produced such a degree of stiffness, that the patient perhaps survives with a limb in a condition not to be at all useful to him, in point of fact, to be rather burthensome than otherwise, and that, too, after many months, and even sometimes years, of suffering. These are the considerations which, under certain circumstances, induce us to think it expedient to amputate a limb rather than to attempt to preserve it. The same question occurs in this case as in the instance of serious gun-shot wounds,—the point at which amputation may be most advantageously performed; for in the case of compound fracture, amputation may be performed immediately after the occurrence of the accident, or may be deferred till some time afterwards. “There is no doubt whatever,” says Mr. Lawrence, “of its being by far the best and most eligible practice to amputate immediately, to perform the operation within twelve or thirteen hours after the receipt of the injury; and all the considerations which led to that decision in instances of gun-shot wounds, are equally applicable to cases of compound fracture that require amputation.”—See *Lectet*, Vol. XI. p. 268. 1830.

—In determining upon a proper case for amputation in compound fracture, where the degree of injury is so extremely variable, we can only speak in a very general way as relates to this important question. The degree of injury which the parts have received must be attended to, as well as the greater or less importance of the parts involved: for instance, we should examine whether the joints are at all injured; whether it is probable that considerable blood-vessels or any large artery be implicated. The age and constitution of the patient must be taken into the consideration; and, which is also at times a question of importance, to ascertain whether the patient will have such professional care and

such comforts as his situation requires.—*See* FRACTURES. GUNSHOT WOUNDS.

METHODS OF AMPUTATION.—There are two methods generally adopted for the removal of limbs: 1. Amputation by the *circular incision*; 2, and the *flap* operation.—In the former of these, a circular cut is made through the soft parts, and a subsequent division of the bone, making the wounds of the soft parts such, that the edges can be neatly approximated, and placed under circumstances favourable to the union by adhesion. In the other case, the soft parts are divided by one, two, or even a greater number of incisions, not in a circular manner, but such that, when the limb has been removed, they admit of being adjusted and fitted to each other, and, of course, being placed in the position most favourable to the union by adhesion. Of these two methods, the first is most frequently employed.

The situation in which amputation is to be performed (having once come to that determination), as well as the mode of performing it, is now to be considered; and, generally speaking, the rule of proceeding is to amputate the limb so as to preserve as much of it as possible, without leaving any of the disease that requires the operation. This situation differs under different circumstances. Amputations may be performed either in some preservation of the continuity of a limb, or at a joint; the limb may be cut off either between two joints, or by making the division at one of the articulations. The former is the mode most commonly adopted. Then follows the consideration of the proceedings that are necessary in order to avert the hæmorrhage (the *TOURNIQUET*); the mode of performing it in the quickest and most prompt manner, as far as the operation itself is concerned; that is, the immediate mechanical removal of the part; the steps that are subsequently necessary for preventing future hæmorrhage by securing the orifices of the divided vessels, the mode of uniting the wound, and the treatment of the patient after the operation has been performed.

I. AMPUTATION OF THE THIGH.

The whole art of this operation consists, after having applied the tourniquet, in making the incisions through the muscles in suc-

anner as to prevent the stump from becoming of a conical shape at subsequent period. It is not always desirable to perform this operation near the knee-joint; in many instances, indeed, it is a great effort to do so, but more especially when the knee is affected with fungoid or scrofulous diseases, because under the tendon of the rectus femoris, for an inch and a half at least above the patella, are situated a quantity of bursæ mucosæ, which if cut into, under any circumstances, when amputating, is bad enough, for extensive suppuration will follow, which will most materially retard the healing of the stump; and if you operate in consequence of a fungoid or scrofulous disease of the knee, and then should cut through these bursæ, the chances are, that the disease would again return in that part, and render another operation necessary. In an operation above the knee, care must be taken not to make a circular incision through the integuments lower than an inch and a half above the patella.—*Sir A. Cooper, MS. Lect.*

OPER.—Having made the first incision through the integuments, and dissected them back as far as may be thought necessary for the purpose of covering the stump, you are then to cut through the superficial set of muscles. The division of these muscles is the chief circumstance to be attended to in this operation, namely, to divide the muscles immediately surrounding the knee at least two inches higher up than the spot at which the incision was commenced through the superficial layer of muscles; which will prevent the formation of a conical stump. The reason is obvious, the external muscle being cut longer than the deep-seated, an allowance is made for their retracting; when, therefore, they are drawn up to their fullest extent, they are then of the same length as the deep-seated muscles: thus the end of the stump, and, consequently, the entire stump, will present a flat surface. The deep-seated muscles do not retract, from their intimate connexion with, and attachment to, the bone. The principle in this operation is, to have the muscles the same length as the bone, without the necessity of applying a bandage.

TREATMENT.—It is a principal object, after this operation, that the stump should be healed by the adhesive process, as much as

that of the leg ; but, in applying the straps of adhesive plaster should be remembered, that if matter form, it will gravitate, and at the lowest part of the stump, where the ligatures are hanging, a small aperture should be left open to permit its escape. It is generally advisable, in dressing this stump, to apply a roller to the skin, in consequence of the space which exists between the muscles and the end of the stump ; the ligatures are then to be placed at the most depending part, and straps of adhesive plaster put on in the same manner as for amputation below the knee.

Q. In this operation, how many arteries is it usually necessary to tie ?

A. Three ;—the femoral, the profunda, and that branch which usually runs either in or by the sciatic nerve.

Obs.—The application of a ligature in this last place requires considerable care, for the want of which, two instances have been known of a ligature having been put upon the sciatic nerve itself. In the first, it was not attended by any evil consequences ; but in the second, violent spasms came on in the part ; they were afterwards diffused throughout the body, and, ultimately, proved destructive to life.—*MS. Lect. citat.*

II. AMPUTATION OF THE LEG, BELOW THE KNEE.

In amputations of the leg below the knee, if its condition will allow of it, the bone should be sawed through four inches below the point of the patella. In cutting through the integuments, the incision should be made with a view of saving two inches of these for the purpose of covering the stump ; the quantity, however, is to be regulated according to the size of the limb ; and, in accidents where the parts have not been reduced by previous disease, four inches will frequently not be found too large a portion. The principal object should be to save integuments, and not muscle : to preserve muscles for the purpose of covering the stump in these amputations, is an exceedingly false and injurious surgical principle. If you save muscle as well as integument, retraction will take place, and the stump consequently will not heal so kindly as it would.

ere done, provided you had only preserved integument.—*Sir J. Cooper.*

OPER.—The amputating knife is not to be grasped with the fore hand, but rather between the finger and thumb, so that the handle may freely play in the hollow of the hand, and at the same time pass between the fingers and thumb, when the circular incision is made: by adopting this method, the first cut may be made in an easy and free manner, and that stiffness obviated which is sometimes observable even in experienced operators. The integuments then being divided, and their two places of adhesion, viz. over the tibia and over the fibula, having been separated, as well as the connecting cellular membrane, the skin is to be detached to the extent of two inches, a quantity quite sufficient to cover the stump; the muscles next being well divided, so as to prevent any of the fibres being lacerated by the teeth of the saw, which would not only impede the action of the instrument, but render the operation painful and clumsy. The limb should merely rest on the hand of the assistant; and during the application of the saw, he should neither elevate nor depress it, but quietly permit the position of the limb to be regulated by the operator, and carefully retain it in that situation; the hitching of the saw will then be prevented, and the operator himself may avoid splintering the bone, by causing the oscillations of the instrument to be short at the moment when the bone is nearly cut through.

The vessels to be secured in this operation are the anterior and posterior tibial arteries, and sometimes the anterior and posterior perosseal. In tying the posterior tibial artery, take care not to include in the ligature, the nerve which accompanies it. After having tied the ligatures, cut off one end of each, and let the remaining ends hang out together at the bottom of the stump. Straps of adhesive plaster are then to be applied over the integuments, some longitudinally, and others perpendicularly, for the purpose of making it circular. These perpendicular and longitudinal straps should be secured in their situation by another strap applied over them and around the limb, so as to retain the first straps that were applied in their proper situation.

The cooler the stump is kept after the operation the better there will be less danger from hæmorrhage, and less chance of suppurative inflammation taking place. The adhesive inflammation is what is wanted; and this will be most likely to be obtained by keeping the stump in as cool a state as possible. rollers are applied by surgeons at the present day, no tow, flannel caps, as formerly.

As regards the removal of the dressings, on the sixth day a strap may be taken away, for the purpose of allowing any pus that may have collected to escape; and on the eighth day all straps may be removed, substituting for each, as soon as taken off, a fresh strap of the same kind of plaster; as, without this precaution, the whole of the adhesions which had formed, might be destroyed, therefore, on removing each strap, another is to be immediately put in its place before a second is touched.

III. FLAP AMPUTATION OF THE LEG.

This operation is usually performed a little above the ankle joint, about two-thirds of the joint downwards. It is performed with a view of enabling the person to wear an artificial leg; and in those individuals whose circumstances do not require them to obtain their food by manual labour, it may succeed, and answer the object in view; but for those persons who, by their industry and muscular exertions, have to obtain a livelihood, it does not succeed. The way in which the operation is performed is by pushing the cutting through the integuments and muscles at the back of the leg at this part, and carrying the incision downwards. When the knife is considered to have passed sufficiently far, you are to make it cut its way out immediately at the back of the leg, making the termination of the flap of a semilunar shape in order that it may correspond with the form of the wound, in which it will afterwards be applied, viz. the upper part of the stump. A circular incision is now to be made over the leg, so as to meet the incisions where the cutting first penetrated; and the limb is removed by sawing through the bones.

OBS.—In addition to the objections against this operation there are two others of very considerable importance:—it does not heal near so well as the common method, from the constant

traction of the muscles of the calf, the calf becomes drawn from the surface of the bone, which exposes it, and the stump usually suppurates most extensively. There is another objection also, against its performance, namely, if hæmorrhage should occur when the ligatures come away, it will be almost impossible to get the vessels so as to secure them, in consequence of their being deeply imbedded in the soft parts. It is altogether, therefore, an operation which it will be prudent to avoid.

IV. AMPUTATION OF THE FORE ARM.

The amputation of the fore arm a little above the wrist is considered a very dangerous operation; and the objection to it is, that a great number of the tendons situated in the fore arm are divided, which suppurate after the operation, and form extensive abscesses, which burrow along the arm. Tendons are exceedingly apt to slough, where matter has been produced, and in this way occasion the loss of life. It may be said, that some tendons are cut through in amputating at the wrist joint; this is true, but at the wrist joint they are so bound down by ligaments, that they do not suppurate after the operation; there is skin enough at the extremity of the joint, which unites by the adhesive process. If you are asked where you should amputate, the answer is, at one-third of the length of the fore arm in tracing it downwards.

In amputating the fore arm, a double flap may be made, one on the inside, and the other on the outside,—a mode of operating which is often adopted. In sawing the bones, both must be sawn through at the same time. A very good stump is left in this operation. Four arteries require to be secured; the radial, the ulnar, and the anterior and posterior interosseal.—*Sir A. Cooper, 3. Lect.*

V. AMPUTATION OF THE UPPER ARM.

This operation is similar to that performed above the knee. In the latter, however, it is necessary to make three incisions; but in amputating above the elbow joint, two circular incisions will be sufficient, one through the integuments, and a second through the muscles down to the bone. Having well detached

the bone from the muscles, you will proceed to divide it with the saw.

OBS.—The reason for this difference in operating is, that above the knee, a considerable portion of integuments to cover the stump is required; in the upper extremity, the muscles are more bound down to the bones. In amputating above the elbow, the principal artery that requires to be secured is the brachial; and in tying it, care must be taken not to include the brachial nerve in the ligature.

VI. AMPUTATION OF THE HAND AT THE WRIST JOINT.

This operation is not unfrequently required in consequence of extensive laceration of the metacarpus. In performing the operation at the wrist, the operator must first feel for the styloid process of the radius. It is preferable, instead of a circular incision, to make a semi-circular one on the back of the wrist, and a similar one on the under side, so as to reach the styloid process of the radius. (It is of importance that sufficient integument should be left to cover the joint completely.) Then depress the hand a little, and cut through the transverse ligament of the wrist. The operation, in this manner, is easily performed, and leaves a neat stump. The radial and ulnar arteries are the ones which in general require to be tied, the interosseal nerve being of sufficient magnitude to require a ligature. In tying the ulnar artery, care must be taken not to include the ulnar nerve, which is close to its side. The ulnar artery is close to the *flexor carpi ulnaris*, and the radial at the outer side of the *flexor carpi radialis*.

VII. AMPUTATION, PARTIAL, OF THE HAND.

It sometimes happens, in the hand or foot, that disease or injury attacks a considerable portion of the member without actually rendering the whole useless. Scrofulous disease may be situated in the metacarpus: it may affect one or two bones of the hand and not the others. The hand may be shattered or severely wounded, by the bursting of a gun or pistol; or it may be entangled in machinery, and dreadfully torn. Under these circumstances

case, it may be found that one or two of the fingers, or thumb, have escaped, while all the rest may be so lacerated, and the rest so broken and comminuted, that there is no hope of being able to restore them to a useful condition. The parts, therefore, which are irreparably injured, are to be removed, leaving behind those which one may reasonably expect to restore; although it should be the thumb, or even the little finger alone, the hand will be much more useful to the patient subsequently, than if all the fingers had been removed. The soft parts, therefore, should be divided, and the injured metacarpal bone cut through and removed, leaving those which have escaped injury. In all these cases, a careful examination is necessary, that the patient may derive every possible benefit from retaining some part that may subsequently be of use to him.

VIII. AMPUTATION OF THE FOOT AT THE TARSI.

The operation for the removal of the toes is so similar to that of the fingers, that it is scarcely necessary here to add much on that subject. (See AMPUTATION OF THE FINGERS.) It may, however, be observed, that a man who had been in the habit of moving fingers at the first joint, and who had never removed a finger, or seen one removed, if he were to conduct the operation in the same manner as for the removal of a finger, would find himself very much puzzled: that is, if he expected to find the first joint of the toes at the same distance from the web as in the fingers. In the toe operation, the incision must be carried down between the web for at least an inch and a half, before you come to the joint: the other steps of the operation are the same for the removal of the finger.

A new operation has, of late years, been proposed for the amputation of the tarsus, by cutting through the joints formed by the astragalus and os scaphoides, and the os calcis with the os scaphoides. "I have tried this operation," says Sir A. Cooper, "and do not like it; the inflammation which generally results is exceedingly severe, and the suppuration very extensive, which may be accounted for from so large a portion of articulating surface being exposed by the operation. I am of opinion that it is

much better to saw through the bones, than to perform this operation; there will be much less inflammation, much less suppuration, much less risk to the patient, and, at the same time, much greater chance that the integuments will unite by the adhesive process."

IX. AMPUTATION, PARTIAL, OF THE FOOT.

In a foot, partial amputation has been performed, in the case for instance, of scrofulous affection of the metatarsus not extending to the tarsus. Here amputation may be performed in the middle of the foot, that is, at the articulation which connects the metatarsal to the tarsal bones.

OPER.—The operation is performed by making an incision across the sole of the foot as much in front of the articulation as possible. It is a kind of flap operation, and the flap of the soft parts must be made from the sole of the foot, for on the back you have merely thin skin covering the bones, which will not answer the purpose. Then make an incision across the sole of the foot, as much in front of the articulation as will enable you to take up a flap sufficient to cover the wound. When you have turned up the integuments in the bottom of the foot, and made the flap, the ligaments that tie the metatarsal to the tarsal bones must be divided, and the foot removed with the toes. The flap is then to be brought up, and the wound united by adhesive plaster or suture.—*Lawrence. See Lancet, Vol. XI. p. 953. 1830.*

OBS.—Partial amputation of the foot has even been performed when certain of the tarsal bones have been the seat of the disease between the astragalus and os naviculare, towards the inside, and the os calcis and os cuboides, on the outside. The line of junction between these bones is nearly transverse, about an inch in front of the ankle; and if, in this case, the partial amputation be performed, the operation should be performed as here mentioned, namely, make a transverse division along the back of the foot, detach the parts in the sole, and separate the bones at their articulation.

. Mr. Lawrence expresses some doubt respecting the advantage to be derived from these partial operations on the foot.

from the surface that is left for supporting the weight of the body being so different from the natural surface of the foot, that, he observes, it may be doubtful, in certain cases, whether it is better than a wooden leg.—*Vide op. supra citat. p. ibid.*

X. AMPUTATION OF JOINTS.

There are certain situations in which amputation at the joint may be preferred, and there are other circumstances under which amputation at the joint is done from necessity. To the latter cases belong amputation at the shoulder and the hip joints; to the former, amputation of the fingers and at the wrist.

XI. AMPUTATION OF THE FINGERS.

Amputation is now rarely performed at either the second or third joint of the finger, because it is found that it is better to remove the entire finger, either at the first joint or even at the metacarpal bone behind the first joint, than to leave a small portion of the finger before it, for the stump is found to be extremely inconvenient, and to interfere most unpleasantly with the motion of the remaining fingers. Amputation, therefore, at the second or third joint, unless particularly requested, is not usually performed; and as this request may be occasionally made, the mode of performing the operation is as follows.

Amputation at the second or third Joint.—Having felt for the joint, a circular incision is to be made a little below it, through the integuments: this is the first step. A cut is then made through these at each side of the joints; the flaps thus produced are then turned back, when, upon dividing the ligament at each side of the joint, you immediately open it, the knife is carried through, and the ligament divided on the opposite side. In this way the finger may be removed. The flaps are now laid over the bone, and form a good stump.

FRENCH METHOD.—The French surgeons perform this operation differently, and in a way not very anatomical; for the connection of the phalanges being such that the upper portion of the lower bone projects over the articulating surface of the upper. This happens both inside and outside the joint, so that, if an at-

tempt is made to cut directly into the joint, it cannot be done in those parts, for the point of the knife will rest upon those processes just mentioned. Their mode is to bend the finger, and then make a cut into the joint behind the process; and in a finger not diseased this may be done; but, generally speaking, in diseased fingers, the joints cannot be bent. It likewise often happens that the joints themselves are diseased, when, of course, flexure would be exceedingly difficult, if not impossible.

Amputation at the first Joint.—In this amputation, the finger is drawn aside; you then make an incision oblique through the web situated between them, and the cut is carried just beyond the knuckle. The knife is then carried through the joint from side to side, leaving a flap of integument sufficient to cover the end of the bone. "This," says Sir A. Cooper, "is not the best mode of operating; it is better to make your oblique cut through the web longer than I have described to you, so as to carry it beyond the joint, some way up the metacarpal bone; you make a similar incision on the other side of the joint, and having cleared the bone from its muscular and ligamentous attachments, you saw through the metacarpal bone itself. The two fingers which were next the diseased one now approximate, and if kept in this situation until adhesion of the integuments has taken place, very little deformity of the hand will be produced; if, on the other hand, a portion of the finger be left projecting, the inconvenience of the stump will not only be felt in the motion of the fingers, but a disagreeable deformity be obvious to every spectator. In the operation I have just shown, neither the one nor the other would exist, comparatively speaking; there cannot be, of course, any annoyance arise from a stump, and the deformity will scarcely be perceptible. (See *Lect.*)—This is the operation recommended at the first joint, namely, that of sawing through the metacarpal bone a little way above the knuckle.

XII. AMPUTATION OF THE METACARPAL BONE OF THE THUMB

The incision in this operation is commenced by cutting through the integuments at the inside of the thumb, nearly opposite the first joint; the incision is carried backwards to the union of the

metacarpal, with the carpal bones; this incision will form a flap, consisting of integuments and the abductor muscles, quite sufficient to cover the wound that will be occasioned by the operation. After having completed this flap, the knife is then to be passed backward from between the index finger and thumb, as near as the trapezium, to which bone the head of the metacarpal is articulated: arriving at this position, the operator is to turn the knife so as to make its blade form a right angle with the incision just made; he is then to carry its edge through the joint, through which the ligaments will be divided, and the bone is thus removed. It will be observed, that the flap first left, and which is formed principally of the abductor pollicis and the integuments, is quite sufficient to cover the wound.

Amputation of the Metacarpal Bone of the Little Finger.—The metacarpal bone of the little finger is removed by nearly a similar operation to the preceding. The incision is begun in the web between it and the ring finger, and carried down to the articulation with the cruciform bone, passing it through the joint, and then letting it terminate upon the outside of the metacarpal bone, opposite the part where the first incision commenced. A flap will be thus formed of muscles and integuments, in the same way as the flap in the thumb operation. Straps of adhesive plaster are to be employed for the purpose of keeping the edges of the wound in contact. The vessels required to be secured in the operations for the removal of the fingers, are the two digital arteries.

Obs.—It is sometimes advised, that the cartilage covering the articular extremity should be removed in amputating at an articulation: this, however, does not appear to be necessary; for if the parts be brought together, they will unite very well over the cartilages; but as it is not difficult to pare off, or to scrape away with the knife, the cartilage from the end of the bone, there is no particular objection to doing so.

XIII. AMPUTATION AT THE SHOULDER JOINT.

Amputation at the shoulder-joint is rare in what is called *civil* practice, although it is not unfrequent in *military* service. In

amputation at the shoulder, or hip-joint, compression with the hand must be trusted to for arresting the hæmorrhage; since, in these instances, there is no opportunity for applying the tourniquet. In this case the artery is compressed where it passes over the first rib. It is expedient, in both instances, on this account, to perform the separation of the limb as quickly as possible.

OPER.—Amputation at the shoulder-joint is a flap operation; that is, a couple of flaps are made, cut out of the soft parts surrounding the articulation; and it is expedient to make the flap which contains the principal arteries the last. These flaps may be formed either by cutting from without inwards, or in the opposite direction. An external flap is made by cutting from the point of the acromion obliquely outwards and backwards to the edge of the axilla; and an internal one is made by cutting from the same point inwards. After making the external flap, which is to be held aside by an assistant, you cut into the joint, and separate the head of the bone from the glenoid cavity, before the soft parts that constitute the internal flap is divided; and then being done, then they may be grasped in the hand, so as to command the artery before you proceed to divide it. Now the surface of the joint is laid bare, and having got the head of the bone out of the socket, by dividing the capsular ligament, the anterior and posterior flap is made, then carrying the limb forward, the internal, or interior flap, which contains the vessels, is to be grasped with the fingers before they are to be divided; and this division is accomplished either by carrying the knife from within (carrying it, of course, round the shoulder) or from without. You now hold the parts in which the cavity is situated between the finger and thumb, and immediately look for the orifice of the artery, which there is no difficulty in seeing, and having tied it, the parts are brought together, and thus the wound closes. The axillary artery is the only one which requires to be secured.

OBS.—Amputation at the axilla is a very simple and safe operation. The joint heals as well and as quickly as after amputation at the middle of the arm. The readiness with which it heals will depend upon the integuments being sufficient to cover the whole of the cartilaginous surface, and upon the constitution of the

ment; which, if the latter be not good, there will be danger of purative inflammation. "I have never known a patient," says Sir A. Cooper, "die from the operation of amputation at the shoulder joint; but I have heard of cases, in which the patient died from hæmorrhage, caused by sloughing of the artery, a few days after the operation." *MS. Lect.*

FRENCH METHODS.—The French surgeons, in performing the operation of amputation at the shoulder joint, make a flap before and behind the joint. M. Le Dran performed the first operation of this kind, of which the particulars are recorded. It was a case of caries and exostosis, reaching from the middle of the shaft to the humerus. (See *Obs. Chirurg.* Tom. I. p. 315. *Paris*, 1741; and *Traité des Oper.* p. 865.) As there was a large flap of skin, Le Dran made a second ligature with a curved needle, dividing a great deal of flesh, the redundant portion of which he cut off, together with the first ligature, which had become useless. The cure was completed in ten weeks*. Garengeot thought that the ligature might be applied by means of a curved needle, with sharp edges, and, in order to lessen the wound, he directs the incision to begin two or three fingers' breadth below the acromion, across the deltoid muscle, so as to form one flap, and a lower one in the axilla; and after the application of the second ligature, the two flaps were placed in opposition. *Traité d'Operation de Chirurgie.* Tom. III. p. 350.; and *Mem. de l'Acad. de Chirurg.* Tom. II. p. 261.

The improvements in this operation were extended still further by La Faye, who, after placing the patient in a chair, and raising the arm into a horizontal position, made with a common bistoury a transverse incision into the deltoid muscle down to the bone, a few fingers' breadth below the acromion. Two other incisions, one in front, the other behind, descended perpendicularly to this, and made a large flap of a trapezoidal figure, which was detached and turned up towards the top of the shoulder. The

* Le Dran (the son), who published this memorable case, does not say that the operation was a new one; and it appears both from the *Recherches Médecines sur l'Origine, &c. de la Chirurgie en France*; and La Faye's *Notes sur l'Amputation de l'épaule*, that it had been previously practised by Morand, the father.

two heads of the biceps, the tendons of the supra spinatus, infra spinatus, teres major, and subscapularis, and the capsular ligament, were next divided. The assistant holding the lower part of the limb, made the bone describe the motion of a lever upward; the head of the bone was now easily displaced from the glenoid cavity. La Faye next carried his incision downward, along the inner part of the arm, until he was able to feel the vessels, which he tied as near the axilla as possible. The separation of the limb was then completed a finger's-breadth below the ligature. The flap was afterwards brought down over the glenoid cavity and the wound dressed.—See *Nouvelle Methode, &c. par M. La Faye, in Mem. de l'Acad. de Chirurgie. Tom. V. p. 195. edit. in 12me*

OBS.—The advantages of La Faye's plan are sufficiently apparent. The patient, in consequence of only one ligature being applied, was saved a great deal of pain; the flap connected with the acromion was capable of covering the whole surface of the wound, and was more easily applied and kept on the stump, than the lowermost of the two flaps, recommended by Garengéot; and the discharge found a ready outlet downwards. This method is still regarded as one of the most approved where the state of the soft parts will admit of it; but it is preposterous to think of applying any one plan to all the various states in which the injured or diseased limb may present itself. It is advised by surgeon Larrey himself, when a wound extends through the upper part of the arm, breaking the bone and injuring the soft parts. "Here," says Larrey, "it would be impossible to form an anterior and posterior flap, for the soft parts in these situations have been destroyed. On the contrary, when the deltoid muscle is shot away, La Faye's plan is inadmissible." (*Mem. de Chirurgie Militaire Tom. II. p. 167.*) It is curious, however, to remark the following coincidence between La Faye and Larrey: the latter, though generally averse to the attempt of uniting stumps by the first intention, is an advocate for this practice after hip-joint amputation; so La Faye, who was fearful of laying down the flap after amputation of the leg, had no such apprehension at the shoulder.

In order to avoid the inconvenience attributable to La Faye's plan, viz. that of the lower flap confining the discharge, Desau-

recommended the formation of two flaps, one anterior the other posterior. The axillary artery was compressed above the clavicle, the integuments and flesh of the upper and internal part of the arm, were freed away from the humerus. A knife was plunged between the arm and the other soft parts behind, to make the anterior flap. The arm being inclined backward and outward, the humeral artery was tied, the articulation opened, and the head of the bone detached. The knife was then carried downward and backward, to form the posterior flap, the incisions meeting in the axilla. See *Sabatier's Médecine Opératoire*, tom. iii. p. 393—399. edit. 2. Baron Larrey, surgeon-in-chief to Napoleon, who is reputed to have amputated at the shoulder joint about a hundred times, aimed at the same object as Desault did; but in his earlier operations, he was in the habit of beginning with the formation of the external, or posterior flap, for the following reasons; namely, by proceeding in this way, the operator can tie the axillary artery more safely, because the ligature is applied after the operation is entirely finished, and, consequently, at a time when there is nothing to be attended to but the hæmorrhage. In latter operations, Larrey has adopted the innovation of first making a longitudinal incision from the acromion to about an inch above the neck of the humerus, down to the bone, so as to divide the fleshy part of the deltoid muscle into two equal parts. This cut, he says, facilitates and renders more exact the rest of the operation. On this wound the incisions for flaps are continued.

LARREY'S METHOD.—"Having made the above incision, I next," says Larrey, "an assistant to draw up the skin of the arm toward the shoulder, and I form the anterior and posterior flaps by two oblique strokes of the knife, made from within outwards and downwards, so as to cut through the tendons of the pectoralis major and latissimus dorsi. There is no risk of injuring the axillary vessels, as they are out of the reach of the point of the knife. The cellular connection of these two flaps is then divided, and the flaps themselves raised by an assistant, who, at the same time, is to compress the two divided circumflex arteries. The whole joint is now exposed. By a third sweep of

the knife, carried circularly over the head of the humerus, the capsule and tendon running near the articulation are cut; and the head of the bone being inclined a little outwards, the knife is to be carried along its posterior part, in order to finish the section of the tendinous and ligamentous attachment in that direction. The assistant now applies his fore-fingers over the brachial plexus for the purpose of compressing the artery, and commanding the current of blood through it. *Lastly*, the edge of the knife is turned backwards, and the whole fasciculus of axillary vessels is cut through, on a level with the lower angles of the two flaps, and the front of the assistant's fingers. The patient does not lose a drop of blood; and before the compression is relaxed, the extremity of the axillary artery is readily seen, taken up with a pair of forceps, and tied. The circumflex arteries being next secured, the operation is completed."—*Mém. De Chir. Milit.* t. iv. p. 428. *Paris.*

OBS.—Larrey was formerly in the habit of placing charpie betwixt the flaps, and bringing them towards each other by the usual means; he now, however, dispenses with this practice, and brings the flaps in due apposition by means of adhesive strapping. He also lays no stress in first making the outer flap; though from the description, it does not exactly appear which flap he now begins with. On another point of importance he has also deviated, namely, instead of preferring La Faye's plan, in certain instances, he affirms that the above way of operating is applicable to almost every instance in military practice. *First*, because in all gun-shot wounds, generally, which mutilate the arm, so as to create the necessity for the operation, partly, or entirely destroying the centre of the deltoid, while there is always enough flesh left at the sides for making the two flaps. *Secondly*, because, in the very rare instances where the lateral parts of the shoulder are destroyed, and the middle untouched, no advantage would be gained by operating in La Faye's manner, as Larrey conceives that the detached flap would slough, or become, as it is termed, disorganized. He now prefers dividing the middle piece of flesh, and giving the flaps the same shape as if they were uninjured, and he even asserts, that the operation, done without any flaps at all, answers better than any method in which the surgeon pro-

flaps not naturally intended for the part; thus, when all the flesh of the shoulder has been shot away, he has seen surgeons pass over the glenoid cavity with a flap saved from the soft part of the axilla; but such flaps invariably sloughed, hæmorrhages ensued, and the patient died."—*Mém. Mil. Chirurg.* iv. pp. 430, 431.

DUPUYTREN'S METHOD.—Baron Dupuytren amputates at the shoulder joint in the following manner, which is at least recommendable for the celerity with which the operation is performed: the arm being raised, and held at a right angle with the trunk, the operator places himself at the inside of the limb; grasping with one hand and elevating the mass of the deltoid muscle, he passes under it a two-edged knife from before backwards, on a level with the end of the acromion. Cutting in this way, close to the head of the humerus, he carries the incision downwards between the bone and the deltoid, and at length bringing out the knife, completes the external or inferior flap." The remainder of the operation does not materially differ from Richerand's, except that Dupuytren's takes hold of the lower flap itself, before dividing it, and compresses the artery, until he has cut through and tied the ligature.

This operation would be difficult on the left side, unless the surgeon were as expert with the one hand as the other.

LISFRANC'S METHOD.—In alluding to the mode of operating at the shoulder joint, adopted by Lisfranc, Richerand observes, "in employing it, the humerus is dislocated, and separated from the arm in as short a time as an expert carver would take to remove the wing of a partridge." It is performed in the following manner: "Let it be the left extremity that is to be removed: the patient is placed on an elevated seat, one assistant presses the arm against the first rib, whilst another draws the arm forwards; the operator places himself behind the patient with a long-bladed catlin, pierces the integuments on the inner edge of the latissimus dorsi muscle, opposite the middle of the axilla, pushing it obliquely upwards and forwards, till its point strikes against the under surface of the acromion; then, by raising the middle of the knife its point is lowered, and protruded first in

front of the clavicle, at its junction with the acromion. By cutting downwards and outwards, a flap is then formed from the superior and posterior part of the arm, including the whole breadth of the deltoid muscle, and a part of the latissimus dorsi. This being held back by the assistant, the joint is cut through from behind forwards, and a corresponding flap is formed by cutting downwards and outwards, between the muscles and the bone, on the inner side of the arm.

When the operation is on the right side, the patient should be seated on a low chair, and the catlin thrust from above downwards, from the part just in front of the point where the clavicle is connected with the acromion, the surgeon raising his hand as the instrument proceeds downwards and backwards, until the point has come out at the inner edge of latissimus dorsi, when the flap is to be made and the operation terminated as above directed.

OBS.—If the scapula be shattered, the loose fragments are to be removed; and if the acromion be broken, and the remnant be pointed and irregular, the sharp rough portion is to be sawed off, as was practised some time ago by M. Faure.—See *Mém. de l'Acad. de Chir.* tom. vi. p. 114. In one case Larrey found it necessary to remove more than two-thirds of the scapula, and the humeral end of the clavicle.—*Mém. de Chir.* &c. Sawing off part of the acromion, and coracoid process according to the opinions of both Fraser and Guthrie, is quite unnecessary and improper, not only as producing delay, but wounding other parts which should not at all be disturbed, and, in all probability, the practice of scraping away the cartilage of the glenoid cavity, except when it is diseased, is not of greater value.

XIV. AMPUTATION AT THE HIP-JOINT.

This operation, as our readers must be aware, has been several times performed. Mr. Brownley, a military surgeon, first performed it during the late war; he did it without putting any ligature on the artery in the first instance; it was only compressed. Mr. Guthrie also performed the operation with success during the late war. He also performed amputation through the trochanter major without securing the artery in the first instance. T

Amputation at the hip-joint has been performed in the same way successfully by Larrey, and many other surgeons. Sir Astley Cooper, however, seems to think that the operation cannot be safely performed without securing the artery in the first instance ; when this is not done, when the femoral artery comes to be divided as near to Poupart's ligament as possible, and a ligature put upon it, the man becomes so faint under the operation that he would be unable to support it ; consequently, that the operation will be most safely performed by tying, in the first instance, the femoral artery, under Poupart's ligament, above the origin of the arteria profunda. A question has been agitated, whether, in the first place, the operation for amputation at the hip-joint should be performed, when it can be done, through the trochanter major. On this subject, Sir Astley observes, that "unless the disease of the thigh-bone extends quite up to the joint, as in the case in which I recently performed the operation, it is undoubtedly better to saw through the trochanter major than to cut the bone from the acetabulum. When the acetabulum is laid open, great constitutional irritation is produced by the suppurative process, an abscess after abscess arises, and the life of the patient is placed in imminent danger : " while "the operation of amputation through the trochanter major is attended with very little risk." The femoral artery being tied, there is no difficulty in the succeeding steps of the operation ; a doubt may, however, arise, whether the femoral artery is exposed above or below Poupart's ligament ; to ascertain this, the artery is directed to be slit up a little, to see whether the orifice of the profunda is above or below. As a very large flap cannot be formed on the outer side, the principal flap must be made from the inner side. The knife is to be passed above the trochanter major, along the muscles ; and having made the two flaps *, the next point is to dislocate the head of

* * Mr. Lawrence, of Bartholomew Hospital, seems to think that, in many cases, the ordinary circular incision, as high up as it can be made, with the removal of the head of the bone, would do very well, and perhaps even better than the flaps which are usually made in amputating at the hip-joint. " You may amputate by making these flaps, carrying in a long double-edged sharp pointed knife near the external side of the artery, passing it through the back of the limb, and along the trochanter, so as to cut the flap on the outside, and

the bone, which snaps from its place as soon as the ligament is divided.

FRENCH METHOD OF OPERATING AT THE HIP JOINT.—The French surgeons operate with a knife nearly as long as a sword; they pass it down directly into the capsular ligament, until it touches the head of the bone, carry it through the round head of the bone, and, cutting through the muscles round the trochanter major, bring it out at the back of the thigh.

XV. AMPUTATION OF ARTICULAR EXTREMITIES.

In the case of disease in the joints, it has been proposed, in certain instances, to substitute for amputation of the limb, excision of the diseased extremities of the bones; to make such incisions as will lay bare the ends of the bones constituting the articulation, to saw through and remove them. Mr. Park, of Liverpool, was the first to propose this operation. He performed it at the elbow and knee joint; and the result, in both instances, was, that the limb proved afterwards of considerable use to the patient. This operation since that time has been practised by others, but with results not sufficiently encouraging to lead to a very general adoption of it. It has turned out most favourable in cases of the elbow joint; but as regards the knee, however, the portion of the bone to be removed is so large, and the limb, after the operation, would seem to be so little capable of supporting the weight of the body, or of performing its functions, that it can hardly be expected to turn out more useful than the ordinary wooden-limb would be after amputation of the thigh. Excision of the diseased ends of bones, has, however, been performed in this manner by Mr. Crampton, of Dublin, who has given a favourable account of the results.

MR. ABERNETHY'S RULE FOR AMPUTATION.

It does not follow, as a matter of necessity, that because you are separating it up to the joint; you have the opportunity of tying the arteries when you have carried the knife on the inside of it, as it is pretty much exposed; then you make the flap on the opposite side, and disarticulate the limb. I do not see, however, that this mode could be much preferable to amputating very high up by the circular incision, and taking out the head of the bone in that way, after it has been exposed." See *Lancet*, vol. p. 951. 1829-30.

bone is comminuted, and the soft parts contused, that you must operate, since there are many such cases that do well.

Q. What, then, are the principles which ought to guide the surgeon in determining upon the operation?

A. "It is quite impossible," says Mr. Abernethy, "to lay down any precise rule, founded on this or that appearance of the parts; or to say, that because this artery is torn, or that part is injured, or that the bone is broken in this or that manner, that we must operate. But if there appears to you to be such a mechanical injury done to the living structure, as could not be ultimately repaired by nature's processes, or that, if reparable, would, from the state of the person's general health, make such demands on the vital powers as they could badly support, then we might be justified in amputating. Rules!" exclaims the philanthropic veteran, "there is, and ought to be, but one rule in surgery—*Do unto others as you would have done unto yourself*. If you can say, after asking yourself, if your limb were in the condition of that man's, you would have it removed, then I say, you can, with great propriety, recommend it."—See *FRAC-
TURE, COMPOUND*.

Obs.—Mr. Abernethy concludes the above advice with the following observation; namely, that "Operations, generally speaking, do much better in the country than in town; and injuries requiring amputation in town will often be recovered from in the country. Of amputations, I have found that those of the thigh do better in London than those of the leg, especially about the calf of the leg; and those of the upper arm do better than those of the fore-arm."—See *Lancet, Lect. 1826*.

ANASTOMOSIS.

DEFINITION.—By this term is understood the communications of the blood-vessels with each other, or their running or opening into each other, by which the continuance of a free circulation of the blood is greatly insured, and the danger of mortification lessened. The vast importance of this part of the human structure, in all cases in which the main artery or veins of a limb are interrupted, is particularly conspicuous in the disease called aneurism.—See *ANEURISM*.

For an account of the changes which take place in the arterial system of the limb, when the main artery is rendered impervious by the application of a ligature, see *Hodgson on the Diseases of Arteries and Veins*.

ANCHYLOSIS.

DEFIN.—An intimate union of two bones which were naturally connected by a moveable joint.

All joints, originally designed for motion, may become ankylosed—that is, the heads of the bones forming them may become so consolidated together, that no degree of motion whatever can take place.

DIVISION.—Ankylosis may be divided into *true* and *false*. True ankylosis is sometimes termed *complete*; false *incomplete*.

True Ankylosis.—In this kind the bones grow together so completely, that the smallest degree of motion cannot take place, and the case is perfectly incurable. The position in which the joint becomes thus unalterably fixed, makes a material difference in the inconvenience resulting from the occurrence.

False Ankylosis.—In false ankylosis, the bones have not completely grown together, and their motion is only diminished, not destroyed.

CAUSES.—In young subjects in particular, ankylosis is seldom an original affection, but generally the consequence of some other disease. It very often occurs after fractures, in the vicinity of joints; after sprains and dislocations attended with considerable contusion; and after white swelling and abscesses in joints. Aneurism, swellings, and abscesses on the outside of a joint, may also induce ankylosis. In fine, every thing that keeps a joint for a long time motionless, may give rise to the affection, which is generally the more complete the longer the cause has operated.

TREATMENT.—The position of an ankylosed limb is of the utmost importance. When abscesses form near the joints of the fingers, and the tendons mortify, the fingers should be bent, though they may ankylose in that position, which renders the hand much more useful than if the fingers were permanently extended. On the other hand, when there is danger of a stiff joint, the knee should invariably be kept as straight as possible. The same principle is to be pursued when the head of the thigh bone is dislocated.

in consequence of a diseased hip. When the elbow cannot be prevented from becoming ankylosed, the joint should always be kept bent. No attempt should ever be made to *cure*, though every possible exertion should be made to *prevent*, a true ankylosis. The attempt even to prevent is not always proper, for many diseases of joints may be said to terminate when ankylosis occurs. When false or incomplete ankylosis is apprehended, measures should be taken to avert it. The limb is to be moved as much as the state of the soft parts will allow. The exercise of the joint promotes the secretion of the synovia, and the grating first perceived in consequence of the deficiency of this fluid, soon ceases. Motion is necessary in moving the limb, since motion too violent might create pain, swelling, and inflammation, and even cancer of the heads of the bones. But if the motion be proportioned to the state of the limb, and daily increased in extent, as the soft parts yield and grow supple, good effects may be derived from it. See *Boyer's Maladies des Os*, &c. tom. ii.

Embrocations, and pumping cold water on the ankylosed joint every morning, have great power in removing the stiffness of a limb remaining after the cure of fractures, dislocations, &c.—See JOINTS, DISEASES OF.

OBS.—When diseases of joints end in complete ankylosis, it is sometimes a desirable event. In fine, it is as much a means of cure, as the formation of callus is to the union of fractured bones.—See *Hennen's Principles of Military Surgery*, p. 161. ed. 2. L. Petit, *Traité des Mal. des Os*, tom. ii.; *Gent.'s Mag.* 1787, a case of universal ankylosis, ligaments ossified; *Richerand, Nosograph. Chir.* tom. iii. p. 223. ed. 4. &c. &c. &c.

ANEURISM.

DEFINITION.—“A pulsating tumour containing blood, and communicating with the interior of an artery. There is one exception to this definition, namely, where aneurism, as it sometimes happens, takes place in the heart.”—*Sir A. Cooper*.

“Aneurism is a tumour generally attended by pulsation; and formed by a general or a partial dilatation of an artery, or in consequence of a wound, rupture, or ulceration of some parts of the coats of an artery.”—*Lawrence*.

SITUATIONS.—Aneurisms are situated either externally or internally; that is, they are either so situated on the limbs that access may be had to them, and the nature of the disease clearly ascertained; or they are so placed in cavities of the body such as in the abdomen, chest, and cranium, as to render the nature of the disease very often extremely doubtful.

VARIETIES.—Aneurisms are comprehended under the four following varieties:—

1st. *Dilatation*, which is an enlargement of the whole circumference of the artery.

2d. *True aneurism*, which is a sacculated dilatation of a portion only of the circumference, or of one side of the artery.

3d. *False aneurism*, which is formed by ulceration or rupture of the internal and middle coats, and expansion of the external cellular sac. It is called *primitive*, when all the coats are directly divided, as by a wound; and *consecutive*, when it is consequent on ulceration or rupture of the internal and middle coats.

4th. *Mixed aneurism*, which is a supervention of false upon true aneurism, or upon dilatation; that is, after dilatation, either partial or general, of all the three coats, the internal and middle burst, and the external alone expands into a further sac, surrounding the original dilatation or true aneurism.

CAUSES.—The whole arterial system is liable to aneurisms, but, says Pelletier (*Clinique Chir.* t. i. p. 54.), experience proves that the internal arteries are much more frequently affected than those which are external. Among the circumstances which predispose to aneurism, the large size of the vessels may unquestionably be reckoned. Those trunks which are nearer the heart are said to have much thinner parietes, in relation to the magnitude of the column of the blood with which they are filled, than arteries of smaller calibre; and since the lateral pressure of this fluid against the sides of the arteries is in ratio to the magnitude of these vessels, it follows that aneurisms must be much more frequent in the trunks near the heart than in such as are remote from the source of the circulation.—*Richerand, Nosograph. Chir.* t. iv. p. 72.

The curvatures of arteries are another predisposing cause of the

ease; and Richerand observes "that such a cause has a manifest effect in determining the formation of the great sinus of the aorta, the dilatation which exists between the cross and the origin of this large artery, and is the more considerable the older individual is." Munro went so far as to think that one-half of old persons have an aneurism at the beginning of the aorta. In regards aneurisms in general, which are preceded by calcareous depositions, thickening, and disease of the coats of the vessel, they are most frequently met with in persons of advanced age. Aneurisms from wounds are of course often seen in individuals of every age. Old people are subject to have these calcareous depositions of the coats of the arteries, to which the young are not so disposed. Though spontaneous aneurisms are most common to old persons, yet they are not absolutely confined to them. Richerand's idea that the laceration of the middle coat of an artery is a common cause of aneurism, while the inner coat is perfect, appears to be unfounded, when it is remembered that Hunter, Home, and Scarpa even dissected off the external and middle coats of arteries, without being able in this manner to produce an aneurism.

Aneurisms are exceedingly common in the aorta, and are very frequently met with in the popliteal artery. The vessels next to these the most commonly affected are the femoral, common carotid, subclavian, and brachial arteries. The temporal and occipital arteries, and those of the leg, foot, fore-arm and hand, are far less frequently the situations of the present affection; though the smaller arteries seem to be more immediately concerned in the formation of one peculiar aneurismal disease, well known under the appellation of aneurism by anastomosis.

According to surgical writers, the causes of aneurism operate either by weakening the arterial parietes, or by increasing the lateral impulse of the blood against the sides of those vessels. It is said to be in both these ways, that the disease is occasioned by violent contusions of the arteries, the abuse of spirituous liquors, frequent mercurial courses, fits of anger, rough exercise, exertions in straining in lifting, or removing heavy bodies, violent extension of the limbs. In some instances, aneurisms of the axillary

artery would appear to have arisen from violent extension of the limb, as well as from reiterated contusions and rough pressure on parts.—*Pelletier, Clinique Chir.* tom. ii. pp. 10. 14. 49. 83. The extremity of a fractured bone may injure an artery, and give rise to aneurism.—*Vide Op. cit.* t. i. p. 178. Aneurism sometimes follows the injury which a large artery suffers in gun-shot wound. The passage of a bullet through the thigh was the cause of femoral aneurism.—*Journal Chir.* vol. ii. p. 109. Paris. A similar cause gave rise to an aneurism high up in the thigh of a soldier, in the hospital at Brussels, after the battle of Waterloo.— See ARTERIES.

OBS.—The time of life when aneurism generally occurs, according to Sir Astley Cooper, is between the ages of thirty and fifty—an age when exercise is considerable, and strength is on the decline. In very old age the disease is not so common. He, however, operated successfully on a case of popliteal aneurism, when the patient was between 84 and 85 years of age; as well as on a boy of 11 years of age, with aneurism of the anterior tibial artery. Aneurisms, and those diseases of the coats of arteries, which precede the formation of aneurism, are much less frequently met with in women than in men. The following table was drawn up by Mr. Hodgson, to exhibit the comparative frequency of aneurism in the two sexes, in different cases of this disease, and also in the different arteries of the body, as deduced from examples, either witnessed by himself during the existence of the patients, or shortly after their death:—

	Total.	Males.	Females.
Of the ascending aorta, the arteria innominata, and arch of the aorta	21	16	5
Descending aorta	8	7	1
Carotid artery	2	2	0
Subclavian and axillary	5	5	0
Inguinal artery	12	12	0
Femoral and popliteal	15	14	1
	63	56	7

This table does not include aneurism arising from wounded arteries, nor aneurisms from anastomosis.—See *Hodgson on the Diseases of Arteries and Veins*.

Sir Astley Cooper estimates the proportion of males affected by aneurisms to females similarly affected, as about five to one; and adds, that if the cases of popliteal aneurism only be taken, the proportion of males would be still greater; also, that when aneurisms do occur in females, they are generally internal. He has seen, however, about eight cases of popliteal aneurism in females. See *Lancet*, vol. i. p. 246. It was remarked by Morgagni, that it has been observed in this country, that popliteal aneurism occurs with particular frequency in postilions and coachmen, whose employment obliges them to sit a good deal with their knees bent. In France, men who clean out the dissecting rooms, and procure dead bodies for anatomists, are said almost all of them to be affected with aneurismal diseases. Richerand remarks, that he never knew any of these persons who were not addicted to drinking; and he comments on the debility which their intemperance and exhausting occupation together must tend to produce.—*Nosogr.* t. iv, p. 74. edit. 2.

SYMPTOMS.—The symptoms of aneurism are different, according as the affection is situated in an *external* or an *internal* artery. Internal aneurisms are meant those of the aorta and arteria celiacata, which are developed either within the cavity of the chest or of the abdomen, and which may proceed to a large size, without showing themselves at all externally. External aneurisms are those that are formed on the principal arterial trunks of the upper and lower extremities, or of the neck, as the carotid. An internal aneurism consists of a firm pulsatory tumour, situated in the course of one of the arteries just mentioned, and inseparably connected with such arterial trunk. With respect to internal aneurisms, the symptoms may be divided into *three* stages. In the early stage, there is a small tumour pulsating very strongly, much more so than in the subsequent stages; “for, it may be taken as a general rule, that *the force of the pulsation is in the inverse proportion of the size of the aneurism.*”—*Sir A. Cooper*.

When an aneurism is first formed, it contains only fluid blood;

and if a finger be applied to the artery, between the aneurism and the heart, the aneurismal bag will be readily emptied by the pressure. In this state there is scarcely any pain, and no other alteration in the limb than some irregularity of circulation, producing spasm in the muscles; and when the patient is going to rest, cramps in the legs, and sudden twitchings, which prevent him from sleeping. The next state in which aneurism is found, is when the blood is beginning to coagulate in the interior of the sac, the coats of which are very considerably thickened. At this time, if pressure be made on the artery, the sac may be emptied in part; and the swelling will be reproduced when the pressure is removed. The bag cannot be completely emptied by pressure, for a considerable degree of swelling will still remain. There is some degree of pain in the limb below, in this stage of the disease, in consequence of the size of the swelling, and the pressure on the surrounding parts. The aneurism becomes a solid swelling instead of a mere bag containing fluid blood; and the circulation is retarded by the pressure on the surrounding parts. In the next stage, the aneurism has acquired considerable magnitude, and the pulsation is in a great degree lost. Pulsation may be observed in some one part opposite to the opening from the artery, but it is seldom perceived over the whole swelling. A small portion of the blood still continues in a fluid state, but the greater part of it is filled with coagulum. In this state, if the aneurism be behind a joint, the motion of that joint becomes impeded. In popliteal aneurism, which is one of the very common occurrences, there is an enlargement behind the knee, just at the bend of the joint, with pulsation; the foot and leg of that side are swollen, the swelling gradually increases, and the aneurism becomes of a dark colour; inflammation of the cuticle covering the sac ensues, vesication of the cutis to the size of half a crown takes place, and the skin in this part becomes quite insensible. In a few days an eschar is formed, the bag opens, bleedings, one after another, take place, and the destruction of life is the consequence. It may be cured by repeated bleedings from the part, and gangrene, and not by the bursting of the aneurismal bag, as stated in some books, but the patient dies. Aneurisms, if not operated on, are not always

destructive of life. "I have seen," says Sir A. Cooper, "gangrene of the foot and leg from aneurism take place, without destroying life. I saw a case where the foot and lower part of the leg became gangrenous in a man labouring under popliteal aneurism; they sloughed off; amputation was performed just above the ankle, and the patient recovered. Destruction of life, then, does place in aneurism from repeated hemorrhage and gangrene. Gangrene of a small part of the limb in aneurism may occur, and may be remedied by surgical aid.

The history of internal aneurism is different from that of external. As regards their symptoms, so long as they remain within these cavities of the body in which they are first developed, there is no circumstance which characterises their existence sufficiently decisive to enable us to know that they do exist. An aneurism, situated about the arch of the aorta, may interfere with the function of the important organs that are in the same situation. The development of a tumour in that part cannot fail, by its pressure on the various important parts seated there, to produce serious symptoms, affections of the respiratory organs, cough, pain, and so forth. A tumour in that situation may soon begin to press on the trachea, as well as upon the œsophagus; and thus it may produce distressing symptoms; but until the tumour makes its way externally, so as to show itself in some part of the parietes of the chest, there is no certainty that these occurrences depend upon aneurism. The symptoms, in fact, frequently are of a nature not calculated to afford the least clue to the existence of aneurism.

I. ANEURISM OF THE ASCENDING AORTA.

Aneurism of the ascending aorta, just at its commencement, where it is covered by the pericardium, is not of uncommon occurrence. When an aneurism takes place between the heart and the curvature of the aorta, after a time, from the pressure of the aneurismal sac, the cartilages of the ribs become absorbed; when the aneurism presses on the lungs, dyspnœa comes on, together with cough, and the complaint is obscure; but at last the fulness on the right side, and the pulsation to be felt by the presence of the hand on the intercostal spaces will enable us to distinguish

this disease; then the ribs become absorbed, the aneurism presses against the pectoral muscle, absorption reaches the skin, and the sac bursts by the inflammation of the skin, the destruction of the life of the part, and the separation of the eschar.

When called to a person with aneurism of the ascending aorta, and when aneurism has come on, life may be protracted by coating the wound with lint, and endeavouring to form an artificial sac. By this means the patient may gain two or three days, or even weeks, to enable him to make any preparation that may be desired. These cases are, however, quite hopeless, and there is, we believe, no instance of one of them having been spontaneously cured.

II. ANEURISM OF THE CURVATURE OF THE AORTA.

These aneurisms are very frequent, and are to be seen just above the sternum. In these occurrences, life terminates in different modes, such as the bursting of the blood into the trachea &c. An aneurism of this kind often causes, by its presence, dyspnoea and suffocation; it also often presses behind on the œsophagus, instead of, in front, on the sternum: it will be seen from the back, through the ribs, by the edge of the scapula, between its base and its spine. Aneurism of the aorta may be very easily mistaken for aneurism of the carotid or subclavian arteries.

III. ANEURISM OF THE ARTERIA INNOMINATA.

These cases, in general, do not allow of an operation being performed, there being no room for a ligature. Dr. Mott, of America, has put a ligature on this vessel, and for a time the patient appeared to be doing well; but he afterwards died.

IV. ANEURISM OF THE DESCENDING AORTA.

When the descending aorta is the site of aneurism, in its course through the posterior mediastinum, it very often breaks into the œsophagus. When an aneurism presses on that tube, adhesion of the coat of the sac to the œsophagus takes place, and afterwards an opening between the aneurismal bag and gullet is formed; the patient vomits a considerable quantity of blood, and soon dies.

V. ANEURISM OF THE ABDOMINAL AORTA.

When aneurism is seated above the cœliac artery, a pulsation may be distinctly felt at the scrobiculus cordis; and a symptom which distinguishes this complaint is, that the pressure on the stomach caused by the aneurismal sac produces nausea and vomiting, and small quantities of food are immediately rejected. When the aneurism is lower down in the cavity of the abdomen, it often bursts into the intestine. When the aneurismal tumour presses on the spine, absorption of the vertebræ takes place; a large swelling will also be found in the loins; though it is necessary to be cautious respecting this swelling, lest it be mistaken for some other complaint. There is no pulsation in the loins to be felt from these tumours, though they may be affected by the pulsation of an artery in their immediate vicinity. Aneurisms may be found in the cavity of the pelvis, in the ischiatic notch, and under the gluteus maximus muscle. When, therefore, tumours are found in the suture, the surgeon must be upon his guard. The symptoms of aneurisms vary according to the seat in which the disease may be found. The digestive organs will be in fault at one time, the urinary at another, according to the part on which the aneurismal sac may rest; from the variety of symptoms, the diagnosis will, of course, be found to be difficult.

Aneurisms may be distinguished from other diseases by the following marks:—If the aneurism be recent, by pressing a finger on the artery which leads to the aneurism, the aneurismal sac will be emptied; but if the aneurism be of longer duration, and the pulsations be but slight, place yourself by the side of the patient, observe carefully the size of the swelling, and, by pressing with your finger on the artery above, you will see the aneurism sink down as you make the pressure, though the sac will not entirely empty itself; and, upon raising your hand suddenly, you will observe a jet of blood rush into the aneurismal sac, and raise it to its former height. In this manner an aneurism may be easily distinguished from another tumour deriving its pulsation from an artery. In the former case the pulsation will be felt over every part of the tumour; in the latter, there will be no pulsation, except in the direction of the artery.

VI. FORMATION OF ANEURISMS.

The first circumstance that takes place in an artery which about to produce an aneurismal swelling, is, that it becomes opaque and slightly inflamed; a small yellow spot appears in the part where the aneurism is afterwards formed, and there is a slight efflorescence around it. The process of absorption afterwards takes place, and thins the coat of the artery, so that the texture becomes like that of a fine web. At the same time that this takes place, nature begins to set up a process of defence; covering is prepared by the adhesive inflammation, which shuts up the artery, so as to prevent the immediate escape of the blood. As the coat of the artery becomes absorbed, the cellular membrane is glued by this matter to the outer surface of the artery. The next substance which becomes absorbed, if it be an aneurism of the ascending aorta, is the pleura, which forms a portion of the aneurismal bag. Then the lungs become absorbed, and form a portion of the bag; next the intercostal muscles; and at last the skin itself, forming the parietes of the aneurism, gives way, and there is no longer any thing to prevent the escape of the blood.

OBS.—Every aneurism was formerly supposed to be produced by the dilatation of the coats of the artery; but it has been found that this is not the case: it is generally produced, not by the dilatation, but by the absorption of the coats of the artery. For this knowledge we are indebted to Scarpa, who first accurately explained the mode in which aneurisms are produced. He thought they were always produced in this way; but they are sometimes, though rarely, formed in the way in which they were at one time supposed to be uniformly produced, namely, by dilatation. Some aneurisms are local, and others general: when they occur in the ham, they are frequently only local; but when between the groin and ham, or in the middle of the thigh, the other arteries are commonly found diseased. Therefore, in popliteal aneurism, the aorta and larger arteries are expected to be found in a healthy state.

TREATMENT, MEDICAL AND MECHANICAL, OF ANEURISM.—It has been conceived, that considerable relief might be afforded

cases of aneurism, by medical treatment. It is natural to expect that, if, by any means, the action of the heart and arteries be diminished, the result would be, that the aneurismal bag would be held less, and consequently would be reduced: experience, however, does not justify this conclusion. Keeping aneurismal patients low, does not agree with them; for the constitution is thereby rendered irritable, and then whatever is lost in the momentum of the circulating fluid, is gained in velocity. The loss of blood, however, in the treatment of aneurism, has been found to be occasionally useful. When the chest is affected, and breathing laborious, it will be right to take blood; and the best state in which the body can be kept, is a little below par—that is, a little under the natural state. Strict attention is to be paid to regimen; and it would be highly improper to give stimuli of any kind. Pressure has frequently been tried, as a mode of treating aneurism, and two methods of applying it have been adopted—one in which the aneurismal tumour, and the artery above it, have been subjected to the pressure; and the other, in which pressure has been applied simply to the arterial tube. In the former instance, compresses have been placed in the aneurismal tumour, and also on the trunk of the artery above the tumour, that is, upon the trunk of the artery between the aneurismal tumour and the heart. The result of experience is, that no beneficial result can be expected from this practice. It has also been proposed to submit the artery, above the tumour, to an effective pressure, such as would bring together and keep the sides of the artery in contact, so as to occasion a diffusion of lymph, for that lymph to become organised, and in this way obtain the obliteration of the artery. Now, this can be effected in the horse, by applying a tourniquet to an artery in the leg of that animal, and screwing it very tight, and leaving it there for two or three days; whereby to excite inflammation, when lymph would be effused externally and internally with respect to the artery, and the tube become obliterated. But this kind of pressure cannot be endured by the human subject, the pain being so excessive, that the necessary pressure cannot be applied. “Without, then, asserting,” reasoning *a priori*, says Mr. Lawrence, “that pressure has in no instance either cured or

contributed to the cure of aneurism, we may at least say, that in the vast majority of instances it has totally failed."—See *Lancet*, vol. ii. p. 160. 1830.

OPERATION FOR ANEURISM.—Surgery is indebted to the late Mr. John Hunter for the principle of the modern operation of aneurism. There is little doubt, in fact, that the merit of the discovery is so far due to this distinguished surgeon, that he appears not to have been acquainted with the passages of those older writers in which the operation is described, or supposed to have been described, when he brought forward the subject; and, at all events, that he arrived at this mode of proceeding, from a physiological view of the principles applicable to the cure of this disease. Since Mr. Hunter's time, several slight alterations have been made in the operation for popliteal aneurism, though the principle established by him remains the same. Mr. Hunter used to make the incision in the middle of the thigh; but experience has shown that it is better to make it one-third of the space downwards from the ilium to the internal condyle of the os femoris; because the artery is more deeply seated in the middle of the thigh than it is higher up, and there are besides many anastomosing vessels in the former situation.

There are four steps in the operation: 1. An incision through the skin, which lays bare the sartorius muscle.—2. The continuation of the division along the inner edge of the sartorius, which exposes the sheath of the femoral artery.—3. The incision through the sheath.—4. The putting of the ligature round the vessel. There is a little septum between the artery and the vein, which the operator should carefully observe. The aneurismal needle is to be introduced under the artery, taking care to disturb the parts as little as possible. The cellular membrane is to be separated to the extent of an inch, avoiding the saphena nerve, which is a small branch of the anterior crural nerve, in the ligature. If the saphena nerve should have accidentally been taken up, it will readily be ascertained by the irritability which it will have excited. Having brought the ligature under the vessel with the aneurismal needle, it is then to be tied with what is called a surgeon's knot, which does not slip. If the artery should have been separated

any extent from the sheath, two ligatures will be necessary, each must be tied close to the part where the vessel is connected with the cellular vessel to the sheath, and the artery divided in the centre; but if the artery has not been disturbed, one ligature will be sufficient. The best mode of applying the ligature is that commonly adopted: tie a knot with a fine ligature, and then draw one end of it close to the vessel, and let the other hang out of the wound. Broad ligatures ought on no account to be used, as they are very likely to produce considerable constitutional irritation, and consequently to cause the parts to suffer for a great length of time. (*See LIGATURES.*)

After the operation the integuments are to be brought close together by means of strips of adhesive plaster, leaving a small space between each, so that the matter may escape through the interstices. No bandage or roller of any sort should be applied, as the blood-vessels of the limb would be compressed by them, and injury done to the part. As regards the position of the limb, it should be placed on a pillow, and on its outer side, occasionally changing it, so as to prevent pressure on any particular part. The warmth of the limb is to be preserved by every possible means, for there is danger from gangrene in cold weather. (*See ARTERIES, SECURING OF, p. 72.*)

The operation for popliteal aneurism is the one used for aneurisms of the anterior and posterior tibial arteries, situated at the lower part; but not when the aneurism is in those arteries near the foot. The time at which the ligature separates is generally from the twelfth to the fourteenth day. "The fourteenth day is generally the extreme; the twelfth day the minimum of separation; but it is variable according to the different kinds of ligature used. I have seen a ligature remain on as long as twenty-eight days, where a broad one had been used. I have known a ligature come off as early as the fifth day, but in this last case it was put on the brachial artery for a puncture made in bleeding; on the eighth day it had come off, and no hæmorrhage had ensued; if inflammation, therefore, ensues, the separation will be delayed; but if there be a broad ligature, and the inflammation intense, it will be from twenty-five to thirty days before it sepa-

rates. And when the ligature has separated, and without a hæmorrhage, the patient is not by any means safe; he should remain quiet for two or three days afterwards.

Q. How is the circulation carried on when the femoral artery is tied?

A. By the arteria profunda, from which anastomosing vessels are sent off, which communicate with branches from the anterior tibial.

OBS. It sometimes happens that the aneurism will be reproduced by means of a vessel which comes off above the part where the ligature is applied, and enters the artery just above the aneurismal sac: these cases are, however, extremely rare. The operation for aneurism may be performed as soon as the nature of the disease is ascertained. The postponement of the operation is very prejudicial; the enlargement of the aneurismal tumour interferes with very important functions, and produces very injurious changes to the surrounding parts. The neighbouring muscles, tendons, and nerves, become involved in the aneurismal sac and firmly connected to it—sometimes the nerves are pressed upon and spread out flat. The progress of the tumour, when it reaches bone, is attended with an absorption of the bone. For these various reasons, then, it is advisable to operate early, and this may safely be done as soon as the existence of the disease is recognized.

In some cases pulsation returns in the aneurismal sac after the ligature has been applied to the artery; it is arrested for some time, but in the course of a few hours it begins again, and to the alarm of the surgeon, lest the operation should not have been properly performed. This has been observed both in aneurisms of the popliteal and carotid arteries. The pulsation, however thus produced is a feeble one; it lasts for some time, then gradually diminishes, and ultimately disappears altogether. The mode of cure, then, so far as the aneurism itself is concerned under the operation as at present practised, is just the same as in that of the spontaneous cure which takes place by the gradual obstruction of the aneurismal sac by coagula, and their consequent removal by absorption.

VII. ANEURISM, VARICOSE.

A varicose aneurism is a tumour usually situated at the bend of the arm, and is generally produced by a wound of the brachial artery in venesection; it pulsates and receives that impulse from the blood derived from the artery. A peculiarity arises from the circumstance, that the artery being wounded through the vein the vessels become connected, closely adherent to each other, so that at the same time the wound, or aperture of communication, remains between them, so that the blood instead of flowing out from the artery as it does under ordinary circumstances, passes immediately into the vein; thus the vein becomes the aneurismal sac, and a swelling very similar to what is called varix ensues, namely, a *varicose aneurism*. The swelling generally proceeds to about the size of a walnut or pigeon's egg, and then remains stationary. It does not enlarge beyond that; the blood passes through the continuous vein in its ordinary course; and inasmuch as there is an outlet from the distended varicose part of the vessel, the aneurism is limited. No doubt this would enlarge much more considerably, and ultimately proceed to inconvenience, unless the blood ran through vessels which carried it back to the heart. In any way the complaint remains stationary through life; it does not acquire a great size; no operation is necessary for it; the patient is perhaps rather weakened, but in other respects the patient suffers no inconvenience. There is that peculiar vibratory thrill communicated to the hand and to the ear, which is produced by the passage of the blood from the artery into the vein. The sensation is almost the same as that which is communicated to the hand by the vibration of the chord of a musical instrument; and is particularly described by some writers, who call it a *rilling* noise; some call it a *whizzing*, and others a *vibratory* noise. This noise is not only heard in the swollen part of the vein, but it also extends along the course of the vessel up the arm. (See VARIX.)

ANTHRAX.

With regard to what has been called Anthrax, Mr. Abernethy

observes, that "the definition of it is not clear as it is given in surgical books." The swellings supposed to be anthrax have always begun, as far as he has seen, in the absorbent glands, such as those of the axilla and neck. There is considerable tumescence and swelling, a purplish kind of tumour—a dusky red with a purplish hue—it is also sometimes of a blackish purple; the part becomes hard, and afterwards has a quaggy feel. When the part is opened, a quantity of cellular substance mixed with matter comes away, like what happens in carbuncle.

TREATMENT. The same as in carbuncle: bark, camphor wine, opium, ether, ammonia, are the internal remedies.

* * Anthrax is a very common symptom in the plague, and in persons affected with typhus. In many of the southern parts of Europe, a malignant species of anthrax or carbuncle appears to be endemic, contagious, and very often fatal. Those who use the word carbuncle instead of anthrax have sometimes divided the affection into what they called a *mild* or innocent carbuncle, and the malignant carbuncle, under which latter denomination anthrax is described, which is made to denote a state of sloughing local inflammation, such as occurs in the plague and very bad fevers. "Respecting this malignant carbuncle, or anthrax," says Mr. Lawrence, "I have nothing to say, because I have never seen it. There are innocent or local inflammations going into sloughing, which I have mentioned under the name of *malignant pustules*, and which are produced by the immediate application of deleterious substances to the skin; but in ordinary habits I know only of one kind of carbuncle which I have described (see CARBUNCLE) and which would come under the head of mild or innocent, as those who divide carbuncle into two species."—*Vide Larrey* vol. i. p. 864. 1829-30.

ANTRUM,

A large cavity in the middle of each superior maxillary bone between the eye and the roof of the mouth, lined by the mucous membrane of the nose.

DISEASES OF. One or both antra are liable to several mor-

tations. Sometimes their membranous lining inflames, and emits pus. At other times, in consequence of inflammation or other causes, various excrescences and fungi are produced in it. Their bony parietes are occasionally affected with exostosis, or caries. Extraneous bodies may be lodged in them, and it is even asserted that insects may be generated in them, and have, for many years, afflicting pains. Abscesses of the antrum are by far the most common.

CAUSES. Violent blows on the cheek, inflammatory affections of the adjacent parts, and especially of the pituitary membrane lining the nostrils, exposure to cold and damp, and, above all things, bad teeth, may induce inflammation and suppuration in the antrum.

SYMPTOMS. The first symptom of an affection of the antrum is pain, at first imagined to be toothach, particularly if there should be a carious tooth at this part of the jaw. This pain, however, extends more into the nose than that usually does which arises from a decayed tooth; it also affects more or less the eye, the orbit, and the situation of the frontal sinuses. But even these symptoms are insufficient to characterize the disease, the cure of which is not unequivocally evinced till a much later period. The disease is, in general, of much longer duration than is entirely dependent on a caries of the tooth, and its violence increases more and more, until at last a hard tumour becomes perceptible below the cheek-bone. The swelling gradually extends over the whole cheek, but it afterwards rises to a point, and presents a very circumscribed hardness, which may be felt above the back grinders. This symptom is accompanied by redness, and sometimes by inflammation and suppuration of the external abscess. It is not uncommon, also, for the outward abscess to communicate with that within the antrum. The circumscribed elevation of the tumour, however, does not occur in all cases. There are instances in which the matter makes its way towards the orbit, causing the bones of the parts to swell, and at length rendering them carious, unless timely assistance be given. There are other cases in which the matter escapes between the fangs and sockets of the teeth. Lastly, there are other examples in which

matter formed in the antrum makes its exit at the nostril of same side, when the patient is lying with his head on the opposite one, in a low position. If this mode of evacuation should be frequently repeated, it prevents the tumour both from pointing externally, and bursting, as it would do if the purulent matter could find no other vent. This evacuation of the pus from the nose is not very common.

TREATMENT. The method of cure consists in extracting of the molar teeth from the affected side, and then perforating through the socket into the bony cavity. A mild injection may afterwards be employed to cleanse the sinus occasionally.

ANUS, DISEASES OF.

The Anus is subject to various diseases, especially piles, ulceration, abscesses, excrescences, prolapsus; and imperforation in new-born infants. (*See FISTULÆ, HÆMORRHOIDS, &c.*)

ANUS, IMPERFORATE.

In cases of imperforate anus, and other malformations, it is one of the most imperative duties of the accoucheur to make him acquainted with them as early as possible. It sometimes happens that children are born without any anus—the formation of the alimentary canal is perfect, except that the large intestine is closed at the extremity. In some instances an external appearance is found resembling an anus, with the only difference that it is closed; it seems as if the anus was formed, that all the essential parts existed, but that the intestine is closed at its extremity. In these cases the bowel sometimes terminates in a cul de sac, or a blind end, a little way beneath the skin; sometimes at a considerable depth from it: it may sometimes open into the vagina or urinary bladder, &c.

SYMPTOMS. When the opening that ought to be in the rectum is closed by a membrane or a production of the skin, the part producing the obstruction is somewhat different in colouring from the neighbouring integuments, being usually of a purple or livid hue, in consequence of the meconium having accumulated on its inner surface. A small roundish prominence is formed, from the meconium being propelled downward by the viscera above, which

is like dough to the pressure of the finger, but instantly recesses when the pressure is removed. When a fleshy adhesion presses the intestine, the protruded part renders the circumstance obvious. The finger feels greater hardness and resistance than when there is only membrane; and the livid colour of the meconium cannot be perceived through the obstructing substance.—(See *UULÆ. HÆMORRHOIDS.*)

TREATMENT. There are varieties of this kind of malformation, and the only one in which the surgeon can render essential service is that in which the formation of the alimentary canal is complete, with the exception of its external opening; there an opening can be made by means of a double-edged sharp-pointed trocar carried into the rectum; and by the daily introduction of the finger or a bougie, as the edges of the wound heal, agglutination may be prevented till the parts have cicatrized. When, however, there is no external appearance to denote where the situation of the anus ought to be, the case is rendered more tedious and embarrassing, as it is doubtful whether the intestine be stopped up by a fleshy adhesion, or the coalescence of its sides, or whether a part of the gut be wanting. Every thing in the power of the surgeon ought nevertheless to be done to afford relief. In this intention a cut, an inch long, or more, is to be made in the site where the anus ought to be; carrying the wound more and more deeply in the natural direction of the rectum. The incisions are not to be made directly upwards, nor in the axis of the pelvis, lest the vagina or bladder might be thus wounded; but backward along the concavity of the os coccygis, where there is less danger of wounding any important part. In these cases the index finger of the left hand is the best director, introduced within the os coccygis. The operator is to dissect in the direction above recommended, until he reaches the fæces, or has cut as far as he can reach with his finger. Should he fail in discovering the meconium, as death must inevitably follow, another attempt ought to be made, by introducing a middle-sized trocar, upon the finger, in the direction best calculated to reach the rectum without danger to the surrounding parts, that is, *upwards and backwards*. The canula of the

trocar may be left in the puncture, and secured there with tape, so as to afford an outlet to the contents of the bowel.

ANUS, ARTIFICIAL.—By an artificial anus is understood an accidental opening in the parietes of the abdomen, to which some part of the intestinal canal tends, and through which *fæces* are either wholly or partially discharged.

CAUSES. It is always preceded by an injury to the intestinal canal, either a penetrating wound of the sides of the belly, ulceration of the bowel, and the bursting of an abscess externally; an operation in which the preternatural opening is purposely made with the view of saving life, in particular cases of imperfect anus; an accidental wound of the gut in the operation for hernia; and, most commonly, mortification of the bowel, the effect of violence and long continuance of the strangulation of the part.

All the cases here enumerated are further divisible into such as are attended with a destruction of a portion of the intestinal tube, and into those which are unaccompanied with any such loss of substance. And, whatever may be the kind of injury which the bowel has suffered, one thing invariably occurs, namely, adhesion of the two divided portions of the intestine to the edge of the opening in the parietes of the abdomen, an occurrence attended with the most salutary effect in preventing extravasation of the contents of the bowel in the cavity of the abdomen, which is produced by inflammation, which precedes gangrene, and closes wounds.

TREATMENT. The treatment of artificial anus is either palliative or radical. The first consists in obviating the habitual uncleanness produced by the involuntary discharge of the intestinal matter, and in relieving such bad symptoms as may arise from this disorder. This indication is fulfilled by the employment of silver or tin machines, which are either kept applied to the external opening by means of a spring, or from receptacles placed more or less off the artificial anus, from which the intestinal matter is transmitted through a tube, kept constantly in the opening. Elastic gum, which is supple, light, and capable of taking any shape, is in general the best substance for the construction of such

truments, which, however, rarely answer their purpose completely, and always give a great deal of trouble to the patient.

Richter, with a view to hinder the too quick escape of the intestinal matter, and the death of the patient from this cause, proposed covering the opening for a certain time with a piece of sponge, supported by an elastic bandage, or truss. Loeffler, however, found this method objectionable, as it was apt to induce colic, sensitiveness, and an inflamed excoriated state of the skin. When the outer opening disposes to contract too much, and inconvenience arises from this change, Sabatier is an advocate for preventing such closure by means of a tent or skein of silk, introduced into the aperture, and changed very often for the sake of cleanliness, while others prefer a ring of ivory for the purpose. These practices have all been objected to.

When the gut protrudes its reduction is to be effected in the same manner as a common case of prolapsus, but a serious difficulty will occur when the protruded part is inflamed, thickened, and of considerable size. The reduction, indeed, under these circumstances, has usually been considered as impracticable; but according to Desault this is not the case, as compression with a bandage, kept up for some time, will succeed. Care must be taken, however, to leave a sufficient opening for the passage of the fæces.

As regards the radical cure, the principal object which the surgeon ought to keep in view, is to prevent, if possible, the formation of an artificial anus; but when the event has taken place, and particularly when the whole or the greater part of the stools are discharged in this way, no attempt must be made to stop up the opening without proper consideration, for any effort of this kind, made under circumstances which do not justify it, may be the means of exposing the patient to the most alarming danger. The following works on this subject may be consulted with advantage: Desault's *Works*, tom. ii. p. 352—354; also *Travers, on the Process of Nature in repairing Injuries of the Intestines*; *Lawrence, Treatise on Hernia*, p. 206; *Le Blanc, Précis d'Operations de Chir.* tom. ii. p. 445.

ANUS PROLAPSUS.—Protrusion, in a greater or less degree, of the rectum at the anus, either the consequence of mere relaxation of the internal membrane of the bowel, or from a real displacement and inversion of its upper portion, which presents itself as an external tumour. The first form of the disease is that which is most common. When the swelling, occasioned by the protrusion of the inner coat of the rectum, or by the actual displacement of a greater part of this bowel, is subject to considerable variety in respect to length and thickness—when small resembling a mere ring, when large and reaching downwards having an oblong globular form—the tumour sometimes admits of reduction with ease; sometimes it cannot be returned without difficulty. The disease occurs in persons of all ages, but it is most common in infants and old people.

CAUSES.—Circumstances which tend to relax and weaken the parts which retain the rectum, or its inner membrane, in its situation. Various kinds of irritation and pressure on the bowel itself, having the effect of increasing the powers by which it is liable to be forced outwards. Diseases or irritation in the adjacent parts, and affecting the rectum by sympathy. Hence a prolapsus of the rectum may be caused by long habitual crying, and great exertions of the voice; violent coughing; sitting long on stool; hard dry fæces, and much straining to void them; obstinate diarrhœa in infants, kept up by dentition; dysentery; chronic tenesmus; various diseases of the rectum itself; the abuse of aloëtic medicines and emollient clysters; hæmorrhoids; excrescence or thickening of the inner membrane of the rectum; difficulty of making water; parturient efforts; stone in the bladder; paralysis of the sphincter or levatores muscles of the anus; and prolapsus vaginale.

TREATMENT.—The three principal indications of the treatment of prolapsus ani are :—1. The prompt reduction of the prolapsed part. 2. The retention of the reduced bowel. 3. The removal and avoidance of the causes by which the disease is induced.

When the case is recent, and the tumour not of an immoderate size, the reduction may be accomplished with tolerable ease, by putting the patient in a suitable posture, with the buttocks raised

the thorax depressed, and by making gentle and skilful pressure, either with the palm of the hand or fingers. When difficulty is experienced, the patient, if young and robust, may be bled; and the part may be fomented. The large intestines may also be emptied by means of a mild emollient enema; exhibit at the same time half an ounce of castor oil.

In the habitual prolapsus ani, the patient himself is generally accustomed to reduce the part, or it goes up of itself, when he lies down. When, however, the inflammation and swelling are present, the part ought on no account to be irritated by repeated attempts at reduction; recourse should rather be had to the antiphlogistic plan, especially leeches, fomentations, or cold blisters, and the exhibition of castor oil: when the swelling has been lessened, the reduction may be again attempted.

Having effected the reduction, the fore-finger should be introduced up the rectum, to ascertain that no intussusception exists above the anus within the sphincter. The bowel is then to be kept in its place by quietude and the recumbent posture; and if there be a great tendency to relapse, it will be proper to apply to the fundament a piece of sponge, or compresses, supported with the T bandage; with such other means as may be contrived for this purpose.—See *Gooch's Chirurgical Works*. vol. ii. p. 30. edit. 1792.

Obs.—Irritability of the rectum may be lessened with opium. The removal and avoidance of causes known to have a tendency to bring on the complaint, is the last indication in the treatment. In infants, a fresh protrusion of the rectum may be prevented, by making them sit on a high close-stool, with their feet hanging freely down. Every thing disposing to diarrhoea or costiveness should be avoided. The intussusception of the higher part of the bowel, especially of the colon, or cæcum, is always incurable, as it is not in the power of art to rectify the displacement. Large portions, however, of the intestinal canal thus inverted, have been known to separate and be voided. And, according to Mr. Keever,—(see *Inquiry into the Process of Nature in repairing injuries of the Intestines*, p. 374.)—when an artificial anus is complicated with prolapsus, the case very rarely admits of cure.

APONEUROSES.

Tendinous fasciæ, covering the muscles of the thigh, leg, foot, arm, &c. under which matter may collect. Abscesses also may form under the temporal, the palmar, and plantar fasciæ; and the tendinous thecæ, which include the flexor tendons of the fingers; and occasionally in the aponeurotic sheath, in which the rectus abdominis muscle is situated.

TREATMENT.—The chief indication is to make an early and depending opening with a lancet, to prevent the extension of the abscess, and to suffer the matter to escape as fast as it is formed. If a spontaneous opening should have occurred in an unfavourable place, a new one must be made in a better situation; or, if the former should be sufficiently depending and near the principal accumulation of matter, but too small, it must be enlarged with a curved bistoury and a director. Whenever any black detached pieces of fasciæ, or tendons present themselves at the opening, they must be seized with a pair of forceps and extracted.

OBS.—If an early opening be not made into a collection of matter lying beneath a tendinous expansion, the progress of the pus towards the surface of the body is materially retarded. Consequently, if the case be left to take its own course, the quantity of matter increases, and the pus spreads extensively under the aponeurosis in every possible direction, separates the muscles from such fasciæ, and the muscles from each other; nor does the abscess burst until a vast deal of mischief has been produced with more or less sloughing of the fasciæ itself, tendons, &c. These circumstances cannot take place without a considerable degree of constitutional disturbance, and a permanent loss of the use of certain muscles. And when a spontaneous opening is eventually formed, and some of the pus escapes, it is often only a very imperfect discharge, for the aperture, for the most part, occurs not in a depending situation, nor over the main collection of pus, but at a part where the aponeurosis is thinnest, and consequently where the matter has the least resistance to overcome.

ARTERIOTOMY.

The operation of opening an artery for the abstraction of blood is the intention of relieving diseases. The only artery of any consequence from which blood is ever taken, is the temporal artery and its branches, which lie so fairly exposed and in such a situation that they may be easily compressed against the temporal bones, and the bleeding stopped. When the vessel which it is intended to puncture lies near the surface, or can be ascertained either by seeing or feeling its pulsation, it may be opened at once with a lancet: but in many instances it lies so deep among the muscles, that it becomes necessary, in the first place, to make an incision in the skin, and then puncture the vessel. The bleeding usually stops without any trouble, and may always be commanded with a compress and bandage. In some cases the blood bursts forth from time to time, and more is lost than is actually necessary. When this takes place it is recommended, notwithstanding pressure, to divide the vessel completely across, which facilitates the process of nature, in contracting and closing the end of the vessel. An aneurism is sometimes the consequence, which must be treated by the principles explained under that head. (*See ANEURISM.*)

ARTERIES.

An artery is a membranous pulsating canal, arising from the heart and gradually becoming less as it proceeds from it. Arteries are composed of three membranes:—1st, a common or external; 2d, a muscular; 3d, an internal one, which is very smooth. They are only two in number, the pulmonary and the aorta, and these originate from the heart;—the pulmonary artery from the right ventricle, and the aorta from the left: the other arteries are all branches of the aorta. Their termination is either into the veins, or in capillary exhaling vessels, or they anastomose with one another. It is by their means that the blood is carried from the heart to every part of the body, for nutrition, preservation of life, generation of heat, and the secretion of the different fluids. The action of the arteries, called the pulse, corresponds with that of the heart, and is effected by the contraction of their muscular and great elasticity of their outermost coat.

ARTERIES, WOUNDED.—It is necessary sometimes to employ the needle and ligature in order to arrest arterial hæmorrhage. When the bleeding vessel is small and deeply seated, or when from any other circumstance, great difficulty is met with in securing the very orifice itself, in such cases a large curved needle armed with a strong ligature, is passed through, so as to include the parts immediately embracing the vessels that are divided, the whole is then tied together. This, however, must always be regarded only as an occasional expedient, when the surgeon cannot succeed in what should be his constant effort,—that of securing the immediate orifice of the vessel whence the hæmorrhage proceeds. When an artery is divided, particularly in the extremities, it is generally necessary, or at all events it may be said to be proper, to tie both ends of the wounded vessel. It is frequently found that bleeding takes place from that extremity of the vessel which is nearest to the heart, and from that which is the most remote. In the arm and fore-arm, where the arterial ramifications are particularly free, this almost invariably occurs; and also on the scalp, when the temporal artery is wounded the vessel will bleed as freely from the orifice the most remote from the heart as from that nearest to it. Under these circumstances it is a matter of obvious necessity to tie both ends of the wounded vessel. “But,” says Mr. Lawrence, “you ought to tie both ends, though no bleeding may be present at that moment from the most extreme orifice; it not unfrequently happens when the circulation recovers, that bleeding occurs from the distal orifice, and thence hæmorrhage may ensue that might prove fatal.”—See *Lancet*, vol. ii. p. 145. 1830. These observations relate to the course to be pursued in treating wounds of arteries, when the trunk is completely divided transversely; but there may be imperfect transverse divisions of the artery, or the artery may be divided longitudinally, or it may be wounded obliquely. In either of these cases the same course here mentioned must be pursued, that is, the artery is to be tied above and below the situation of the wound in the vessel.—*Ibid.* p. 14

OBS.—This plan of tying an artery is still more necessary

cial wounds than in complete divisions of the tube ; for the partially wounded artery is placed under less favourable circumstances affecting the natural cessation of the hæmorrhage. The orifice of the partially divided artery comes together circularly so as to close it; and thus we find the retraction and contraction of the artery of the completely divided artery, the two circumstances principally contributing to the natural cessation of hæmorrhage, which in partial division, are not existing. It is true that these partial wounds of an arterial tube, like complete divisions, may in some instances admit of spontaneous cure, particularly if the external wound be small, if effectual compression has been made on the arterial trunk, if the limb has been kept quite at rest, if the patient has altogether been kept very quiet, and if a course of treatment has been rigidly pursued, calculated to diminish the force of the circulation generally. Under such circumstances, even partial or entire divisions of vessels of considerable size are sometimes spontaneously cured; but if such a proceeding is only occasional, it cannot be calculated upon; and the mere fact that they do occur, ought not to induce the surgeon to neglect tying a wounded artery, that being indeed the only mode of treatment in which the patient can be placed in a state of safety. In all cases, whether the wound be small or large, the wounded vessel must be found out and secured by the ligature; and it is important that the ligature should be employed as early as possible, if hæmorrhage still continue from the wound; for bleeding, of even a short duration, or a very few repetitions of it, from a large vessel, as, for example, as the femoral artery, is attended with imminent risk to the life of the patient. Another source, too, of aggravation is occasioned by delay; in order to prevent the patient's death by loss of blood, it is necessary to apply a tourniquet on the upper part of the limb; and the application of this apparatus is attended with very great pain, irritation, and swelling of the limb, below the part where it is placed. Thus all circumstances tending to delay increase the difficulties, and those evils become more and more aggravated the longer the operation is postponed. The wisest plan is to cut down upon and take up the wounded vessel the moment the accident has happened, if there be an op-

portunity of doing so; for then the parts are free from distension and inflammation, and these are all the natural guides to lead once to the injured artery. (*See HÆMORRHAGE.*)

The operation of cutting down upon and securing an artery, is in some cases, a very serious, and indeed a very difficult one. It is necessary for the surgeon to be quite clear, before commencing an undertaking of this sort, that the character of the injury is fully understood, and also of the required remedy. If the patient is not seen immediately after the wound has been inflicted the surgeon is obliged, in a great measure, to trust to the report of others to guide his judgment on very important points; and in this way also his difficulties are increased. In the first place there would be reason to suppose that an important vessel has been wounded, if profuse bleeding took place immediately after the accident, and that that vessel is an artery, should the fluid possess the characters of arterial blood. In the next place, should there be a recurrence of free hæmorrhage some time after an accident; or if both of these circumstances occur, there will be no doubt that what has taken place is a wound of some important vessel. Some knowledge may generally be derived of the state of the wound, by observing the condition of the vessels of the limb beyond the part that has been wounded. If the main artery of the limb has been seriously incised, the pulsation will probably either be found suspended, or, at all events, materially altered from its natural condition in the vessels that are seated beyond the seat of the injury.

GENERAL DIRECTIONS FOR SECURING AN ARTERY.

Having determined on the nature and situation of the wound in the vessel, as well as the diagnosis, as far as the circumstances will enable you to decide, and, in fact, having come to the conclusion that an artery is wounded, and that it is necessary to secure the vessel, you proceed to perform the operation, by first applying a tourniquet upon the main arterial trunk above the situation of the injury, or by causing the circulation through that tube to be obstructed by pressure made by an assistant. The course of the external wound is to be observed with the utmost accuracy, and

direction, if possible, which the instrument that inflicted the wound has taken; and thus you may be led to infer, with some degree of correctness, that part of the artery which has been injured. A free incision must then be made immediately over that situation. The advantage of a free incision will soon be recognized; for, in these cases, much room is wanted, when the artery which is wounded lies pretty deep; so that unless a large opening is made at first, it will require to be made larger afterwards, or you will be embarrassed throughout the operation.

When the incision is made, supposing it to be a case of diffused aneurism, on cutting into the tumour, you will get into a quantity of recently coagulated blood; and when this is removed, and the wound cleaned out by means of a sponge, it will generally be found that the artery is already separated by the effusion of blood into the cellular tissue, and probably the orifice will be observed as soon as the compression is relaxed, or the bandage slackened; and there is then no difficulty in opening the extremity of the vessel.

OPERATIONS FOR THE TYING OF ARTERIES.

AORTA.—In two instances, the aorta has been tied in the human being: in both cases, between the aneurismal tumours of the heart; both those patients died; but there did not in either appear to be any deficiency in the supply of blood. The case in which Sir Astley Cooper performed this operation was as follows: the incision was commenced in the linea alba, two inches above the umbilicus, and carried to the same distance below, taking care, in the descent, to avoid the umbilicus, by giving it a curvilinear turn. “I was astonished,” adds Sir Astley, “to find with what ease I could pass my finger down to the artery. However great the apparent difficulty of performing this operation, there was in reality none. The principal danger appeared to arise from the irritation produced in the intestines by the ligature, and that is the reason why (in a future operation of the same kind) I should cut the ligature close to the vessel. Time will show us whether this operation will be successful or not. I believe, for my own part, that I would not hesitate to have my own

aorta tied, if it would save my life for only forty hours."—*Lect.*

OBS.—A gentleman of Dublin had a preparation in which the aorta had been obliterated in the abdomen; and in this case the circulation was carried on by the lumbar arteries going from above to below the part where the vessel was obliterated. The principal danger in performing this operation consists in including the nerves—the aortic plexus.

ARTERIA INNOMINATA.—The arteria innominata has been twice tied in the human subject, and in both instances the circulation was carried on in the upper extremity and in the corresponding, *i. e.* right side of the head, in the one for about three weeks and in the other for about five or six weeks, for the patients lived so long.

ARTERY, EXTERNAL ILIAC.—It is not at all an uncommon occurrence to meet with an aneurism of the femoral artery just below Poupart's ligament, exactly similar to the aneurisms which occur in the ham. The mode in which the operation is here performed is as follows:

(1.) The incision is made a little above the abdominal ring, and extended in the shape of a crescent, to the edge of Poupart's ligament, and then continued to about an inch and a half from the inner side of the spine of the ilium, where it terminates. In this incision the tendon of the external oblique muscle is laid bare; the second incision divides this tendon, and exposes the internal oblique and transversalis muscles. Having arrived at this stage of the operation, there will be no necessity for any further use of the knife.

(2.) The next step will be to raise the internal oblique and transversalis muscles from Poupart's ligament, by introducing the finger behind them—this done you reach the passage of the spermatic cord, and feel it distinctly; and then behind this the pulsation of the iliac vessel. The internal oblique and transversalis muscles are now to be drawn aside with the finger, elevating, at the same time, the spermatic cord a little, and then carrying the finger into the abdomen, behind the peritoneum; thus the beatings of the iliac artery is ascertained.

33.) Having found the artery, an aneurismal needle is put into the opening, and introduced under the vessel. It will be recollected that the artery is accompanied by a vein, and that the vein is on the inner side—the artery on the iliac, the vein on the pubic side; “the operation may be performed without the least difficulty, and is as easy as tying the femoral artery, there being only one circumstance that occasions the least danger, and that is the epigastric artery which passes up from the pubic side of the iliac vessel, and on the inner side of the incision; but this, however, may be avoided.”—*Sir A. Cooper. MS. Lect.*

44.) The artery being cleared a little from the surrounding parts and taken up, it is very desirable to ascertain that the vein is not secured, because the interruption to the return of blood would be very injurious. If the artery has been much exposed in the course of the operation, say, for instance, an inch and a half, several ligatures must be employed; but if a small portion only of the vessel has been laid bare, a single ligature will suffice. When several ligatures are used, they are to be separated from each other, drawing one upward and the other downward, and leaving about three quarters of an inch of the vessel exposed at the extremity of each ligature; for if this be not done, on dividing the artery, there will be danger of the ligature slipping off. The instrument with which the artery is usually divided is the probe-pointed bistoury. When the vessel is once divided, retraction immediately takes place. There will be no danger of including the nerve in the ligature, as the anterior crural does not accompany it. The vein and artery are included in the sheath, and the nerve is on the outer side. The edges of the wound are to be brought together, strips of adhesive plaster are to be applied, and the ligatures are to be allowed to come away by suppuration and ulceration.

2. How is the circulation carried on after the external iliac has been tied?

1. Principally by the gluteal artery which passes out through the greater sciatic notch, comes over the ilium to the groin, and enters the femoral artery a little below Poupart's ligament. The second artery is the ischiatic, which arises from the termination of the

external iliac, passes out of the pelvis between the trochanter major and the tuberosity of the ischium to the back of the thigh, and sends a few branches to the arteria profunda and external circumflex arteries; the external pubic also communicates freely with the internal pubic; if asked, therefore, by what vessels the circulation is carried on after the external iliac is tied, the answer should be, *principally by the gluteal.*

ARTERY, INTERNAL ILIAC.—The tying of this artery is an operation of considerable difficulty. It has been performed by Mr. Stevenson, in the West Indies, and since by two other individuals, of whom one was Mr. Atkinson, of York, for the purpose of securing the internal iliac artery. The operation consists in making an incision on the inner side of the spine of the ilium, by which you cut through the abdominal muscles, and reach the peritoneum, which is turned to the opposite side, in order that the artery may be reached. In this operation there is considerable difficulty in separating the ureter from the artery, because it crosses just at the bifurcation of the iliac artery, and if a man has not been well acquainted with the anatomy of the part, he might include the ureter in the ligature, and thus cause destruction of life.

Q. In what case, then, would a surgeon be called upon to perform this operation?

A. For aneurism of the gluteal artery, just at its commencement; so that it cannot be reached under the gluteal muscle.

OBS.—It is an operation highly creditable to any one who performs it, but particularly to him who first attempted it.

ARTERY, THE CAROTID.—In securing this vessel it is desirable to make the incision as high as possible; the upper boundary therefore, will be the angle of the jaw, and below the omo-hyoideus. The patient is placed either sitting or lying with the head thrown back, and turned slightly to the side opposite the tumour. Make then the first incision high up, on the inner side of the sterno-cleido-mastoideus, upon drawing aside the edge of which you will distinctly see the omo-hyoideus obliquely crossing the artery.

Q. What is there to be principally avoided in this operation?

A. The *par vagum* *, or eighth pair of nerves, which accompanies the artery. Were this nerve to be included in the ligature, life would be endangered. In passing the ligature round the carotid, the latter be raised a little, it can readily be discovered whether the nerve be in contact with it, and thus an accident which might prove fatal guarded against.

ARTERY, THE SUBCLAVIAN.—In tying this artery the middle of the incision should be opposite to the external jugular vein, and the centre of the clavicle. Speaking anatomically, the view of the vessels exposed in this operation may be thus described: the *omohyoides* muscle crossing obliquely above the clavicle, below the *omohyo-cleido-mastoideus*, upon the inner side, and the jugular vein passing immediately opposite to the centre of the opening. According to Mr. Key, of Guy's Hospital, this operation may be much facilitated by a free division of the clavicular portion of the *omohyo-cleido-mastoideus*, and that after having done so, he was enabled, in the subject on which he operated, with a common surgical needle, to introduce the ligature under the vessel.

Soon after commencing this operation, branches of nerves from the maxillary plexus are met with, which must be carefully avoided by the ligature, for were these included it would prove a fatal error. The *scalenus anticus* being the boundary of the artery in the inner side, you cut down for the purpose of finding its inner edge—this will be found a useful guide.

Q. What artery chiefly supports the circulation after the subclavian has been tied?

A. The superior scapula.

REMARKS. It has been asserted, but upon what authority is not known, that the operation for tying the subclavian artery has been successful but upon one side only. The first person who succeeded in this operation was Dr. Post, of Philadelphia. Since

* The eighth pair of nerves, or *par vagum*, arises from the medulla oblongata, and joins with the accessory nerves of Willis, giving off several branches and causes:—1. The right and left recurrent nerve. 2. Several branches in the neck to form the *cardiac plexus*. 3. Several to form the pulmonic, œsophageic, stomachic, hepatic, splenic, and renal plexuses.

this gentleman it has been performed by several others with favourable results. Mr. Liston, of Edinburgh, is one, Mr. Bullock of Lynn, in Norfolk, another; and Mr. Key a third. Mr. Keane senior, performed the operation below the clavicle, and the first time he did it, it was completely successful. "There may happen cases of axillary aneurism when the operation below the clavicle would be the best and safest, but, unquestionably, in ordinary instances, that which is here described, viz. the one above the clavicle, is by far the most preferable."—*Sir A. Cooper. MS. Lect.*

ARTERY, THE BRACHIAL.—This artery seldom requires to be secured in consequence of aneurism; but it is often rendered necessary from other causes, such as wounds, and some of these wounds, as in bleeding, give rise to aneurism. When an aneurismal tumour in the hand or the arm is thus formed, you are required to cut down upon it in order to secure the vessel; but to tie the brachial artery at the middle of the arm. The direction for the incision is the inner edge of the biceps muscle, and this cut almost immediately lays bare the median nerve, which is carefully to be avoided in the ligature, since it would either destroy the patient's life or cause paralysis of the limb.

ARTERY, THE ULNAR.—In securing this artery the anatomical direction for the incision is the tendon of the *flexor carpi ulnaris*: if the incision be made upon the inner side of this tendon, you will directly perceive the ulnar artery and ulnar nerve.

ARTERY, THE RADIAL.—The anatomical direction here for tying this artery is the tendon of the *flexor carpi radialis*: cut upon the radial side of the tendon, and you will immediately find the artery close to its edge.

OBS.—Instead of putting ligatures upon these vessels at the wrist for aneurism, or wounds of the palmar arch, it has been recommended to employ pressure, by means of cork folded in linen and bound down by a bandage. This practice, when adopted, leads to considerable irritation and inflammation, and ought not to be adopted generally, and more especially as regards the ulnar and radial arteries, as they can be so easily tied by those who possess the least anatomical knowledge.—*Sir A. Cooper, MS. citat.*

ARTERY, THE ANTERIOR TIBIAL.—This artery passes forward between the bones of the leg, about an inch below the upper head of the fibula. In tying the vessel in this situation, a free incision must be made through the fascia, extended between the heads of the tibia and fibula. The cut is then to be continued more deeply along the edge of the *peronæus longus*, following the fascia between this muscle and the origin of the *extensor digitorum communis*. The artery will be met with on the interosseous ligament.—(C. Will, vol. ii. p. 376.) In order to expose the anterior tibial artery a little above the middle of the leg, the finger is to be passed along the outer side of the spine of the tibia, and the breadth of the *tibialis anticus* is to be ascertained. Along the outer margin of this muscle an incision is to be made through the integuments and fascia, two inches and a half in length. The knife is then to be introduced between the outer margin of the *tibialis anticus* muscle, and the *extensor longus* of the great toe. In this space, at the depth of about an inch, the anterior tibial artery is situated. Cutting down upon this artery, near the tarsus, where it passes out between the tendons of the *tibialis anticus* and the exterior muscle of the toes, is not a difficult operation.

ARTERY, POSTERIOR TIBIAL.—In exposing the posterior tibial artery, behind the *malleolus internus*, an incision, about two inches long, is to be made between the internal malleolus, and the tendon of the *Achillis*, down to the posterior surface of the tuberosity of the tibia. At this depth the tendon of the *tibialis posticus*, and that of the *flexor communis digitorum pedis*, run as in a groove. In company with these two tendons, but somewhat closer to the *calcis*, the posterior tibial artery descends to the sole of the foot. The depth of the posterior tibial artery at the middle or in the upper third of the leg, renders it very difficult to tie the vessel in these situations. The difficulties here are also not a little increased by the spasmodic contractions of the *gastrocnemius* and *calcis* muscles. When necessary, however, the artery may be exposed and tied above and below the wound in it in the following manner:—Make an incision three or four inches in length, along the inner side of the crest of the tibia, and the origins of the *calcis* muscle are to be detached from it to the same extent, and

reflexed. Under the soleus is found the aponeurosis, which separates the muscles of the calf of the leg into the superficial and deep-seated. When this fascia has also been divided, the posterior tibial artery may be seen, or felt, deeply situated, running on the tibialis posticus and flexor muscle of the toes.—*See Haller, Icon. Anat. Fasc. 5. Tab. V.*

ARTERY, THE AXILLARY.—In tying the axillary artery when wounded, an assistant must compress the vessel, from above the clavicle, as it passes over the first rib. If the weapon has penetrated the vessel from below upward, directly into the axilla, the surgeon is to make a free dilatation of the wound upon a director or his finger, to a sufficient height to expose a considerable portion of the artery, and the precise situation of the wound in it. If the weapon has pierced obliquely, or from above downward through a portion of the great pectoral muscle, into the axilla, Scarpa advises an incision to be made through the lower edge of this muscle, and the wound to be enlarged, on a director, or the finger, so as to bring the injured artery fairly into view. The thoracic arteries divided in this operation must be immediately tied. The clots of blood are then to be removed, and the bottom of the wound cleaned with a sponge, by which means the opening in the axillary artery will be distinctly seen.

OBS.—As the axillary artery is imbedded in the tracheal plexus of nerves, care must be taken to raise it from these parts with a pair of forceps before it be tied. Two ligatures are to be applied, one above, the other below the wound of the arteries.—*For the operation of tying other arteries, see ANEURISM.*

BANDAGES.

Without regard to ancient titles, whether it be a deligation, fascia, or what not, the *modus operandi* of a bandage is a piece of surgery that ought to be well understood; but, descriptively, a bandage consists of one or several pieces of linen, cotton, or flannel intended for covering the surrounding parts of the body for several purposes. Bandages are either single or compound. The chief of the single are the spiral, the uniting, the retaining, the expellant, and the creeping. The compound bandages used in

every are the T bandage,—the suspensory one, the capistrum, eighteen-tailed bandage, the four-tailed, the nodose, &c.

USE AND APPLICATION.—To keep dressings, compresses, remedies, and other applications in their proper situation; also to support parts whose action may have become impaired or debilitated; to rectify certain deformities; to arrest hemorrhage; to compress blood-vessels, &c. In applying a bandage care must be taken that it be put on tight enough to fulfil the object in view, without running any risk of stopping the circulation, or doing harm in any other way. If it be not sufficiently tight to support parts as it ought to do, it is useless—if it be too tightly applied, it will produce swelling, inflammation, and even mortification.

The mode of applying a roller skilfully, is to place the part to be covered in a proper position; the head of the roller is to be held in the surgeon's hand, and only so much rolled as is necessary for the commencement of the application. The bandage in general ought to be applied so as to admit of its being most conveniently removed, and, at the same time, to allow of the subject's parts being examined as often as occasion may require, with the least possible derangement of them. Hence the reason, in fractures of the leg and thigh, the eighteen-tailed bandage is generally preferred to a simple roller. If a roller is to be applied to the fore-arm, it will be best to make a few turns of the bandage round the hand. In using a single-headed roller, or a retentive bandage only, the application of it should always be begun on the side opposite the wound.

"Practice," says Mr. John Bell, "will convince you that the firmness and neatness of a bandage depend altogether upon these two points—first, upon the turns succeeding each other in regular proportion—and secondly, upon making reverses, wherever you find any slackness likely to arise from the varying form of the limb. Then in rolling from the foot to the ankle, leg, and knee, you must take care first that the turns, or, as the French call them, *doloires*, of the roller be over one another by just one-third the breadth of the bandage; and, secondly, that at every difficult part, or over a joint, you turn the roller in your hand, make an angle, and lay the roller upon the limb, with the opposite flat

side towards it; you must turn the bandage so as to reverse making what the French call à renversée of the roller at the ankle at the calf of the leg, and at the knee. You must be careful to roll your bandage from below upwards, and support the whole limb by a general pressure. That you may be able to support the diseased part with a particular pressure, you must lay compresses upon the hollows and upon the bed of each particular abscess, and change the place of these compresses from time to time, so as now to prevent matter from sinking into a particular hollow, next to keep it out from a place where it has already lodged, and again to re-unite the surface of an abscess already completely formed from which the matter has been discharged."—*Principles of Surgery*, vol. i.; and for further information on the subject of bandages, see *Rees' Cyclopædia*, under the head of Bandage. *Dictionnaire des sciences Medicales*, &c. &c.

BLADDER, DISEASES OF.

The urinary bladder is frequently the seat of a variety of diseased actions.

1. *Irritable Bladder*.—During the latter stages of gonorrhœa often occurs that the patient is annoyed by a frequent desire to void his urine; these symptoms at length become so urgent, that the inclination to evacuate the urine returns as often as every ten or fifteen minutes, accompanied with pain in proportion to the quantity of urine contained in the bladder; sometimes the urine is mixed with blood, an appearance calculated to deceive the surgeon and excite a suspicion of stone, and induce him to pass a sound, which is highly improper.

CAUSES.—Often slight, as voluntary retention of the urine, &c.

DIAG.—In irritable bladder the pain is felt when the bladder is full; in a case of calculus the pain tortures when the bladder is empty.

TREATMENT.—The bladder is to be kept in a state of rest by means of a short flexible catheter, which should just enter the bladder, and be retained by a bandage carried between the thigh and groin. Opium should be given in doses from gr. j. to gr. ij., and with the same intention, namely, that of allaying the pain and irrita-

five or six grains should be introduced into the rectum, in form of suppositories. Opium administered with the liquor iussæ, combined with some aperient tincture; or the confined state of the bowels may be obviated by castor oil. A blister to the loins, with a view to produce counter irritation, will be of great service.

Ulceration.—Sometimes irritable bladder goes on to produce ulceration; the urine will then be mixed with blood; there will likewise be a discharge of bloody mucus, and the inclination to urinate will be more frequent, and exceedingly urgent. The treatment here is the same as in irritable bladder. The catheter will afford great ease, and keep the bladder at rest, by allowing the urine to escape as fast as it streams from the ureters, thus keeping the bladder constantly empty.

Mucous disease.—Known by the discharge from the urethra of an enormous quantity of ropy mucous, so thick that it will adhere to the sides of the urinal, and is of a yellow colour. This discharge is produced from the internal surface of the kidneys, ureter, and bladder. This affection might be denominated catarrh of the bladder."

TREATMENT.—A short catheter, as in the cases irritable and ulcerated, is to be introduced. The medical treatment consists in the exhibition of oxymuriat. hydrargyri, gr. $\frac{1}{8}$ three times a day; with spir. æth. nitrici. 3j. in mist. camph. ʒiiss. as often. Persons with this disease should drink plentifully of soda water. The best remedy, however, is the bals. copaib. No medicine completely robs the urine as this. Eight or ten drops three times a-day will be found quite sufficient; and it may be given in conjunction with the medicines above mentioned, or in mucilag. acacia. 3ij. and aq. font. ʒx."—*MS. Lect. Sir A. Cooper.*

Paralysis of the Bladder.—Now and then a paralytic state of the bladder occurs. Sir A. Cooper relates a case of this kind which he cured by blistering the loins, and by giving a pill twice a day, composed of five grains of chio turpentine, and a quarter grain of powdered cantharides; by these means the voluntary power of the bladder was restored. The catheter was intro-

duced in a horizontal position, but the urine did not pass till the patient was placed in the erect, which was attributed to the weight of the superincumbent viscera pressing on the bladder.

5. *Rupture of the Bladder.*—The bladder is sometimes ruptured in consequence of external violence, particularly in pugilist encounters. The urine escapes into the abdomen, and most violent inflammation ensues, which terminates fatally in a very short time.

TREATMENT.—Should the surgeon see the patient soon after the injury, and ascertain the nature of the accident, all that can be done to afford relief is to introduce a catheter into the bladder and to leave it there to suffer the urine to flow off in that way, so that it may not pass into the cavity of the abdomen. These cases are generally fatal.

6. *Bursting of the Bladder.*—The bladder when extensively distended may burst, not exactly in the same manner, be it understood, as it would burst in the dead subject if excessively blown, but probably by *sloughing* like an aneurismal tumour when its coverings are rendered thin. This, however, is a rare termination of excessive distension of the bladder; it is much more common to have inflammation and ulceration of the urethra behind the stricture taking place, and the consequences already described.

7. *Inflammation of the Bladder.*—The mucous membrane of the bladder may be the seat of inflammation; and is then attended with violent pain in the lower and anterior part of the abdomen, with continual desire to void the urine, and with a mucous, purulent, sanguineous discharge blended with it. The mucous discharge when present, is generally of a peculiarly thick, ropy consistency, which separates from the urine, subsides to the bottom, and adheres firmly to the vessel in which the urine is contained, so that when the water is poured off there is a thick, viscid, mucous substance adhering to the bottom of the utensil.

TREATMENT.—The antiphlogistic treatment in the acute stage—subsequently narcotics, either in the form of clyster or suppository, diluent and mucilaginous drinks, &c.

Tapping or puncture of the Bladder.—An operation for relief

bladder after all other means have failed.—See PARACEN-
SIS VESICÆ.

Wounds of the Bladder.—See WOUNDS, GUN-SHOT.

Tone of the Bladder.—See CALCULI, p. 115.

BLEEDING.

Abstraction of blood for the relief of diseases. It is distinguished into general or topical. General bleeding is resorted to in a view to diminish the whole mass of the circulating medium; it is performed with a lancet, either by opening a vein, called phlebotomy or venesection, or the puncturing of the temporal artery, or one of its branches, called arteriotomy.—See ARTERIOTOMY and VENESECTION.

Topical blood-letting is performed either by means of a sufficient number of leeches, or a cupping glass and scarificator, or dividing the visibly distended vessels with a lancet, as is often practised in some cases of ophthalmia. This mode of abstracting blood is performed in the vicinity of the diseased part, for the express purpose of diminishing the quantity of blood in that particular part.—See CUPPING and LEECHES.

BLEEDING, ACCIDENTS FROM.—Among the ill consequences of bleeding in the arm may be enumerated.

- a. Ecchymosis.
- b. Inflammation of the integuments and subjacent cellular substance.
- c. Inflammation of the absorbent vessels.
- d. Inflammation of the vein.
- e. Inflammation of the fascia of the fore-arm.
- f. Partial division of a nerve.

These, although represented separately, may, doubtless, in some cases, occur together.

Ecchymosis.—A thrombus, or ecchymosis, is a small tumour at the orifice, occasioned by the blood insinuating itself into the adjoining cellular substance at the time when it is flowing out of the vessel. If the posture of the arm be changed, it frequently prevent the thrombus from increasing in size, so as to impede the abstraction of blood. In some instances, how-

ever, the tumour suddenly enlarges, and entirely interrupts the operation, and prevents it from being finished; but the most effectual method to prevent the tumour from increasing is to remove the bandage; for were it to remain, a considerable degree of swelling might be induced, even to the extent of being attended with great trouble. Should it be necessary to take away more blood, another vein should be opened, or probably which is better, from a vein in the opposite arm.

TREATMENT OF ECCHYMOsis OR THROMBUS.—Absorption of the tumours to be promoted by lotions containing spirit, vinegar or the muriate of ammonia: compresses wetted with any lotion of this kind, may be advantageously applied to the swelling, and retained there with a slack bandage.

b. Inflammation of the integuments and subjacent cellular substances.—The inflammation and suppuration of the cellular substance, according to Mr. Abernethy, in which the vein lies, are the most frequent occurrences. Sometimes the inflammation is rather indolent, producing a circumscribed and slowly suppurating tumour. Sometimes it is more diffused, partaking of the erisipelatous kind. At other times it assumes the phlegmonous form.

CAUSES.—A bad lancet, which rather lacerates than makes a clean incised puncture; when the constitution is irritable, and particularly if care has not been taken to bring the edges of the puncture in close contact, and the arm is not kept steady, which allows of the edges disturbing the adhesive process.

TREATMENT.—To keep the arm perfectly at rest in a sling; the application of saturnine washes, and exhibiting a mild saline aperient or two. Should suppuration follow, a small poultice should be applied, &c.

c. Inflammation of the absorbents.—Occasionally, and more particularly when the arm after bleeding is not retained in a still posture, swellings make their appearance about the middle of the arm, over the large vessels, and about the middle of the fore-arm between the wrist and the elbow, in the integuments covering the flexor muscles. The wound becomes painful, inflames and suppurates. The pain shoots from the orifice made in the vein.

lines up and down the arm, extends to the axillary glands, and from the wound in the vein down to the enlarged glands at the middle space between the elbow and wrist, over the flexor muscles of the hand.

CAUSES.—Inflammation of the absorbents is to be deduced from two causes; namely, the absorption of irritating matter, and the effect of the mere irritation of the divided tube. When virulent matter is taken up by the absorbent vessels, it is generally conveyed to the next absorbent gland, where its progress being retarded, its stimulating qualities induce inflammation; and, frequently, no visible disease of the vessel through which it has passed can be distinguished. That part of the vessel nearest the irritating cause usually suffers most, while the glands themselves, being more remote from the cause, do not participate so much in the affection.

TREATMENT.—The arm is to be kept quiet in a sling; the fracture of the arm is to be dressed with some mild, simple ointment: and the situation of the lymphatics is to be covered with linen soaked with the saturnine lotion. Some gentle aperient, as in the former case, is also to be administered. Should the glandular swellings suppurate, poultices should be applied; and if the matter does not soon make its way outward, the abscess ought to be opened.—*Abernethy*.

1. *Inflammation of the vein*.—If the wound made in the vein does not soon unite, the vein itself is very likely to become inflamed. This affection will vary both in its degree, extent, and process. The treatment consists in diminishing the inflammation in the ordinary way, and preventing it from extending along the membrane-lined lines of the vessel towards the heart, by placing a compress over the vein a little above the puncture, in order to make the opposite sides of the vessel adhere.—*See VEINS, DISEASES OF*.

2. *Inflammation of the fascia of the fore-arm*.—It occasionally happens that, in consequence of the inflammation arising from the wound of the lancet in venesection, the arm becomes very painful, and scarcely admits of being moved; the puncture often remains unhealed, though not accompanied with much inflammation of the surrounding ligaments; the fore-arm and fingers can-

not be extended without much pain; the integuments are sometimes affected with a kind of erisipelas, which, when slightly touched, is not very painful, but if forcibly compressed, so as to affect the subjacent parts, the patient suffers much. The pain often extends to the axilla and acromion process, though swelling is not perceptible in either one direction or the other. These symptoms are accompanied with a considerable degree of fever, and in about a week after, a small superficial collection of matter sometimes takes place a little below the internal condyle. On opening this swelling a small quantity of pus is discharged, and there is scarcely any decrease of the pain or swelling. In a few days more a fluctuation is perhaps again felt below the external condyle, which on being opened a quantity of matter gushes out, the swelling materially subsides, and the sufferings of the patient from that time are comparatively trivial. This last opening however, is inadequate to the perfect discharge of the matter which is sometimes originally gathered beneath the fascia, and in the direction of the ulna, and its pointing at the upper part of the arm depends on the thinness of the fascia in this place. The accumulation of pus descends on the lower part of the detached fascia, and a depending opening for its escape becomes necessary. This being effected the patient soon gets well. In these instances neither the vein nor the absorbents have the appearance of being inflamed. The integuments are not much affected, and the patient complains of a tightness of the fore-arm. Pus does not always form, and the flexibility of the arm after some time gradually returns.

TREATMENT.—General means for the cure of inflammation. The limb to be kept quiet, and the inflamed part relaxed. On the inflammation diminishing, the gradual extension of the fore arm and fingers ought to be attempted, and daily exercised, to obviate the contraction that might otherwise follow. When the elbow joint and fore-arm continue rigid after the inflammation has ceased, Mr. Charles Bell recommends friction with camphorate mercurial ointment, &c., and the arm gradually brought into its natural degree of extension by placing a splint on the fore part of the arm.—*Vide Operative Surgery, Vol. I. p. 65.*

f. Wounded nerve.—Two cases are mentioned by Mr. Aber-

thy, on the authority of Mr. Pott, in which the patient suffered attracting pains, followed by convulsions and other symptoms which could only be attributed to nervous irritation, arising from the partial division of a nerve, in which he recommended its total division as a probable remedy. Other cases are related by Dr. Monro, where such a mode of treatment proved successful.

When a nerve, says Mr. Abernethy, is irritated at any part between its origin and termination, a sensation is felt as if some injury was done to the parts which it supplies. If, therefore, the cutaneous nerves were injured in venesection, the integuments of the fore-arm would suffer pain; if the median nerve, the thumb and two adjoining fingers would be painfully affected. The general opinion appears to be, in these instances, that there is only a partial division of the nerve, and that complete division would afford relief. Mr. Pott proposed enlarging the original orifice; but if the injured nerve be under the vein, this would fail of its object, which can only be accomplished by making a transverse division above the orifice of the vein, where the nerve lies superficially; and as the extent of the inflammation of the nerve may be uncertain, Mr. Abernethy has suggested even a division of the cutaneous nerve still further from the wound made in bleeding.—See *Bell's System of Surgery*; *Hodgson on the Diseases of Arteries and Veins*; *Abernethy's Essay on the ill-consequences sometimes following Venesection*; *Travers, in Surgical Essays*; *Mapman, in Philadelphia Journal, Feb. 1824, &c. &c.*

BONES, DISEASES OF.

It is to the phosphate of lime contained in bones, and which is more or less distributed in their texture, that they owe all their solidity; and, probably, it is to the same earthy substance that the difference in their vital properties, and in their diseases, from those of the rest of the body, is to be referred. This particular organization, in fine, and inferior vitality of the bones, are generally supposed to account for the small number, peculiar character, and generally slow progress of the diseases to which they, common with the soft parts, are liable. For an account of which see—

ANTRUM.	NEUROSIS.
CARIES.	OSTEOSARCOMA.
EXOSTOSIS.	RICKETS.
JOINTS, DISEASES OF,	SYPHILIS
MOLITIES OSSIUM.	

BOUGIE.

A smooth flexible instrument made for the purpose of being introduced into the urethra, for the cure of diseases in that passage and is so called from its generally containing wax in its composition, and having some similitude to a wax taper, called in French bougie. They are divided into those that are solid, and those that are hollow.—*See* CATHETER.

BOIL, or PHLEGMON.

The cellular membrane is the seat of several inflammations and of two particularly, in which the inflammatory process is peculiarly characterised by induration, and the formation of partial sloughing; these two inflammations are boil and carbuncle, which differ only from each other in magnitude—that is, in the quantity of the cellular structure which they occupy. *See* CARBUNCLE.

CAUSES.—A boil very commonly arises from some external irritation of the skin. In persons who have a tender skin, friction and irritation of any other kind may produce it. Sometimes a succession of boils form in the skin, after it has been irritated by a blister, more especially if the blister has been dressed by any irritating application; or they may arise from some internal cause. Frequently a person will have one or more, but generally there is a succession of several, and the patient will be pestered with them for many weeks, or even months.

SYMPTOMS.—A firm but hard swelling of a painful kind under the skin; the skin itself assumes a red colour, and presents a pointed projection. Examined externally, the part feels very firm and hard; the inflammation does not proceed very rapidly. It will continue some days, and, at length, on the most prominent part of the cutaneous irritation, a small yellow pustule forms; the cuticle breaks, and the discharge of a little thick matter takes

see; this discharge is not sufficient to produce a subsidence of swelling, nor, in fact, does it materially diminish it. The opening enlarges, the discharge becomes more copious, and as the opening increases, a dirty whitish or yellowish substance, called the core, (the slough of the small portion of the adipose substance) seated in the aperture, is seen; which in the course of a few days comes detached and passes out; after which the boil heals.

TREATMENT.—The treatment of this local affection is simple. In fact, its progress cannot be materially controlled. A poultice is generally applied, a trouble which people are not fond of giving themselves; and instead of which a piece of drawing plaster is put on to bring it to a head. Adhesive plaster, or the emplastrum ammoniacum, may be applied till it comes to an opening; and then it may be covered with a common poultice. If, however, the boil be very large, a poultice can be frequently applied; and if there should be a succession of them taking place, you may find it necessary to pay some attention to the health, to see that the assimilative functions are properly performed.

BREAST, DISEASES OF.

—The female breast, during the period of suckling, is often affected with acute inflammation, which proceeds to suppuration—the formation of phlegmonic abscess, called milk abscess, in consequence of the particular period at which it takes place; and when it breaks externally, the case, in common language, is called a broken breast.

CAUSES.—Vascular activity of the breast, mechanical irritation, pressure, attempts made by the mother or nurse to promote the flow of milk, irregular diet, and too high living.

SYMPTOMS.—Pain in the part; sensation of heat to the touch, when the patient finds the breast hot, without hardness, inflammation, induration, or swelling, the secretion of milk still continuing. These are the early symptoms when the disease may be brought under controul by adopting the antiphlogistic plan.

TREATMENT.—Active antiphlogistic treatment at the commencement, by the free application of leeches to the breast, evacuating lotions, purgatives, and taking the child from the breast.

If the antiphlogistic treatment do not succeed in arresting and reducing the inflammation, it will at least diminish the extent of suppuration—it will lessen the quantity of matter and the size of the abscess. When matter has formed, the cold application should be discontinued, and warm fomentations and soft poultices substituted. If the suppuration be partial it may be left to itself, but if it be situated underneath the gland, or between the under surface of the gland and parietes of the chest, the period of relief may be considerably accelerated by making a free external opening, and perhaps also limit the extent of the mischief.

II. BREAST, CHRONIC INFLAMMATION OF.

The breast is liable to *chronic inflammation*, and to *chronic abscess*, which may be of the scrofulous kind, though the last is not very common.

TREATMENT.—Local means suited to the symptoms; antiphlogistic measures may be necessary; a few leeches, poultices, fomentations, &c. If there be fistulous openings, from the matter having been discharged by external apertures, the general treatment will prove of more consequence than the local, and when the affection is of a scrofulous kind, those constitutional means of relief should be adapted which are pointed out under scrofula. In most instances of chronic disease in the breast, whether of a scrofulous or other nature, the functions of the uterus are deranged—for were these functions properly carried on, the breast would seldom become the seat of disease. In consequence of the sympathy between the breast and the uterus, the condition of the latter, during the disease of the former, ought to be inquired into, and means adopted for correcting its unhealthy condition. For this purpose aloetic and chalybeate medicines are particularly proper.

III. BREAST, INDOLENT AFFECTIONS OF THE.

The substance of the female breast, in many instances, undergoes a slow kind of induration and condensation, not connected with any very essential change. On feeling the part, a species of lobulated tension is detected, seeming as if it were a part of the natural structure of the mammary gland, differing only in the

circumstances of its being much firmer and harder. This change may either affect a part or a whole of the gland; and is found existing on both breasts at once. It has been known to produce retraction of the nipple to a considerable extent—an effect ordinarily considered to be characteristic of a scirrhus affection—though it is not to be regarded exclusively as such, for it may take place under the circumstances here described. Females, at a certain age, and single, unmarried women, from, perhaps, the age of twenty-five to forty years, are more particularly the subjects of this chronic condensation of the breasts. It comes on slowly and almost insensibly. Steel medicines, good diet, air, and exercise, are the means best calculated to invigorate the system and more especially to act on the uterus, and, if not remove, to retard the progress of these indolent tumours.

IV. BREASTS, IRRITABLE.

The mammary gland is sometimes the seat of painful sensation without any visible alteration in the structure—an affection which Sir Astley Cooper has characterised under the appropriate designation of *irritable breast*; by others called *neuralgia of the breast*.

Symptoms.—The pains experienced in the breast are not constant; they are experienced more particularly at certain times; and more severely previous to the return of the periodical discharge. While, at other times, the patient is comparatively free from pain. The gland appears to be a little larger than natural, but there is no external redness, no induration, in fine, no appearance of disease whatever; but the patient is sometimes subjected to such very severe pain, as to prevent her from making any exertions which affect the breast, or from using the arm on the affected side, and altogether even to affect the system very considerably.

Treatment.—The antiphlogistic plan of treatment has no influence over this affection. Leeching, purging, and other similar means produce no effect whatever. Probably chalybeates might be good, and even these have been known to fail. The narcotic has been tried, conium, hyosciamus, and more especially the opium-plaster, on which, by some persons, considerable re-

liance is placed in neuralgic affections, though little benefit has been derived from even that. Change of air, with carbonate of iron and rhubarb, might, perhaps, effect more. These affections of neuralgic type have been considered as depending on some arrangement about the spinal cord; probably a blister applied between the shoulders, in conjunction with the above, might be attended with the best advantages.

V. BREAST, MALIGNANT DISEASE OF.

The female breast is liable also to change of structure of a malignant character, similar to cancer, and to *Fungus Hæmatodes*; more particularly to the former. (See BREAST, SCIRRHOUS.) It is equally liable to affections that are not malignant, but which resemble the malignant, both in the change of structure, and in certain stages of their progress; consequently it is important to pay close attention to the circumstances attending diseases of this part in order to be able to distinguish between those diseases which are, and which are not malignant, that the proper means may be adopted in either case, since the remedies in each are very opposite, and the treatment materially different.

VI. BREAST, SIMPLE UNNATURAL GROWTH OF,—ENCYSTED SWELLING OF.

The breast is liable to enlargement from a kind of simple growth—simple vascular excitement—augmentation in bulk of the natural structure with more or less condensation. One of these simple vascular enlargements of the breast, which often proceeds to great magnitude, throughout which there are cellular cysts dispersed, Sir Astley Cooper calls the *hydatid tumour* of the breast, probably the same which Mr. Abernethy designates as the *cystic sarcoma*. Many of these tumours may exist together, or even a single cell or cyst may form in a mammary gland. Some of the cysts may enlarge, come near to the surface, present a feeling of fluctuation, and induce the surgeon to puncture them, and then the clear watery fluid they contain will point out the nature of the affection. The skin is quite free from discoloration, excepting a little prior to the appearance of the catamenia, when the part

to ulcerate, if such a disposition has taken place. The complaint is entirely unattended with constitutional derangement, as at the time when ulceration commences, when there will be a degree of irritable fever. The swelling is at first hard; in the second place, fluid; thirdly, unattended with pain; and, finally, there is no particular constitutional irritation, unless, as already stated, and then it is slight, and not at all alarming to the patient's mind. The disease never requires removal on account of any thing malignant in its character, but is generally removed at the solicitation of the patient. It sometimes acquires an extraordinary magnitude. Of the causes of this complaint nothing is known, nor of the production of the cysts. When the tumour has acquired a considerable magnitude, the operation is usually performed for its removal. It is an unadherent tumour, is loose, and lies upon the pectoral muscle, consequently can be easily extirpated. The operation is neither dangerous at the time nor in future, to the patient's life.

VII. BREAST, FLESHY TUMOURS OF.

The female breast is frequently the seat of small fleshy tumours, some exceeding the bulk of an egg, somewhat analogous in nature to that of the breast itself in which they form; but in the proper sense of the term, they are new depositions, new growths, tumours, generally of a firm feel, loose in their situation,—and is, connected by loose cellular texture to the surrounding tissue of the breast,—and very commonly about the size of a hazel nut at all events seldom even exceeding the bulk of an egg. They are apt to be painful; occasion uneasiness, and are tolerably tender to the touch.

TREATMENT.—As there are no means of lessening or checking the growth of these tumours, it is advisable to remove them. Under such circumstances it is only necessary to remove the tumour itself, without any part of the gland to which it adheres. It will be found, on cutting into them, hard and lobulated, and extremely vascular. To correct any thing amiss in the state of the constitution give the hydrargyrus c. creta, or Plummer's pills together with soda and rhubarb; in the use of mercury, care

must be taken not to trust it too far; in short, whatever the medicines may accomplish towards preventing the growth of tumour, they will certainly not disperse it when once formed; all events if medicines be not tried, no relief can be expected. The worst that can happen is the removal of the tumour by the knife, an operation not attended with the least danger. The vessels that supply these tumours are not large, "and the operation is that always succeeds in affording permanent relief, for the disease does not return." Sir A. Cooper. *M.S. Lect.*

VIII. BREAST, SCHIRROUS TUMOUR OF.

There are but two malignant diseases of the breast, namely, *scirrhus tumour*, and the fungoid tumour. The first is an extremely frequent disease. See FUNGUS HÆMATODES.

CAUSES.—As regards the causes of this disease, it is very frequently attributed to accident, but that is rarely the case; and then it may result from a blow, or pressure on the part, or injury to it in some shape or other, but this does not often happen. "Although," observes Sir Astley Cooper, "the disease operates on some particular part of the body, yet it is always preceded by a state of constitution which has excited it. He who looks at this disease in the light of a local affection only, takes a narrow view of it. A blow or a bruise inflicted on a healthy person would be followed by common inflammation only, which would lead to the removal of the matter effused. But if a blow were received on the breast, when the constitution was in a state disposed to the formation of scirrhus tubercle, it would be the cause of a particular action being excited in the injured part; and might lay the foundation of this complaint. There must be a predisposing cause in the constitution, or it will not occur. Yet the formation of scirrhus tubercles does not entirely depend on constitutional arrangement; there must be also a peculiar action excited in the part, and if there be no specific action, nor any of the scirrhus kind, you will have no appearance of the disease."—"The scirrhus tubercles are said to be fibrous: here let me observe that the fibrous do not belong to it. They are nothing more than the cellular

ue thickened; if you were to macerate a scirrhus tumour, might pick out from the cellular tissue the scirrhus substance, and it would then have the appearance of a honeycomb, consequence of the cancerous substance being removed. This deposited between the cellular tissue, in the same manner as substance of the testicle is between the septa."—*M.S. Lect.*

SYMPTOMS.—1. A hard and moveable swelling; now and then little blood discharged from the nipple, which stains the shirt, induced by the inflammation extending along the lactiferous ves. The swelling is attended with little pain. At first it is moveable, free from pain, and circumscribed. In this last respect there are some varieties; it occasionally happens that the inflammation extends, and the disease is lost in the surrounding parts, but generally happens that the exact situation of the tumour can be defined. In this case, it continues a long time, for weeks or months gradually increasing, and at last the *second set* of symptoms are ushered in.—*e. g.*

1. Violent darting pain is felt in the breast, which the patient describes as resembling a knife or lancet being pushed into it; there is also a burning sensation of the part—and the patient feels, about one or four days before, the appearance of the catamenia; if, indeed, the disease be traced, the symptoms are less severe after the first fortnight from the disappearance of the menstrual discharge; but that for the last fortnight, and a little before the flow of the menses, the pain is excessive. It is not a continued or a darting pain coming at times, and is so severe as to make the patient startle. The increase of the size of the breast is unequal, and it does not follow any regular progression; it increases by starts; prior to menstruation it gains in size—after the menses have appeared it loses again. The glands of the axilla or those between the neck and breast, begin next to enlarge? The skin round the nipple has a puckered appearance; is drawn in at the centre, and is elevated on the sides, giving the part an appearance resembling that produced by ulceration and cauterization. In the progress of the complaint, a number of small black spots will be seen on the breast, which increase as the latter enlarges. In the second stage inflammation of the skin and nipple

comes on, and the cellular membrane partakes of the character of the disease. Scirrhus of the skin has been noticed as well marked as that of any other part.

3. The third set of symptoms is the consequence of suppuration going on in the part, for the breast undergoes the same process as any other spot affected with cancerous disease. Prior to an opening being formed, the skin becomes livid, and the breast is very painful in that part where it opens. In general, the opening is not made by art, as the object is to prevent ulceration as long as possible; but when the ulcerative stage has commenced, the glands above the clavicle enlarge, the arm swells just above the elbow, and then extends over the hand, fore-arm, and upper arm. There is an interruption to the functions of the absorbent system; the blood is not returned by the veins; an increased secretion takes place from the termination of the arteries; fluid is thrown out into the cellular tissue, which even, when evacuated, coagulates. The constitution is severely affected, there is difficulty of breathing; an inability but to lie on one side, pain in the right side, and also in the loins: the patient says that she has rheumatic feelings all over her bones. The organs of digestion are deranged; the patient has severe spasms at the scrobiculis cordis, and frequent vomitings—at length, exhausted by irritation, the unhappy victim expires.

Post mortem appearances.—On dissection the breast is found on a solid mass, like cartilages, with very little of vascularity, except at its edges; internally fibrous, but the vessels are few, and pass over its surface. When the breast has acquired any magnitude there is generally an opening in it; and then, internally, it has the appearance of being worm-eaten, and is spongy: at the part where there is ulceration it is very vascular, and with the ulceration you will find a bloody serum. The absorbent glands put on the same character as the scirrhus breast; and besides this, the scirrhus extends to the cellular membrane, the skin and muscles. The glands in the axilla are of a scirrhus nature; in the beginning they are solid, and continue so until ulceration commences—they then become spongy and contain a sanous serum. Occasionally tubercles are found on the pleura, being the lungs on the

face opposite to the diseased breast, and having the true scirrhus character. The liver is most frequently diseased; and the uterus it rarely exempted from a participation of the same; it is affected with what are called Polypi, but they are rarely sarrihi of that organ—hence the pain in the loins, the result of the connexion between the nerves of the uterus and those of the lungs; there is also fragilitas ossium.

SUBJECTS OF THE DISEASE.—Married women, who bear no children, and single women, are more subject to this complaint than those who have large families. It is very probable that the natural change which the breast undergoes in the secretion of milk has some power in preventing this diseased action of the breast. It is generally believed that the scirrhus tubercle of the breast is connected with the cessation of the menses. “I believe,” says Sir A. Cooper, “that if a person has a tumour in the breast which is not malignant, and that it remains so till the change of life takes place, that then an undue action may be excited in the part, and the tumour become scirrhus, just at the cessation of the menstrual discharge. But the disease occurs at an earlier period: the period at which the scirrhus tubercle is usually formed, is from thirty-five to fifty years of age; however, it is more frequently found under forty than above it. It is not a disease of young persons; it is rarely seen between twenty and thirty. There are many tumours met with at an early age, which are called scirrhus tumours, but they are not so. I have only met with two cases under thirty; and the most advanced age at which I have seen this complaint is eighty-six.”—

S. Lect.

The progress of scirrhus tubercle is in some persons extremely slow. In general, however, it destroys life in about four years from the commencement. It is from two to three years in its growth, and from a year and a half to two years afterwards in destroying life. When suppuration and ulceration have commenced, and the constitution is disordered, it is even then some time before the patient is worn out. Four or five years often elapse before life is destroyed. There are instances also on record in which the progress of the disease to the destruction of life

is extremely slow ; and it not unfrequently happens that two or three in the same family are affected with it.

TREATMENT OF SCIRRHOUS TUBERCLE.—We have no medicine which has any power or specific influence over this disease. When a patient applies to a surgeon with scirrhus tubercle, and her general health is in a disordered state, the progress of the disease may be retarded, and thus her days prolonged, by giving alterative medicines. The operation for the removal of a scirrhus breast should never be performed previous to the patient having undergone a course of medicine. Medicine is also to be given with another view: if an operation has been performed, the state of the constitution is to be altered by the exhibition of alterative medicines, such as Plummer's pill, and the compound decoction of sarsaparilla ; or infusion of gentian with soda and rhubarb. By these means you improve the constitution, and lessen the chance of the disease returning. The constitution may be altered ; but a scirrhus tubercle, when once formed, is not to be dispersed. The surrounding inflammation may be removed by local means ; but no part of the scirrhus inflammation can be taken away.

Neither are there any specific local applications. These, whatever they may be, can do no more than retard, in some slight degree, the progress of the disease. When the disease is accompanied by local inflammation, evaporatory lotions of the ordinary kind may be used ; otherwise they seem to do rather harm than good. Warm applications are also improper, if the heat be considerable. Under applications, the disease grows ; for they increase the determination of blood to the part. If poultices are used, they should not be above the natural heat ; but under any circumstances, patients generally complain of them as being uncomfortable. It is better to employ the soap cerate.—(See CERATES.) If there be much pain with the disease, Sir Astley Cooper recommends a drachm of the extract of belladonna to be rubbed down with an ounce of the soap cerate: this diminishes the nervous irritability of the part ; and the advantage of the soap cerate is that it excites a gentle perspiration without any undue heat. It is unquestionably a most useful application.

If there be much inflammation, leeches may be applied ; but the

the mode of treatment is to alter the constitution, according to Sir C. Cooper's plan, by the exhibition of five grains of Plummer's salt at bed-time, and on the following day the following draught:—

R. Infus. gentian.℥iss.

Sodæ carbonat.....℥ss.

Tinct. Calumb.....℥j.

Ammon. carbonat. ...grs. v.

These will restore the secretions, and diminish the irritability of the nervous system. The patient should live upon such things as she can agree with her own feelings, and which do not derange the general health. But if a vegetable diet be prescribed, water allowed for drink, and she be otherwise kept low, it will be the worst plan that can be pursued; for if you weaken the strength by a low diet, the pulse will quicken; it will, *cæteris paribus*, in a person in whom the pulse at 80, increase in a short time to 110 and 120, and become small. In proportion, therefore, as the constitution is weakened, the pulse is quickened. The constitution should not be debilitated on the one hand, nor stimulated on the other; for if you do it will be the surest way to accelerate the progress of the disease. In short, it has been uniformly agreed by some of the most distinguished of the faculty, whose lives, it may be said, have been devoted to the practice, study, and improvement of the profession, that, in every case of cancer, or malignant tumour, in proportion as the patient is kept low, her course to the grave is prematurely precipitated. Climate has been supposed to have an effect in preventing that heat of the constitution which favours the return of cancerous diseases; but we are told, and experience and observation bear out the assertion, that this agent has no such influence. A person, then, who has scirrhus tubercle, in England, could derive no advantage whatever by going to a warm climate, or by any change whatever.

OPERATION FOR SCIRRHOUS BREAST.

This operation, which is nothing more than a simple piece of dissection, consists in making a semicircular incision at the upper part of the breast, and over the tumours by which the vessels supplying the scirrhus are divided. When the mammary artery and

its branches have been cut through, an assistant is desired to compress the vessels by making pressure with his fingers just above the incision, while the surgeon continues excavating the parts and cellular tissue: the pectoral muscle is laid bare (and it is a good plan always to do this): lastly, the integuments should be divided below the tumour, lest, as is sometimes the case, a gland is enlarged in the axilla; then it will be best to remove it, as well as the intervening part between it and the breast; for if you cut out the gland only, the disease returns, and it is always attended with unfavourable results, the absorbent vessels being the means by which the disease is communicated to the other parts. If the glands in the axilla are enlarged, do not operate; for the disease will be sure to return. Neither ought the operation to be performed when dyspnœa is present; for it has been found, that those operated on for this disease, under this symptom, and who die three days after the operation, have had water in the chest and tubercles on the lungs. After the breast is removed, bring the edges together by suture, one or two, as may be required to keep the edges of the recent wound together. The glandular structure and the roots which extend to a considerable distance round the tumours, should all be removed, or there will be little advantage from the operation.—See FUNGUS HÆMATODES, &c.

BRONCHOCELE.

The disease thus named is characterized by a tumour on the fore part of the neck, and seated between the trachea and the skin, though supposed principally to occupy the thyroid gland. It is called by different names, *e. g.* Goitre, Hernia Bronchialis, Tracheocle, &c. It is a very common disease in Derbyshire, hence called Derbyshire neck; but its occurrence is by no means frequent in other parts of Great Britain and Ireland. Amongst the inhabitants of the Alps, and other mountainous countries bordering thereon, it is a disease very common, and is there known by the name of *Goitre*.

CAUSES.—The causes giving rise to Bronchocele are by no means certain; and the observations of different writers are of very little practical utility. The general idea of its being

duced by the use of snow-water, has been controverted by Dr. Anders; but from observations made during a residence of two years in the Alps, many of the English prisoners of war, in 1812 and 13, seemed greatly disposed to this affection, several considerable enlargements of the thyroid gland having appeared among them. The swelling, or enlargement, comes on without pain or violent fluctuation. When the disease is of long standing, and the swelling considerable, it is a very difficult matter to effect a cure by medicine; and it often acquires such a hideous magnitude, the tumour descending below the scrobiculus cordis, that every idea of treating it medicinally would be absurd; and it might be unsafe to remove it with a knife, on account of the enlarged state of its arteries, and its vicinity to the carotids: but in an early stage of the disease, a cure may be effected by the aid of medicine.

TREATMENT.—External applications, such as blisters, embrocations, saponaceous and mercurial plasters,—although they may afford some relief, and probably somewhat retard the growth of the tumour, seldom effect a complete cure without the internal use of medicines; and those which have proved the most efficacious, are burnt sponge and iodine. The form under which the burnt sponge is usually exhibited is that of a lozenge, formed of 3ss. of burnt sponge, made up into that form with gum Arabic. The virtues of the burnt sponge, in the cure of certain forms of Bronchocele, are now ascertained to be owing to the iodine which it contains.

When the tumour appears about the age of puberty, and before the structure has been too morbidly deranged, a pill, consisting of grain or two of calomel, is directed to be given for three successive nights, and on the fourth morning a saline purge. Every night afterwards, for three weeks, one of the troches of burnt sponge should, when the patient is in bed, be put under the tongue and suffered to dissolve gradually, and the solution swallowed. The disgust arising from this remedy soon wears off. The pills and the purge are to be repeated at the end of three weeks, and the troches had recourse to as before. This is the plan to be pursued until the tumour is dispersed. The burnt sponge has been recommended in larger doses.

Sulphuretted potass, dissolved in water, in the proportion of half a drachm to a quart of water daily, is a remedy which Richter, a German physician, has employed with success in some cases when calcined sponge had failed. The subcarbonate of soda, being the basis of the burnt sponge, is frequently employed instead of it, and is a more active medicine. Of late, however, iodine has superseded the use of these medicines both in Bronchocele and other tumours, particularly those of a scrofulous nature. One grain in the form of pill, or ten minims of the tincture, three times a-day, and the ointment of the hydriodate of potass rubbed on the swelling morning and evening, have proved of considerable efficacy. For preparations and doses of *Iodine*, see this word in *New London Med. Pharmaceut. and Posolog. Pocket Book*.

BRONCHOTOMY.

Bronchotomy; Laryngotomy; Tracheotomy. An operation in which an opening is made into the larynx, or trachea, either for the purpose of making a passage for the air into and out of the lungs, when any disease prevents the patient from breathing through the mouth and nostrils; or of extracting foreign bodies which have accidentally fallen into the windpipe; or, lastly, in order to be able to inflate the lungs in cases of sudden suffocation, drowning, &c. The practicability and little danger attending the operation are founded on the facility with which certain wounds of the windpipe, even of the most complicated kind, have been healed without leaving any bad consequences, and on the nature of the parts cut, which are not furnished with any vessel of consequence.

OPERATION.—The operation is performed in the following manner:—The patient is placed in an arm-chair, or, what is better, laid on a bed with his head hanging backward: an incision is to be made, commencing below the cricoid cartilage, and continued downward, about two inches, along the space between the sterno-thyroideal muscles. In making the incision, care should be had not to cut the lobes of the thyroid gland, lest a troublesome and dangerous bleeding be occasioned; and as the left subclavian vein lies a little below the upper part of the first bone of the

num, the incision should never extend so low as this point. The knife must not be carried either to the right or the left, in order to avoid all risk of injuring the large blood-vessels situated on the sides of the trachea.

When the incision in the integuments having been made, the sterno-hyoid muscles are to be pushed a little towards the sides of the neck, so as to bring the windpipe fairly into view. The point of the knife is then directed to be introduced between the third and fourth cartilage of the trachea, and the opening to be enlarged transversely; though it is safer and better, in every instance, to make the wound in the trachea in a perpendicular direction, since no advantage is gained in avoiding a wound of the cartilages of the windpipe,—the only reason assigned for cutting the membrane between them in a transverse direction; while a sufficiently large opening cannot thus be safely obtained in cases where it is deemed expedient to introduce the nozzle of a pair of bellows, when the object is to inflate the lungs. The preferable plan, in cutting into the trachea, is to cut the rings from below, upwards, avoiding every part of the thyroid gland.—*See Burns on the Surgical Anatomy of the Head and Neck, pp. 393, 394.*

The following cautions are also laid down by Mr. Burns:—The arteria innominata is in risk in some subjects. I have seen it mounting so high as to reach the lower border of the thyroid gland: even the right carotid artery is not always safe. Where the carotid arteries originate from the arteria innominata, there is considerable danger in performing the operation of tracheotomy; for in such cases the left carotid crosses the trachea pretty high in the neck.”—*See “Med. Chirurg. Trans.” vol. vi. p. 248.*

BUBO.

DEFIN.—A swelling of the lymphatic glands; particularly those in the groin and axilla.

CAUSES.—Bubo, or swelling of a lymphatic gland, may arise from mere irritation, the consequence of a local disorder; absorption of putrid matter, *e. g.* venereal poison; or from constitutional causes. The first kind of bubo, or that arising from mere irritation, is called a *sympathetic* bubo; and that which is the consequence

of absorption of a poisonous virus, of which the venereal bubo is a remarkable specimen.

The glands of the groin are often affected with simple phlegmonous inflammation, the consequence of irritation in parts from which the absorbent vessels, passing to such glands, proceed. Some discrimination is necessary here, in order to distinguish these swellings from those which arise from the absorption of venereal matter. The former are only simple cases of inflammation, and merely require the application of leeches, the cold saturnine lotion, and the administration of a few saline purges, though the latter render the exhibition of mercury necessary. "The symptomatic bubo is mostly occasioned by the irritation of a virulent gonorrhœa."—See GONORRHŒA, and SYPHILIS; also inflammation of the absorbents, under the head BLEEDING.

OBS.—The pestilential bubo is a symptom of the plague; and scrofulous swellings of the inguinal and auxiliary glands may be considered as examples of buboes from constitutional causes.

BUBONOCÉLE.

DEFIN.—That species of hernia, where the bowels protrude through the abdominal ring, is called by this name, as well as inguinal hernia, in consequence of the tumour taking place in the groin. See HERNIA.

BURNS AND SCALDS.

Burns and scalds produce three different effects, namely,—vesication, desquamation, and gangrene.

1. When vesication only is produced,—although the vesicles may be numerous and extensive, there is comparatively little danger. The object is to preserve them entire; they are, therefore, not to be opened on any account, but the serum is allowed to accumulate in them until new cuticle be produced. The opening of the vesicles is attended with constitutional effort, followed by considerable inflammation, and sometimes by suppuration, and the sufferings of the patient are very great.

TREATMENT OF THE VESICATIONS.—Apply evaporatory lotions, as the camphorette spirits of wine, or spirits of wine and the white

1, to prevent the disposition there is in the cuticle to break. A little opium should also be given to allay irritability.

Desquamation.—When desquamation of the cuticle is produced, the most violent symptoms arise: as when a person falls into boiling water or wort. The exposure of so large a quantity of surface produces great constitutional irritation in the re-action which takes place; but sometimes a person dies from the shock on the nervous system, without any re-action having taken place at all.

Treatment.—Spirits of turpentine is the best application in this form of burn, as the object is to excite speedy re-action; if evaporating lotions be applied, re-action can never take place.

Lime-water and linseed oil, and lime-water and milk, have been commonly used; but the spirits of turpentine is the best application. Where the constitution is irritable, and the turpentine gives violent pain, it may be diluted with oil, or with sweetened lime-water. It should be applied by means of linen.

During the chilly state, give opium and wine; but as soon as it begins to diffuse, and the pulse is recovered, do not continue it any longer, but employ other means to reduce the inflammation.

3.—Turpentine does not succeed, where the scald is produced by hydrogen gas, so well in London as the country.

Gangrene.—In this state of a burn, where the life of the parts is destroyed to a great extent, there is no immediate danger; for the constitution does not suffer in the first instance: the danger is to be apprehended, when the sphacelated parts begin to separate, the absorbents act briskly, and a great discharge follows the separation of the injured places.

Treatment.—Fomentations and poultices are most useful in these cases, as the turpentine cannot act on dead surfaces. Wine and opium are necessary, as in the former case, during the chilly state. The treatment, in fact, is just the same, as in a case of burn on gangrene: and, toward the end, when the process of suppuration is commencing, you may give wine and opium, or bark and ammonia, to support the constitution.

4.—Many of these cases produce the most remarkable deforma-

mities, which very frequently do not come within the sphere of the surgeon's treatment, as they occur principally after the cicatrization has taken place, and are owing to the natural tendency there is in the cicatrix to contract. The wounds often heal smoothly, but afterwards become puckered. These contractions are most apt to take place in the neck, by which the chin is united to the chest; and if the arm be the burnt part, the fore-arm becomes united to the upper arm. The fingers also become united to each other; and the thumb is sometimes bent very much backwards. This contraction may be prevented in the arm by passing a splint behind it, and keeping it extended. The same means should be adopted if there be any danger of the thigh uniting to the abdomen. A splint should be passed behind it, and the thigh kept extended. By this means the contraction may be prevented. But as regards the neck, all that can be done by binding the head before or to either side, will not prevent the contraction from taking place. When the cuticle is removed, and the cutis is in a granulating state, cuticle may be produced over it very quickly by using the acetate of zinc lotion, made by adding two grains of sulphate of zinc to one ounce of the *liquor subacetatis dilutus*. This object is sometimes well accomplished by sprinkling the granulations with the oxide of zinc; though the lotion appears best for this purpose. Some lint should be dipped in the lotion and laid on the wound; over the lint some folded linen, and over the whole a piece of oiled silk to prevent evaporation.

VARIOUS MODES OF TREATMENT.—Mr. Cleghorn, who was a brewer at Edinburgh, and paid great attention to the effects of various methods of treating burns, on account of the frequency of these accidents occurring among his own workmen, preferred the immediate application of vinegar until the pain abated; diluted sulphuric acid was found to answer the same purpose; if the accident had been so severe as to have produced a destruction of parts, these, as soon as pain had ceased, he covered with an emollient poultice, and left it on for six or eight hours; when it was removed, the parts were entirely covered with finely powdered chalk, so as to take away every appearance of moisture on the surface of the sore; and as soon as this was done, a poultice

was laid over the whole. In this manner he continued to dress the parts morning and evening until the cure was complete. When the poultices relaxed the ulcers too much, a plaster or ointment containing the acetate of lead was substituted; but the chalk was continued as before.

Sir James Earle was an advocate for the application of cold water, into which the burnt member was plunged as soon as possible after the accident; or covered with linen dipped in the same, and renewed as often as it altered its temperature, and continued till the pain abated. This practice, however, requires some caution where the scald or burn is very large, or situated upon the back of the body, since the patient is liable to be seized with cold shivering, which may be greatly aggravated by being exposed to, as well as by the application of cold.

Baron Larrey's plan recommends dressing all deep burns with cold linen, spread with saffron ointment, which has the property, he says, of diminishing the pain, and preventing irritation, and guarding the nervous papillæ from coming in contact with the air, or being pressed by the linen and clothes. This ointment is applied until suppuration ensues, after which the baron employs styrax ointment, to promote the detachment of the cutis, and to check the extension of the sloughing. When the dead parts have separated, he has recourse to the saffron ointment, for which he gradually substitutes dry lint, with strips of linen covered with cerate, &c. Baron Larrey declares that he has long been struck with the pernicious effects of expellents, such, for instance, as fresh water with the muriate of ammonia, oxycerate, preparations of lead, and the solution of opium in ice-water.

Dr. Kentish advocates holding the burnt part to the fire; the application of the strongest rectified spirits, increased in strength by the addition of essential oils, and which may be also heated so much as the sound parts can bear. These, and many applications of the same class, Dr. Kentish says, will give the most speedy relief.

Although the external treatment of these injuries has varied, the internal treatment has been always of one kind, and the ancients and moderns again in advising blood-letting,

cooling purgatives, and, in fine the whole of the antiphlogistic plan. And, with the exception of Mr. Cleghorn, who condemns purges, and allowed stimulants internally, Dr. Kentish has been the sole advocate for the latter means.

Raw cotton has been applied in America, thinly drawn or carded, to superficial burns with much success.—See *Dalla Med. Lyceum*, p. 22; *Dickenson on Scalds and Burns*; *Lecture on Inflammation*, by J. Thompson, &c.

BURSÆ MUCOSÆ.

These bursæ, or bags, are small membranous sacs, placed in the vicinity of joints, particularly the large ones of the upper and lower extremities, lying for the most part under the tendons. Under this denomination, Mr. Brodie includes the membranes forming the sheaths of tendons, as they have the same structure and perform the same functions. They naturally contain an oil kind of fluid, to lubricate the surfaces upon which the tendons play in their action over the joints. The same authority remarks that in the greater number of instances, inflammation of the bursæ mucosæ occasions an increased secretion of synovia; while, in others, they are distended with a somewhat turgid serum, containing floating portions of coagulable lymph. This inflammation leads occasionally to a thickening of these sores, which become converted into a gristly substance, which Mr. Brodie has witnessed of at least half an inch in thickness, with a small cellular cavity in the middle, containing the synovial fluid. In other instances, though the inflammation has lasted a considerable time, the membrane of the bursæ retains its original structure.

CAUSES.—The causes of diseased bursæ mucosæ may arise from pressure, or other local injury; the abuse of mercury in rheumatism, or some other constitutional affection. In such cases the disease is usually combined with inflammation of the synovial membrane of the joints. Sometimes it takes on the form of an acute, but more generally, that of a chronic inflammatory affection.—See JOINTS, INJURIES OF.

TREATMENT.—If the swellings be not very painful, an attempt may be made to disperse them; and for this purpose, warm appo-

ions, friction, particularly with camphorated and mercurial ointments, or blisters kept open with the ung. sabinæ, are the most effectual. But should they become painful, and not yield to these methods, Dr. Monro recommends opening them; and in this operation, he directs the opening in the bursæ not to correspond with the incision made in the skin. At the commencement, Mr. Brodie recommends leeching and cold lotions; afterwards blisters, or stimulating liniments; and, in particular cases, to combine these means with constitutional treatment, as circumstances may suggest. And should the preternatural secretion of fluid continue after the inflammation has abated, and blisters fail in procuring its absorption, he advises the fluid to be discharged by puncture. The presence of those substances in the bursæ, Mr. Brodie thinks, may of themselves keep up a collection of fluid. Also that when the coats of bursæ mucosæ are much thickened, they cannot be restored to their natural condition; and that, if these bursæ be superficially situated, they may be removed with as much facility as an encysted tumour.

CÆSAREAN OPERATION.

By this operation is commonly understood that in which the foetus is removed from the womb, by an incision made through the parietes of the abdomen and uterus, though the term admits, in its most comprehensive meaning, of being applied to three different proceedings. First, to denote the incision occasionally employed in the cervix uteri, with a view to facilitate delivery, called the vaginal cæsarean operation, in order to distinguish it from the second, or abdominal cæsarean operation; and thirdly, an incision made in the parietes of the abdomen for the extraction of the foetus, when, instead of being found in the womb, it lies in the cavity of the peritoneum, in consequence of the rupture of the womb, or on the ovary, in consequence of an extra-uterine conception.

CAUSES WHICH RENDER THE VAGINAL OPERATION NECESSARY.—The vaginal operation may be rendered indispensable in disease, malformation, preternatural position of the cervix uteri, though a scirrhus hardness of the neck of the womb is the most frequent cause. When the indication has proceeded to the

extent that the cervix cannot be dilated, and the patient is exhausting herself with unavailing efforts, the parts should be divided in several directions. This has been successfully performed under various circumstances. Strong convulsions at the moment of parturition, a considerable obliquity of the neck of the womb, combined with a pelvis of small dimensions, may all be reasons for the performance of this operation.

OPERATION.—When the obliquity of the womb is such that the os tincae cannot be detected, and the mother and fœtus are both in danger of perishing, the portion of the womb that projects towards the valve is to be opened. When the case is a scirrhus or inclination of the neck of the womb, or a laceration of the parietes of this viscus, at the place where it projects into the vagina, the vaginal operation is attended with no difficulty. It is performed with a blunt pointed bistoury, the blade of which is well shielded with lint to within an inch of the point. The instrument is then introduced, under the direction of the index finger, into the opening presented by the womb, and the aperture is to be properly enlarged, from within outwards in various directions. But when the scirrhus hardness of the neck of the womb presents no opening at all, or when the presenting part of the uterus in the vagina is entire, the incision should be made from without inwards, with the same description of instrument. The greatest caution is necessary in introducing the knife. And if it be found necessary to extend or multiply the incision, the cutting instrument should be regulated in a similar manner with the same finger.

The neck of the womb once divided, the expulsion of the child is either to be left to nature, or to be promoted by the ordinary means. This operation requires no dressings; but if the hæmorrhage should become troublesome, a dossil of lint wetted with vinegar, or with spirit of wine, is directed to be applied to the incision. The principal object here is to prevent adhesion between the cervix of the uterus and the superior part of the vagina.—See *Sabatier Médecine Opératoire, Tom. I.*; also *Dictionnaire des Sciences Médicales, Tom. XXIII. p. 298, et seq.*

CAUSES WHICH REQUIRE THE ABDOMINAL INCISION.—The

Abdominal cæsarean operation is by far the most serious, and is that to which the cæsarean operation is more particularly applied ; and there are three cases laid down in which it is deemed necessary.

1. When the fœtus is alive, and the mother dead, either in labour or the last two months of pregnancy.

2. When the fœtus is dead, but cannot be delivered in the natural way on account of the deformity of the mother, or the unproportionate size of the child.

3. When both the mother and child are living, but delivery cannot take place from the same causes, as in the second example.

OPERATION FOR THE ABDOMINAL INCISION.—When, by reason of the insurmountable impediments above detailed, the fœtus cannot be expelled from the womb, the cæsarean operation should be performed before the mother and child both perish from the violence of the pains, hemorrhage, convulsions, &c., it then becomes necessary to make an extensive incision in the integuments of the abdomen and in the uterus. As regards the time of operation, practitioners are at variance ; some advising the operation to be performed before the membranes have burst, and the water discharged ; others not till afterwards. The propriety of previously emptying the bladder and rectum is self-evident. The instruments and dressings necessary are two bistouries, one with a convex edge, the other with a probe point. Sponges, basins of cold water, acidulated with a little vinegar, long strips of adhesive plaister, needles, and ligatures, lint, long and square compresses, a bandage to be applied round the body, with a scapular, &c.

POSITION OF THE PATIENT DURING THE OPERATION.—In order to undergo the operation in question, the patient is laid on the edge of the bed, well supported ; her head and chest moderately raised, the knees somewhat bent, and held by assistants ; one of whom is expressly appointed to fix the uterus by steady lateral pressure, and from above downwards, so as in some degree to circumscribe the swelling of the womb, and prevent the protrusion of the bowels. These preliminaries having been attended, the integuments are to be divided with the convex-edged

bistoury to the extent of at least six inches. The place and direction of this incision vary with different operators, but the linea alba has been frequently considered as the most eligible place for making the incision. This method, according to Sabatier, was the one adopted by Soleyres and Deleurye; and it is supported by the recommendation of Baudeloque, on the consideration that there are fewer parts to be cut; and when the uterus is exposed, an incision parallel to its principal fibres may be made in its middle part.

EXTRA-UTERINE OPERATION.—GASTROTOMY.—A woman cannot possibly be delivered in the ordinary way when the child is situated in the ovaries, the Fallopian tube, or in the cavity of the peritoneum. There are, however, many cases on record of ventral pregnancies which the mother has got over, the dead putrefied foetus having come away, either through an abscess or *pilon rectum*. The practitioner is not unfrequently called upon to perform an operation very similar to the preceding, when the foetus has escaped into the cavity of the peritoneum, in consequence of the bursting of the womb. These accidents are by no means uncommon, and although the cause may not be sufficiently obvious, it is certain that the foetus itself is entirely passive, and has no share in producing the occurrence.

SYMPTOMS.—The symptoms by which the foetus has escaped from the uterus are not always easily understood. The least equivocal are, the violence of the pains, after having been excessively severe, are followed by a kind of calm, when the countenance loses its colour, the pulse grows weak, and the extremities become cold and covered with a cold sweat; when the abdomen is generally flat and only partially swollen, occasioned by the foetus continuing to move, or from its being dead and motionless; when the patient complains of a moderate degree of heat about the abdomen; and, lastly, when the child shrinks from the touch of the accoucheur—it is manifest then that the uterus is torn. If the foetus has passed completely into the abdomen, gastrotomy is the only alternative. The same operation has also been advised in cases where the foetus has grown in the Fallopian tube, ovaries, and cavity of the abdomen. Extra-uterine conceptions seldom

live at maturity. The pouch in which the fœtus is contained most frequently bursts about the middle of the ordinary term of gestation, and the child passes into the cavity of the peritoneum. At the same moment, the blood vessels ramifying on the parietes of the containing parts, usually pour forth into the abdomen so much blood that the patients generally die in the course of a few hours.*

After the cæsarean operation or gastrotomy has been performed, the attention of the practitioner is not to be directed solely to the prevention of inflammation, healing the wound, and trying any untoward symptoms that may arise, the mother should be prevailed upon to suckle the child, in order to restrain the lochia within bounds; and after the wound has healed, to advise her to wear a bandage for the purpose of guarding against the formation of ventral hernia, of which there appears to be considerable risk.

CALCULI, URINARY.

Urinary concretions are formed in different parts of the urinary apparatus; that is, in the pelvis of the kidney, in the ureters, in the bladder, and in the urethra. In technical language, the term calculus is generally used as equivalent to the term stone; calculous disorders, being the ordinary expressions, which include gravel or renal, vesical, and urethral calculi. Those who may wish to consult more minute information on these subjects, may refer to Dr. Marcet's essay on the chemical history and medical treatment of calculous disorders; and Dr. Prout's inquiry into the nature and treatment of gravel, calculus, and other diseases connected with deranged operation of the urinary organs, &c. &c.

FORMS OF URINARY CONCRETIONS.—Urinary concretions take place in three forms. 1. A powdery sediment taking place in the urine after it is evacuated. There is a pinkish or pinkish white sediment very frequently observed in the case of febrile disorders,

For cases of this kind consult Dr. Clark in *Trans. of Med. Society*, &c. Mr. C. Bell, in *Med. Chirurg. Trans.*, Vol. IV. p. 340; Sabatier's *Médecine Opératoire*; and I. H. Green, *idem*. Vol. XII. p. 46, &c. &c.

or persons labouring under indigestion; it consists very generally of the lithate of ammonia, of soda, or of lime. There is a sediment occurring under other circumstances, called white sand, consisting of the phosphate of lime and magnesia. 2. These substances are again observed in the form of crystallized minute particles; in which case they are technically as well as commonly called gravel. These consist of particles, varying in size, sometimes very small, sometimes larger, and generally, when accurately examined, have a crystalline figure. Then there is what is called red gravel, or the lateritious or brick-dust-like sediment; in which case some of those substances may be voided from the bladder in their concrete state, though it will often be found that the patient voids his water in a clear and transparent state, and that the particles crystallize in the vessel in proportion as the urine cools. The most familiar example of this kind of substance is that just mentioned; it bears a pretty close analogy to some forms of red gravel, and consists of the lithic uric acid. 3. The third form in which urinary concretions are observed, is that of calculi or stones; and these are very various in their compositions. The most common of these substances is that of *lithic acid*, or *uric acid*, in a concrete state; and the mulberry calculi.—See LITHOTOMY; also MED. POCKET BOOK, AND LITHONTRIPTICS, &c.

CALLUS.

A concrete juice, secreted and deposited by the arteries of a fractured bone, and which serves to unite the broken ends, as well as to supply the loss of parts: new bone, furnished with arteries, veins, and absorbents. The process which nature sets up in this instance is as follows:—A bone being a well organized substance of the living body, the matter which keeps its earthy parts together is of a gelatinous nature. The phosphate of lime, to which bones owe their firmness, is deposited in the interstices of the gluten, where it undergoes a continual change and renovation. It is incessantly taken up by the absorbents, and secreted again by the arteries. It is this continual absorption and deposition of earthy matter which forms the bone.

first, and enables it to grow with the growth of the body; and this unceasing activity of the vessels of a bone which enables it to renew itself when it is broken and diseased. In fine, it is by various forms of one secreting process that bone is formed at all, is supported during health, and is renewed on necessary occasions. Bone is a secretion, originally deposited by the arteries of the bone; these arteries are continually occupied in its renewal.

When callus forms, the perfect constitution of the bone is restored; and is found to be more vascular than old bone. Incidentally callus is soft, fleshy, and yielding; it is ligamentous in its existence, so that it is not very easily injured; and in its organization it is so perfect, that when it is hurt, or the bony secretion interrupted, the breach soon heals, just as soft parts adhere; and thus the callus becomes again entire, and the process is immediately renewed. In consequence of these circumstances, if a bone be broken a second time, when the first fracture is nearly healed, the bone unites more easily than after the first accident; and Mr. John Bell even asserts, that when it is broken a third or a fourth time, the union is still quicker.

According to Mr. Wilson, when bones granulate, the granulations first appear exactly similar to those of the soft parts, and, as in soft parts, take place to restore any loss which the bones may have suffered. This process is very similar to that of the first formation of bone. In the skull membrane was first formed; and here also, in the process of restoration, the granulations pass into membrane, and then into bone. In cylindrical bones the granulations first produce a species of cartilage, and this afterwards converted into bone. Thus, in the restoration of bone, nature is guided by the same laws which prevail in its first formation!—See *Lectures on the Structure, Physiology, and Diseases of the Bones, &c.* p. 196, and 208. 8vo. Lond. 1820.

CANCER.

There are two principal forms of this disease, namely, *scirrhus*, or *solid cancer*; *ulcerated*, or *open cancer*.—See SCIRRHUS.

The skin being subject to cancer, the affection is arranged under the order *tubercula* of cutaneous nosologists; because cancerous diseases of the skin commence with a small inclined tubercle. It goes through two successive changes; in the first place, induration and enlargement, the scirrhus condition; and subsequently, the ulcerated state. All parts of the skin are not equally liable to cancer; the integuments of the face, and perhaps those of the eye-balls, are most so. It is occasionally seen on the organs of generation in both sexes, and sometimes on the hand. The female breast and uterus are particularly subject to this disease. The breasts of men are but rarely affected with it. The scrotum is liable to a peculiar kind of this disorder, from certain local causes.—See CANCER OF THE SCROTUM.

SYMPTOMS.—When cancer attacks the integuments of the face, it begins with a small induration and enlargement of a certain spot, which may be called a *tubercle*, and which the patient supposes to be a wart. It is uninflamed, possesses the colour of the natural skin, and is not particularly sensitive. In this state the affection remains for a very considerable length of time; however, it sooner or later ulcerates, and the ulceration formed on this tubercular enlargement of the skin does not penetrate very deeply, nor assume any unfavourable appearance. It secretes a matter which forms a thin brownish incrustation over the part; on being exposed to the air, a thin crust or scab forms over it, and in this state the thing goes on for a considerable time, without much attracting the attention of the patient. The disease, however, gradually advances, and the ulceration ultimately attains a considerable magnitude. The edge of the sore is elevated and ragged, but still presenting more or less of the character of sound integument. There is no great excavation. The secretion does not seem to possess any very acrid or offensive quality; and the disease, in fact, will go on in this form, without any very rapid increase, and without any very serious alteration, for a great many years. Slowness is its peculiar characteristic; and in the majority of instances, it does not affect the absorbent glands in the way cancer does, when it takes place in the female breast, for

nance. This affection is seen more frequently, perhaps, in the hands than in the other parts of the face.

The practitioner sometimes meets with ulcerations of a cancerous nature affecting the *external organs of generation in the female*; affecting either a portion of the integument, or a portion of the covering which lines the external opening, and sometimes of both. It is here important to be correct in distinguishing the affection, for such ulcerations are liable to be mistaken for venereal complaints, and treated by means which are incapable of rendering any service in cancer. The ulcer (and I have never seen it in its tubercular state) is generally deep; there is a considerable excavation; it has a red appearance, like raw flesh, the margin of the sore presenting a kind of sharp cut edge. The secretion is of a thin ichor; and very great pain is experienced in the part. I have generally observed in those cases, that the glands in the groin are affected. The disease is slower in its progress than the venereal ulceration; at the same time it proceeds more rapidly than cancerous ulceration seated on the face.—See *Lancet's Lect. Lancet, Vol. II. p. 99, 1830.*

An affection is sometimes met with which commences on the hands of the *hands*, probably deriving its origin from the local irritations to which the hands are liable, proceeding to an indurated enlargement and warty condition of the skin, and going into a stage of disease which does not admit of being described by any other name than that of cancer, an affection having the same inevitable tendency.

The great advantage often derived from *arsenical* preparations in those ulcerations of the face known under the name of *lupus*, (or *LUPUS*), has led to the application of some of the same kind in cancerous affections of the face; but they are not here of equal efficacy, nor is their application equally safe; for by applying them, a degree of stimulus is sometimes produced, which increases the mischief, and causes the affection to spread more rapidly. For this reason it is necessary to distinguish carefully between ulcerations of the face of a cancerous nature, and those which come under the head *lupus*.

DIAG.—The tubercle which is considered cancerous, is hard

at its commencement, and uninflamed; that is, it has the same colour as the natural integuments; the tubercle of lupus is softer, and of a bright red colour. The cancerous tubercle is single, that is, the affection is confined to some one spot; but in lupus there are generally two or more spots of the skin affected. The margin of the ulceration in cancer retains the same colour as that of the surrounding integuments, and the ulceration generally presents a smooth round surface, and is particularly characterised by its slow progress; it does not eat deeply, nor destroy the part rapidly. In lupus, the margin of the skin surrounding the ulceration is of a bright red; the ulcerated surface itself is generally yellow, something like that of a phagedenic sore*, and the destruction extends rapidly, so that it will destroy an alæ of the nose, or any other part, within a short period of time.

TREATMENT.—The palliative and soothing treatment has been found the most advantageous; soft poultices applied to the part, lotions of opium and water, or Barclay's liquor opii sedativus, and the administration of opium internally, to quiet the pain, &c.

CANCER OF THE FEMALE BREAST.—The disease at the onset of the attack on the female breast, by no means presents that formidable character which it shows in its progress and termination. Indeed for a certain time it exists merely as an indolent swelling in the breast, which is hardly noticed by the individual in whom it takes place. It very often happens that the female discovers it by accident the existence of a scirrhus lump in the breast; but when she does discover it, it has already attained a considerable size. In this indolent state a scirrhus lump will remain for many months, or for some years, neither enlarging nor producing pain. After some time, however, the disease loses this indolent character, and assumes a much more active progress, with symptoms which obtrude themselves on the notice of the patient, &c.

CAUSES.—Cancerous diseases in general, frequently arise from external or accidental causes, such as a blow; but more commonly they appear to arise spontaneously, that is, from internal

* An ulcer which spreads, and, as it were, eats away the flesh. Hence the term *phagedenic*, so common with surgeons.

causes, the nature and origin of which cannot be exactly traced.

It has been made a question whether cancer is a local or constitutional disease. This is a point of much practical importance; if cancers be originally only local affections, no objection can be made against extirpating them; but those who think otherwise, of course, have much less confidence in the operation which may even regard as useless, perhaps injurious: inasmuch as it may convert a scirrhus into an open cancer, or induce the affection in some other part. Some practitioners, however, reject the doctrine of cancer being dependent on constitutional causes; and J. E. Home's sentiments, in opposition to the opinion, may be consulted.

SYMPTOMS.—When the disease assumes a more active character, there is pain in the tumour, increase of size, with some degree of heat, with sometimes redness, and swelling of the breast generally. On examination of the swelling, it is characterized by peculiar incompressible inelastic hardness: it cannot be compressed: it has almost the hardness of a stone, or some other solid substance. The surface of the tumour is generally uneven, more or less knotty, or tuberculated: it is loose, and admits of being easily moved about: it does not adhere to the pectoral muscle, or integument. On examining the breast carefully, the superficial veins may usually be observed to be larger on that side than on the other; sometimes almost assuming a varicose kind of enlargement. The pain in the tumour is not in general constant; it comes at particular periods, and then ceases for a while; it is of a stinging, shooting character, technically called a carcinating pain. It is now usually found, that the glands of the axilla become enlarged,—one or more of them; and sometimes the same kind of pain is experienced in the glands as is felt in the tumour. In the progress of the disease, the affection begins to extend from the circumscribed tumour, of which it first consisted, to the surrounding parts. First, the skin becomes adherent to the swelling on its most prominent point; and frequently, in consequence of which, the skin appears to be drawn in, or tucked in under the swelling; at the same time, it is not uncommon to observe a retraction of

the nipple, which is now considerably less elevated than that of the healthy breast. Sometimes, in fact, the nipple is completely drawn in, so that, instead of being seated on a prominence, the nipple is found at the bottom of a depression, the retraction is considerable. It afterwards becomes attached to the pectoral muscle, and the cellular substance between them becomes consolidated; so that the tumour can no longer be moved laterally; and with the mammary gland forms one dense mass, clearly connected to the surface of the chest, and does not admit of being moved at all on the surface of the chest. The numerous glands in the axilla enlarge, the disease occupies the whole mass of them, and a firm solid tumour is formed, which becomes fixed in the axilla in the same way that the breast itself is fixed to the chest. The lymphatic glands, too, above the clavicle, at the root of the neck, probably become enlarged; and the progress of the changes here described, is attended with considerable increase of suffering to the patient. The pain which was only felt at times, now becomes constant and severe; and the health of the patient begins to be affected. As soon as the glands are enlarged above the clavicle, œdematous tumefaction of the upper extremity takes place. Sometimes, however, before the disease has gone to the extent here mentioned, ulceration commences in the original tumour. This ulceration takes place in two ways: sometimes it is superficial, and produces but little discharge; while that discharge encrusts, and forms a kind of dry scab upon the surface of the part, particularly where the integument is drawn in, forms the deep fold already mentioned, over the tumour. The ulceration will take place in the form of a crack, at the bottom of this fold; the discharge which takes place from it, encrusts over it; and the patient is hardly aware that ulceration has commenced. But more commonly, a nipple-like prominence,—one or more, arises on the surface of the tumour: this becomes red: the tumour, which before had been incompressibly hard, now begins to be soft in the situation of these projections: the surface becomes thinner and thinner, assuming a dark red colour, and finally gives way; and a discharge of ichorous matter, generally of a fœtid odour, escapes. This is the more common form of the carcinomatous ulceration.

When the skin has once given way, there is soon formed an extensive ulcerated excavation, taking place in the substance of the pector. A deep and irregular cavity is formed, and the parts are removed very readily by ulceration and absorption: frequently there is a process going on similar to that of sloughing, by which the ulcerated cavity is increased;—that is, a part of the surface of the sore assumes an ash-coloured appearance, seems to lose its vitality, and separates like a slough. The discharge which takes place from the ulcer, whether it be of the one or the other kind, is never at all like pus; it is always a thin ichor, and is generally fetid. When the ulcer becomes of a considerable size, its margin is usually found elevated, and probably everted. There is a rising margin, and considerable excavation in the centre; the bottom is very irregular, sometimes presenting a bright red appearance, something like granulations; and sometimes exhibiting the ash-coloured sloughs already mentioned. In the situation of the axilla, it not unfrequently happens that considerable bleeding occurs. This process of ulceration is attended with constant burning pain.

Sometimes the cancerous structure appears as a distinct and circumscribed tumour, the limits of which are well defined; but in other instances, portions of this cancerous structure extend from the original seat of the disease into the neighbouring parts, forming a striking contrast in their appearance to that of the adipose substance which separates them from each other. The absorbent glands of the axilla assume a nearly similar appearance; they seem to be converted into a texture very much like that of the mammary tumour.

TREATMENT.—A very general opinion prevails, that true carcinoma, such as here described, does not, under any circumstances, admit of being cured. Of the general remedies, narcotics, as opium, conium, belladonna, &c. have been employed with most success. All these have been tried without any decided success. Scammony and digitalis have also been given; the hydro-sulphuret of ammonia, the laurus cerasus, arsenic, mercury, sulphate of iron, preparations of iron locally and internally, tar-ointment, lemon juice, absorbent powder, &c. without, however, producing

any specific effect over the malignity of the disease. Many remedies, in fine, have acquired a sort of mongrel celebrity in cases of cancer; merely because very bad and malignant diseases, or supposed to be cancers, have got well under their use.

The only mode of treatment Mr. Pearson has ever seen do any good to cancer, is that of keeping the patient on a diet barely sufficient for the support of life; such as barley-water alone, tea, and the like. A milk diet has also been recommended. Sir Astley Cooper protests strongly against such a plan: "If," says he, "the patient be already weak, you will thus render her still weaker, and soon bring her to the grave: in proportion as the strength declines, the pulse is quickened. Sir Astley moreover declares that we are in possession of no specific power over the disease, though the state of the constitution may sometimes be improved by Plummer's pills, given at bed-time, and the draught recommended at page 101.

Sir Astley also regards climate as having no controul over this insidious and malignant disorder. And as mental commotion is frequently concerned in bringing on the complaint, he enjoys taking every possible means of quieting the patient's mind, and lessening her anxiety.—*MS. Lect.*

Sir Astley Cooper has no confidence in the utility of evaporating lotions. Warm applications are also, by him, represented as improper. The dressing he mostly gives a preference to, is a plaster, made by blending 3j. of the extract of belladonna with an ounce of soap cerate. When inflammation is present, he does not object to the use of leeches. All local applications, as well as internal medicines, he considers as merely palliatives, unpossessed of any power of curing really scirrhus diseases.—*See p. 100.*

Since, then, we neither possess any means of essentially controlling the progress of cancer, occult or open; and since we are unacquainted with any mode of treatment that we can suppose to possess specific powers over this peculiar form of disease, it becomes a question how far it may be advisable to have recourse to an operation, as the only rational means of getting rid of it. Then comes the question, at what time ought the operation to be performed? "I think," says Mr. Lawrence, "we may venture

te, that excision is a safe and effective mode of proceeding in the indolent stage of the scirrhus tumour; that is, while the tumour is loose and moveable,—before the skin has become adherent to it,—before the tumour has become fixed to the pectoral muscle,—before the tumour has become the seat of any considerable pain,—before the vessels have become enlarged, or assumed anything of the varicose appearance; and particularly before the absorbent glands of the axilla have taken on the disease. At all times, if the operation be not effectual then,—if it cannot be recommended in that condition of the disease, still less can we venture to propose it when the absorbent glands have become affected, or when the local disease has passed into the ulcerated state. In operating in the early period of the disease, we have the power of effectually removing the whole of the disease, and of saving it away, with a considerable portion of the surrounding healthy substance, of which the operator ought to be by no means economical.”—*See Lawrence's Lect.—Lancet, Vol. II. p. 825.*

Q. Is it advisable to operate, when the lymphatic glands in the axilla have become affected, or when the tumour has become ulcerated?

A. The general result of experience is, that the disease returns under such circumstances. The operation may be performed, the parts will unite, the wound will heal, and the part will appear to be well; but within a longer or shorter time the disease will return, either in the same part, or some internal organ or organs will become diseased; and thus the patient will perish in this manner.

REMARKS.—It would appear, that the opinions of those who have had the greatest experience in the treatment of this complaint, are generally unfavourable to the operation, even in the early stage. Without quoting Hippocrates or Celsus, both of whom are very favourable to the operation, Baron Boyce may be mentioned, who has had great experience in diseases of this nature, and speaks of the numerous relapses which occur, even when scirrhus tumours have been removed under the most favourable circumstances; and he adds his opinion, that the disease proceeds most

rapidly, and the patient dies sooner, than if no operation had been performed. Dr. Monro (*see* "Edinb. Med. Essays," vol. v.) likewise remarks, that in those in whom he saw the disease relapse, was also more violent, and made a quicker progress, than it commonly did in others on whom no operation had been performed and he concludes against the extirpation of cancerous tumour except such as are of the occult kind in young healthy people and have been occasioned by bruises or other external cause. Sir Astley Cooper admits that the operation is followed by return of the disease in many cases. Sir Astley Cooper is also very properly adverse to the performance of the operation when dyspnœa is present; for he has known patients die in two or three days, who had been operated upon while labouring under the symptom. On examination after death, water was found in the chests, and tubercles in the pleura. The same experienced authority gives it as his opinion, that a breast should never be removed unless the patient has undergone a course of alterative medicines as Plummer's pills, and the compound decoction of sarsaparilla or, what he prefers, the infusion of gentian with soda and rhubarb. Thus the constitution may be improved, and the danger of relapse diminished. Indeed, it is a waste of time to allow the disorder to increase, merely for the sake of trying a catalogue of unpromising medicines. Perhaps, in recent cases, it may be proper to give arsenic, conium, preparations of conium, a trial and, in particular, iodine, in the form of ointment, (*ung. hydriodat. potass.*) which Dr. Wagner found capable of dispersing one swelling reputed to be cancerous.—*See Revue Medicale, Juin, 1823.*

In France, the *ung. hydriodat. potassæ* is applied to various tumours. That composed by Dr. Wagner contained eighteen grains of the hydriodate of potass to six drachms of lard; but in France the proportions are as much as two drachms of the first article to an ounce of the second.

The cancerous tumour should always be removed with the scalpel, never by means of caustic or corroding applications the use of which, though they may occasionally succeed, by producing a complete destruction of the diseased parts, cause severe pain, and not unfrequently, without having acted sufficiently on

the diseased part, kills the patient. The operation with the scalpel is what ought to be generally adopted; and it is always admissible, when every particle of the disease can be removed by it.—*See* SEAST, &c. *p.* 96.

CANCER SCROTI. In the scrotum there is a peculiar cancerous disease occurring in certain individuals, called the chimney-sweeper's cancer, from this class of people being most subject to it. It does not, however, exist in what are called climbing boys; but is, in boys actually engaged in cleaning chimneys, it actually takes place in adults. It is very uncommon under puberty; and is rarely occurs under the age of thirty.

CAUSES.—The result of the irritation of the soot lodging in the crease of the scrotum. The disease commences by the formation of an indurated enlargement of the integuments of the scrotum; a time in which it often remains for a considerable length of time. The cuticle may be separated, a little discharge may take place from the part, and form an incrustation, and this may be picked off or removed accidentally. The part, however, sooner or later, ulcerates, and an ulcerative affection is established in the scrotum, the principal characters corresponding with this disease; namely, there is a deep excavation, a hardened basis, and very commonly an elevated and everted margin; and the ulceration thus produced, exudes very copiously a fœtid ichorous discharge, of a peculiarly offensive nature.

Sometimes the affection consists not so much of a state of ulceration as in a warty, or rather a fungoid, excrescence on the affected part,—what we should call a soft vascular kind of wart, which produces the same kind of offensive ichorous discharge that an ulcer does. Whether the affection takes place in one or the other of these forms, it will extend over the whole scrotum, and usually pass to the peritoneum. After it has lasted a certain time, it will extend to the testes, and the glands of the groin will become indurated, and pass into a state of ulceration. The affection is attended with very severe pain; and the patient in whom it occurs generally exhibits marks of an unhealthy constitution. The progress of the disease, by its local effects, and the serious

disturbance it produces in the constitution, ultimately destroys the individual.

TREATMENT.—Neither local nor internal remedies, have any effect whatever in arresting this complaint: in that respect it corresponds with cancer generally. Local remedies may soothe; the local application of opium may diminish the pain; local remedies may destroy or remove the fætor of the discharge; but there are no local remedies, or external applications, or external remedies, that will arrest the destructive progress of the disease, although particular symptoms may be removed or lessened by internal or external means.

The only effectual mode in this case is extirpation; and wherever the disease can be completely removed,—whenever the incision, necessary for the removal of the diseased part, can be carried beyond the parts actually affected, so as to cut into the sound structure around, the disease may, with great confidence in the efficacy of that proceeding, be removed. If any indurated parts be left behind, and, still more, any parts that would become ulcerated, we should not be surprised that the disease should reappear; but if every diseased portion can be taken away, by carrying the incision into parts completely sound, then the operation is a safe and effectual remedy. It does not matter how far the disease may have extended to the integuments; for should it even have involved the whole integuments of the scrotum, or of the peritoneum, it may all be taken away; for though the testes, or portion of the penis, be denuded, the surrounding integuments will be drawn together by cicatrization, and cover those parts. Mr. Lawrence thinks, that if the glands of the groin should be swelled, without being indurated, the operation may be performed; but if the glands be hardened as well as swollen, he should doubt the propriety of the operation; and if ulceration of the glands should have occurred, this reason would be conclusive against the operation.—*See Lancet, Vol. II. p. 101. 1832. Also Earle, in Med. Chir. Trans.*

CARBUNCLE.

DEFINITION.—“An inflammation attacking a particular structure.”—*Abernethy*.

Carbuncle is essentially the same affection as boil, only differing in magnitude, and in its situation.”—*Lawrence*.

TREAT.—Carbuncle forms on the trunk of the body, seldom if ever on the extremities; and it forms, in a great majority of instances, on the posterior surface of the trunk, on the back of the neck, on the shoulders, or on the interval between them, or on the chest. It seems to attack those parts of the skin where the texture of the integument is the thickest. A very common part is below the transverse ridge of the occipital bone, immediately below the occiput, at the very upper part of the neck.

CAUSES.—The causes of carbuncle are essentially similar to those of boil, or phlegmon; and commonly arises as the immediate result of external irritation; blisters, issues, setons, tartar emetic ointment, irritating plasters of various kinds, applied to the skin, or any other considerable irritation of the skin, may excite it, in persons of a particular constitution, or in persons under a certain state of health at the time, to the occurrence of this formidable carbuncular inflammation.

SYMPTOMS.—When carbuncle is about to take place in any part, it is generally preceded by pain, and at first a swelling of a considerable hardness, occasioned by the adhesive inflammation. The surface of the tumour then assumes a livid redness, and a spongy, soft feel; little ulcers now form in the skin, which, from their number, give it a cribriform or sieve-like appearance, so numerous are the orifices: from these a white discharge, resembling water and flower, passes, by which the disease may be instantly recognised. When the little openings are all formed into a network, the dead cellular membrane begins to escape, for it previously cannot do so from the smallness of the apertures. In the gangrene of the extremities, there is not this mechanical obstruction to the sloughing of the dead part. And though gangrene is generally difficult to cure, carbuncle, nevertheless, usually does well, except when situated on the head or neck. Though persons will

recover from carbuncles of enormous size upon the back, yet very small ones on the head or neck will often destroy life. Sir Astley Cooper remarks that he never saw a patient who recovered from a carbuncle upon the head; in which cases there is effusion between the tunica arachnoides and pia mater.

TREATMENT.—The peculiar treatment of carbuncle consists in making, at an early period of the disease, a large conical incision down to the very base of the tumour, for the purpose of affording the deadened parts an opportunity of escaping; then applying a poultice made of port wine and linseed meal, and giving the patient such stimulants as will tend to increase the vigour of his constitution; such, for instance, as opium and ammonia, as directed in gangrene. Copious bleedings often take place from these incisions; the patient, consequently, ought not to be let bleed until you are satisfied that no hemorrhage of a serious kind can take place.—*See ANTHRAX.*

CASTRATION.

The operation for the removal of a diseased testicle. The patient is laid on a table of convenient height; the integuments covering the spermatic vessels in the groin are to be divided. The incision should be begun as nearly as possible opposite to the opening in the abdominal muscle, and continued to the inferior part of the scrotum, which affords the greatest facility to remove the testicle, and presents the accumulation of matter there, which would otherwise happen, and seriously tend to retard the cure.

In removing a testicle, there is a caution which seems particularly necessary, namely, if the chord should be at all enlarged, the surgeon should examine carefully whether augmentation of its size may not be owing to a portion of intestine or omentum that is contained within it.—*Sabatier, Médecine Opératoire, Tom. I. p. 332; Ch. Bell. Operative Surgery, Vol. I. p. 224, et seq.*

In the performance of this operation, there is another circumstance which demands the attention of the operator; that is, when there are reasons which require us to divide the chord high up, and this part has not been tied before such division has

made, it may be drawn up with the cremaster within the ominal ring,* and some difficulty may be experienced in tying spermatic arteries. Hence it is necessary to cut through the chord near the ring; and perhaps the safest plan may be always to tie the ligature first, taking care not to include the bas deferens in the ligature. At all events, were the chord, previously to application of ligatures to its arteries, to happen in any instance to be drawn up within the ring, a surgeon would be guilty of the most gross neglect to suffer the patient to die from the hemorrhage; for, as remarked by Mr. C. Bell, the chord may be moved with perfect safety, even to the origin of the cremaster, when drawn up, if attention be paid to the course of the chord, namely upward and outward within the inguinal canal. Sir J. Cooper, in order to avoid this inconvenience, approves of tying a temporary ligature through the chord as soon as it is exposed.

Abscesses occasionally form in the remains of the spermatic cord, after the extirpation of the testicle. Suppuration, however, may be prevented by bleeding immediately after the operation and repeating this evacuation on the first appearance of the inflammation of the part concerned. In addition to bleeding, low diet, neutral salts, diluents, &c. are included; and the part should be covered with an emollient poultice. On the complete formation of matter, the abscess should be opened.

When disease, not merely an œdematous swelling, extends up the chord, Pott, as well as the best surgeons of the present day, consider the operation of castration as too late; and, in such cases, Lisfranc has seen Dubois pull down the chord and then divide it, and Baron Dupuytren cut up the inguinal canal to the internal ring; all the patients died.—*Vide Bell's Operative Surgery, p. 103. Lond. 1823.*

The oblong separation of the tendinous fibres, called an opening, in each of which the spermatic chord in men, and the round ligament of the uterus in women, pass, and through which the abdominal viscera protrude, is a species of hernia called Bubonocele.

CATAPLASMS.

These forms of external applications are composed of various ingredients; but the two following formulæ are introduced in the Pharmacopœias to fix their proportions.

1. CATAPLASMA ALUMINIS, DUB. *Alum Cataplasma.*

[Take the white of two eggs and one drachm of alum. Beat them up briskly together until a coagulum be formed.]

An excellent application in ecchymosis of the eye, and in ophthalmia, accompanied with a thin ichorous discharge. It is directed to be applied between folds of muslin. It is the solution of alum held in the coagulum as in a sponge, which is the active part of the preparation.

*. * The coagulum is best formed by putting a piece of alum in the white of the eggs, and beating the whole up with a spatula until it forms, and then separating the coagulum from the albumen.

2. CATAPLASMA CARBONATIS LIGNI. Dub. *Charcoal Cataplasma.*

A very inelegant form of poultice, made by mixing very finely powdered charcoal with linseed, oatmeal, or bread crumb, and warm water. Some put the charcoal only on the surface.

USE. To correct the state of ill-conditioned ulcers and destroy their fetor.

3. CATAPLASMA BYNES. *Malt Poultice.* Mix finely ground malt with thin yeast to the consistence of a poultice, and apply it warm.

USE. Stimulant and antiseptic, for sloughing or gangrenous parts.

4. CATAPLASMA CEREVISIÆ. Strong beer poultice. Made by stirring oatmeal into the dregs or grounds of strong London or other porter, to a proper consistence, and heating it cautiously in a pannikin, or other earthen utensil.

USE. As the cataplasma Bynes. No 3.

5. CATAPLASMA CONII. *Hemlock Poultice.* Made from a decoction of the dried leaves of hemlock, 3ij. to water Oij., boiled down to one; and as much linseed-meal added as may be necessary to give it the proper degree of consistence.

USE. An excellent application to many cancerous and scrophulous ulcers, and other malignant sores; it frequently produces

at diminution of the pain of such diseases, and improves their appearance.

(CATAPLASMA DAUCI. *Carrot Poultice*. Made of carrots boiled and beaten up into a pulpy mass.

USE. Employed as an application to ulcerated cancers, scrofulous sores of an irritable kind, and various other inveterate stagnant ulcers.

(CATAPLASMA LINI. *Linseed Poultice*. This is the most common as well as the most convenient and emollient form of poultice for ordinary use, and has in a great measure superseded the old and milk one so much in vogue at one time.

(CATAPLASMA SINAPIS. *Mustard Poultice*. Made by blending either half a pound of the flour of mustard with an equal quantity of linseed, with boiling vinegar, as much as is sufficient. Mix it until it acquires the consistence of a cataplasm.

(CATAPLASMA PANIS ET AQUÆ. *Bread and Water Poultice*. Abernethy directs the bread and water poultice to be made as follows: "Put half a pint of hot water into a pint basin, add to it as much of the crumb of bread as the water will cover, then place a plate over the basin, and let it remain about ten minutes; then stir the bread about in the water, or, if necessary, chop it a little with the edge of a knife, and drain off the water, by holding the basin on the top of the basin, but do not press the bread, as is usually done; then take it out lightly and spread it about one-fourth of an inch thick on some soft linen, and lay it upon the part. If the part to which it is to be applied, should be a wound, you must place a bit of lint dipped in oil beneath the poultice. It is very comfortable and soothing to the part; it is like a bath of warm water—it produces a perspiration on the part to which it is applied. I do not know a better application. If there should be a surplus of heat in the part, you may expose the poultice, and let the evaporation go on a little."

REMARKS.—"This poultice may be made with poppy water, if you require sedatives are necessary. It may also be made with hemlock juice, if recently expressed, and it is a very good application to irritable sores. So also you may make the carrot poultice; but it should not be made with the great coarse substance of that ve-

getable—you should use the recent juice. This poultice adm of medication, but there is nothing better that I know of than t bread poultice for broken surfaces.”—*Abernethy's Surg. Lect.*

CATHETER.

The catheter is a long and hollow tube introduced into t urinary bladder to remove accumulation of urine, which the in vidual is unable to pass. They are fabricated either of silver mixed metals, or of elastic gum. That for the male urethra, a matter of course, is much longer than that for the female, and curved, if metallic, as to adapt it to the urethra. The form and s of the catheter are subject to variation; that which is used stricture of the urethra differs materially from that which is quired in cases of enlargement of the prostate gland. The pr tate catheter, if it may be so called, should be two inches long than the common catheter; and the curve is considerably grea than that of the catheters for strictures in the urethra. The lat is, indeed, generally too much curved; they should be, as nearly possible, like the natural curve of the urethra. The catheter is a often used as a bougie, to dilate strictures in the urethra. El tic catheters, now much in use, are less irritating to the ureth and less apt to become eroded, or covered with calculous encr tations, than silver tubes—they can also be frequently introdu when a metallic one will not pass.

Obs.—The elastic gum catheter, now fabricated in Lond are equal to, if not better than the French; they are smoot and more regular, and have latterly undergone considerable provement. They are made in sets, from No. 1 to 12, or mor

CATHETERISM.

The operation of introducing the catheter. The following the directions for performing it. When called upon to in duce a catheter, place yourself upon the right side of the tient, pass it down under the arch of the pubis perpendicular until you reach the membranous part of the urethra, and then not continue to press the instrument in that direction, for if did you would push it towards the rectum, instead of entering

bladder; but having reached the membranous part of the urethra, have only to make a semi-rotatory half-circular motion upwards, and the instrument will immediately enter the bladder.

OBS.—This is the whole secret of catheterism; you have only to bear in mind the two motions which are necessary to effect the purpose, for if you continue to press the catheter onwards, when you have reached the membranous portion of the urethra, you will press the point of the instrument upon the rectum, instead of introducing it into the bladder. In cases of enlargement of the prostate gland, there will be some difference in the mode of passing the catheter; and it is a difference which it is somewhat difficult to explain. When the prostate is enlarged, the urethra is pushed forward, so as to be doubled on the point of the instrument. In this case you must pass the catheter down to the apex of the prostate gland, then carry the instrument towards the perinæum, so as to push the instrument as much as you can towards the perinæum; and then having brought the urethra into a straight line again, depress the point of the instrument, and you will be enabled to pass it into the bladder. Sometimes spasm of the perinæum renders the introduction of a catheter difficult. In this case a dose of opium should be administered before a second attempt is made. When inflammation prevails in the passages of the bladder, the introduction may frequently be facilitated by a previous bleeding. The catheter may be introduced either in the erect or horizontal posture; either with the concavity directed toward the abdomen, or with the concavity directed downwards.

CARRIES.

DEFIN.—A disease of the bones; supposed to be very analogous to ulceration of the soft parts. The bones, like other parts of the body, are composed of arteries, veins, absorbent vessels, nerves, and a cellular texture. They are endowed with vitality, are nourished, they grow, decay, and are repaired, as well as undergo various changes, according to the age of the individual: they are also subject to diseases.

Bones of a spongy texture are more frequently attacked by diseases than such as are of a compact nature: such, for instance,

as the vertebræ, the astragalus, and other bones of the tarsus; the sternum, the bones of the pelvis, and the head of the long cylindrical bones, are often diseased in this manner. In necrosis (*see* NECROSIS,) the bones are entirely deprived of life: in caries the vital principle exists, but a morbid action continues which alters the texture of the bone, and renders it softer and lighter than its natural state. These disorders, however, although essentially different, frequently occur together in the same part.—*See Liston in the Edinb. Med. and Surg. Journal, No. 18, p. 50.*

The absorption of bone, like that of the soft parts, may be distinguished, according to Dr. Thompson, into interstitial, progressive, and ulcerative.—*See Lectures on Inflammation, p. 389, sequent.*

DIVISION OF CARIES.—This disease of the bones has been divided into three kinds, according to the nature of its cause, namely,—

1. Caries from external causes.
2. Caries from internal local cause, where no outward injury to the bone, and no internal constitutional disease, are suspected to have produced the disease; and where the affection can be observed by local means: as caries of the finger bones from whitlow, which in all probability partakes more of the nature of necrosis.
3. Caries from a general internal cause, or constitutional disease, in which cases, besides local remedies, it becomes necessary to employ such remedies as are calculated to remove the particular affection of the system from which the diseased state of the bone has taken its origin.

CAUSES.—Abscesses in the vicinity of bones. The venereal disease; which attacks the bones of the nose, the breast, the tibia, cranium, &c.

SYMPTOMS.—Caries of the vertebræ is known by peculiar symptoms; among the most remarkable of which are, paralysis of the lower extremities, lumbar abscess, &c.

PROG. AND DIAG.—Caries from an external, or a local internal cause, is less dangerous than that which proceeds from a constitutional disease; particularly when the latter is difficult of cure. Caries of the spongy is more difficult to cure than a similar affection

of the more compact parts. Caries of the carpal and tarsal bones is particularly obstinate; since, from their juxta-position, the affection easily communicates from one to the other. The affection of the ossa ilium is also remarked to be extremely difficult of cure: when it arises from scrofula, it is more difficult to cure than that from syphilis and scurvy. The prognosis is less favourable in old than in young subjects; and a great deal depends on the extent of the affection, the strength of the patient, and the condition of the soft parts.

TREATMENT.—If from constitutional disease, internal remedies are the first instance; such, for instance, as will remove the original disease; though it is questionable whether external applications be necessary or free from objections. This, however, is not the case in caries from scrofula, where issues, blisters, friction, and other local means are advantageous.

Strong stimulants have also been employed, in order to accelerate the action of the diseased bone; such as tincture of aloes or rhubarb; a solution of the nitrate of quicksilver; concentrated vinegar diluted muriatic acid. And for the destruction of caries, the actual and potential cauteries, and cutting instruments, have been employed in the first or inflammatory stage. Mr. Liston, of Edinburgh, prefers topical bleeding, practised with moderation, followed up by issues, sinapisms, blisters, and the antimonial ointment. He thinks, however, that the moxa is the most effectual remedy.—*See Edinb. Med. and Surg. Journ. No. 78, p. 54, et seq.*

The author just quoted, when the caries is fairly established, and the integuments have given way, represents the indications to be either the immediate renewal of the diseased bone, or the employment of means calculated to make it be thrown off the constitution. The first indication is to be attempted by the proper use of trephines, perforators, gouges, gravers, scoops, saws, and forceps, of different constructions, for dividing or extracting: the second, by cauteries, actual or potential. The combination of both is in general required.—*Vide Op. Citat. p. 55.*

CATARACT.

By cataract is understood an opening of the crystalline lens, or

its capsule; the cataract depending on a morbid secretion of the liquor morgagni. There are four different kinds of cataract, viz.

1. The hard or soft cataract.
2. The fluid or milky cataract.
3. The soft or caseous cataract.
4. The capsular cataract.

The three first form in the lens itself; and the last in the capsule, which comes on after, or in consequence of an operation; and is also found in children, when it is called congenital, on account of its occurring at a particular period of life, or children being born with it; otherwise, it does not essentially differ from the others: it also requires a particular operation. Of the lenticular cataract there are three kinds; the *soft*, the *fluid*, and the *hard*; and these occur at different periods of life.

a. *Firm or hard Cataract*.—In this kind the lens acquires a greater degree of density or firmness than natural; and in undergoing this change, it becomes smaller, thinner, and more concentrated. It has a yellow or brownish appearance, the colour of amber. The next thing to be remarked, is the interspace between the iris and front part of the lens, in consequence of the lens becoming thinner. The motions of the iris are free, there being no adhesions. There is generally some degree of vision, and the patient can often discern large and bright objects,—even differences of colour, and sometimes the shadow of minute objects. When the light is faint, the patient can see more distinctly than when it is strong. This kind of cataract generally occurs at an advanced period of life.

b. *Fluid Cataract*.—This kind is always more or less fluid, and is called milky, from its white colour: it is not of equal density throughout. The eye has a flocculent appearance, from specks and streaks, consisting of solid particles of the lens, which are movable up and down in the various positions and motions of the head, and may even be removed out of sight; but on the head becoming steady, they re-appear. The size and shape of the pupil is altered. The rays of light do not pass into the eye, and the patient can scarcely tell the difference between light and darkness.

Soft or caseous Cataract.—This kind is of the consistence of jelly or cheese; is uniformly opaque; and there is a milky whiteness, as in the fluid cataract; but the spots and streaks, sometimes observable in this form, never shift their position, as in the pedicled; the lens also becomes increased in size. The motions of the iris are with difficulty performed, from the size of the lens, and the rays of light are prevented from entering. The patients sometimes cannot distinguish between light and darkness; although they are seldom so blind as this.

Membranous Cataract.—This form is not connected with the lens but with the capsule itself; and the opacity may exist either in the anterior or posterior capsule, or combined with that of the lens thus producing cataract. In this last case, there is no distinctive diagnostic mark; but when the capsule is affected, an operation may be offered. If the anterior layer of the capsule is opaque, it has the appearance of being superficial and close to the pupil, and has rather a nebulous appearance. It does not quite lose its transparency, but becomes semi-transparent. When the posterior capsule is affected this appearance is deeper, and has a more or less lobulated form. Another species of membranous cataract is, when the capsule becomes opaque, and the lens at the same time absorbed, and a tough, dense, membranous substance is formed, as in congenital cataract.

CAUSES OF CATARACT.—The causes of cataract are in general obscure; it, however, arises sometimes from obvious causes, such as injury, violence, inflammation, or sharp-pointed bodies striking the capsule of the lens, or the lens itself; and constantly producing opacity of those parts. Inflammation of the cornea of the eye is another cause; but here the cataract is capsular and not lenticular: these causes, however, are exceedingly rare.

It is congenital, runs through families, and appears to be hereditary. Severe exposure of the eye to much exercise and bright light, as with glass-blowers and blacksmiths, has, it has been said, produced cataract: this is exceedingly doubtful. It has been shown, that it may be produced by external causes which are obvious; yet it more frequently comes on without any assignable cause.

PROGNOSIS.—By this is meant, a prognosis as to the issue of the case by other means than an operation; ascertaining whether service can or cannot be afforded by the operation; whether, in fact, the changes which the eye may have undergone from inflammation during the progress of the complaint, or the symptoms are such as to preclude and destroy all hopes of vision ever being regained. The circumstances which lead the surgeon to determine as to the success of the operation are as follow:—

1. Whether the loss of vision has been gradually supervening, and has always been in proportion to the opacity of the lens.

2. Whether the cataract has been accompanied by chronic ophthalmia, or any changes have been produced in the eye by it. If the cataract has been attended by a penetrating pain in any part of the eye, or orbit, or back of the head.

3. Whether the motions of the iris are duly performed in different variations of light: if not, fear may be entertained of the eye being ameyrotic.

4. If there be the power of distinguishing between light and dark, or the colour or form of things, or the shade of passing objects.

These circumstances should be minutely inquired into; and it should be ascertained that the patient has all, or the greater part of them; that is, if the defect of sight has been increased just in proportion to the increase of the opacity of the lens, and the patient has had no pain in the head, and the motions of the iris are free, and light can be distinguished, the operation may then be performed with every chance of success, as there are no evident reasons against it. Another question to be determined upon is, whether the operation should be performed if one eye only be affected? There are various opinions on this subject: the opinion that appears to be the most rational, is not to operate unless both eyes are affected.—“The operation,” says Sir Astley Cooper, “may then be safely performed.”—*MS. Lect.*

MEDICAL TREATMENT OF CATARACT.—The opacity of the lens, or its capsule, does not admit of being altered in any degree, much less of being removed by any kind of external application to the eye; or by any species of internal treatment. All local appli-

, and internal remedies, are inefficacious in the treatment of cataract; except, indeed, so far as may relate to some particular symptoms connected with it. The principal remedies that have been tried are, bleeding, cupping, scarifications, setons, issues, blisters, and fumigations, externally; and the chief internal remedies, aperients, emetics, cathartics, sudorifics, and sternutatories. Formerly eye-bright, millepedes, wild poppy, henbane, mandragora, were credulously extolled as specifics for cataract. In venereal patients, cataracts are said to have been cured while taking a course of mercury. These, in all probability, might only have been opacities of the transparent cornea; or, at most, only recent opacities of the capsule; or depositions of lymph in the anterior chamber,—the consequence of previous, or existing inflammation. Hence the necessity of resorting to a surgical operation for the purpose of removing the opaque substance, called cataract, which is situated in the axis of vision.

OPERATIONS FOR CATARACT.—The operations for cataract are three in number.—

1. Depression, or couching; by which the cataract is removed from the axis of vision.

2. Extraction; which consists in making an incision through the cornea.

3. The operation for the solution of cataract.

By Depression.—This mode of operating consists in removing the opaque lens out of the axis of vision, by depressing it into the vitreous humour. This is done by a needle, of which there are several different kinds now employed,—namely, Hey's, Scarpa's, &c. The needle is the only instrument required: some use

Hey's needle is spear-pointed, with a narrow neck. Sir A. Cooper gives preference to this; as he observes, "a surgeon is not so apt to wound the ligaments or processes with it. Hey's needle is about seven-eighths of an inch in length: it is rounded, except at the point, where it is flat for the space of an inch, and terminates by semicircular cutting edges, which ought to be exceedingly sharp. Scarpa's needle is more slender, and curved at the point. Looking at it sideways, it presents a flat convex appearance on the one side, and has also a concavity. It is sufficiently strong to depress a

a speculum; but, excepting in children, this will not be of much service.

All the preparation necessary, previous to the operation, is to ascertain whether the patient be in good health; see that the bowels are regular; and that all the functions are properly performed.

The *light*, and the *position* of the patient and operator, are extremely important to be attended to.

1. *Light*.—The light should be clear, distinct, and full, but not vivid; and it should not fall upon the centre of the eye of the patient, but laterally; otherwise, it would produce a dazzling unsteadiness of the organ.

2. *Position of the Patient*.—The patient should be placed on a low seat, with a high back; his head resting against it, or against the body of an assistant.

3. *Position of the Operator*.—The operator should be on a high stool, or at least one of sufficient height to enable him to place his foot upon it, and rest his elbow on the knee opposite the eye to be operated on.

Having thus ordered things, the operator holds the instrument between the thumb and fore-finger: the assistant, passing his fore-finger round the head of the patient, raises the upper eyelid by a fold of skin, and presses it gently against the superciliary ridge. The patient is now directed to look inwards towards his nose; and the operator, resting his little finger on the upper part of the chin of the patient, penetrates the sclerotic coat about a line and a half from the junction of the transparent with the opaque cornea, and a line below the transverse diameter of the eye. In the first place, the needle is introduced here, just where the retina terminates and the ciliary ligament commences, so that these structures may be avoided; and, *secondly*, for the purpose of not wounding the ciliary artery, as it goes along the middle of the external convexity of the eye-ball, between the sclerotic and choroid coat.

In using Beer's needle, it is introduced with the edge laterally, and its surface upwards and downwards, and directed towards the middle of the globe of the eye. It must be moved slightly between the fingers,—a piece of ivory or brass at the handle, showing

disposition of the cutting edges; the point is then carried in-
; parallel to the iris, and so as to cover the posterior cham-
the instrument will now be visible through the pupil. When
as the case, the operator must raise the needle upwards, and
depress it downwards and backwards, and a little outwards;
which means the crystalline lens becomes pushed into the vi-
s humour. If the lens should rise from its situation, it must
again depressed; and when it is safely lodged in the vitreous
humour, the needle must be withdrawn.

AFTER-TREATMENT.—The treatment after the operation, which
is very simple, consists in a single fold of linen, moistened in cold
water, being applied to the eye. The patient is confined in a
darkened apartment, and narrowly watched, in order to detect in-
flammation, should it supervene; but very frequently none arises.

3.—The operation of what is termed *reclination*, which con-
sists in capsizing the lens, and pushing the upper edge back-
wards and the lower forwards, and likewise puncturing the
cornea instead of the sclerotic coat, is performed by some con-
temporal surgeons. That plan recommended by Scarpa is the

By extraction.—In this operation a cornea knife, in the first
instance will be necessary; and that commonly known as *Beer's*
is the best. The next instrument is a pair of curved scis-
sors, in order to enlarge the opening made in the cornea, should
it be of sufficient size to extract the cataract. A minute
needle will be required to scratch the capsule of the crys-
talline lens; a curette or scoop, to remove any opaque fragments
of lens; and a pair of minute forceps, of which the best con-
struction is that recommended by Beer, to extract any portion of
the membrane from the capsule of the lens. The position of
the patient is nearly the same as in the operation for couching,
as well as those of the assistant and operator.

The operator places himself behind the patient, in a chair of
convenient height to enable him to plant his foot conveniently on
the floor, resting his elbow on the knee opposite to the eye to be
operated upon, and bring his hand towards it. The assistant at
the same time should place his hand behind the patient's head, and

with the extremity of his fore finger gently raise up the without making pressure on the globe. The operator now takes the knife in his right hand, if it be the patient's left eye he is about to operate on, and in his left hand if it be the right in the same way as he would take a pencil between his fore finger and thumb. The puncturation, as it is called, is then made, the point of the instrument being introduced at the distance half a line from the anterior junction of the cornea with the sclerotic coat, which is passed in a direction nearly parallel to the iris, and before it with a little obliquity, through the anterior chamber to the opposite or nasal side.

In making the section through the cornea, the knife should be carried outwards, without any downward motion; and as soon as the section is completed, the lid should be allowed to drop over the fore part of the eye, to prevent the escape of a portion of the vitreous humour, should there be any spasm of the part, or any unsteady motion of the patient. The operator now waits till the eye is quiet, and then introduces the curved needle with a convexity under the flap of the cornea; and turning the point towards the fore part of the capsule, moves it upwards and downwards, and laterally from side to side, making a sort of circular incision; he then squeezes out the cataract by making gentle pressure on the globe above and below, until the lens is lifted from its bed, and passes through the opening of the cornea towards the cheek of the patient. All now that remains to be done is to examine whether there be any opaque fragments of the lens, and if there are, they should be scooped out by means of the curved needle; if not, the upper lid is to be rubbed over the surface of the cornea, and if there be any portion of opaque membrane remaining, it may be removed by the forceps. In this manner the operation may be completed; and dexterity in performing it can only be acquired by practice.

OBS.—Many untoward circumstances, however, interfere with the success of this operation:—1. The section of the cornea may be too small. 2. The premature escape of the aqueous humour, either from the unsteadiness of the operator, or from some defect in the knife. 3. The loss of a portion of the vitreous humour.

ing from undue pressure on the globe of the eye by the operator or assistant, or from some spasm of the muscles of the eye, though the last cause seldom happens; it may nevertheless occur the needle being injudiciously used too near the circumference of the lens, and the capsule of the vitreous humour is torn through, &c.

AFTER-TREATMENT.—To prevent, as far as possible, inflammation, a compress of fine linen or cambric, kept wet with cold water, should be applied to the eyes, or rather to the eye opposite that which has been operated upon; it should be fixed by means of a bandage, carried round from the occiput, crossed in front, and pinned to the sides of the night-cap. The patient should be carried to bed after the operation, and the chamber opened. He should only be allowed barley-water, tea, or water-gruel, for the few first days; and should there be any symptoms of inflammation, such as pain or uneasy sensations in the eye, accompanied with quickness of pulse, a quantity of blood should be immediately taken away from the arm. After three days the eye should be examined. The patient should be kept in bed five days, in the recumbent posture, and not even be suffered to rise for usual purposes, for which a bed-pan should be used; and every possible means ought to be adopted to prevent irritation of the mind.

Operation for procuring solution, &c.—This operation, which is very simple, consists in making an opening in the anterior part of the capsule of the lens, breaking up more or less of the centre of the cataract, and admitting the aqueous humour in such a manner that the cataract is dissolved, and by this means absorbed. The instrument required is a needle, very similar to that employed in the operation for couching, with the exception that the point is somewhat different; its shoulders are made cutting. Before commencing the operation, it will be right to use ext. belladonnæ, reduced to the consistence of cream, to be introduced for the purpose of dilating the pupil; or it may be smeared round the eyelids.

In operating on the adult, the patient should be placed in the same position as in the operation for couching. Children are

better in the recumbent position, with the head fixed on a pillow. Sometimes a speculum is required to steady the eye—Pellie's speculum is best for that purpose. The needle may be introduced either in the same way as in couching, or else through the cornea. In the latter case there are two modes of operation, called the anterior and the posterior. In the former the needle is introduced at the distance of half a line from the junction of the cornea with the sclerotica, carried parallel to the iris; and the texture of the capsule is broken up in the same way, so as to admit the aqueous humour. If the cataract be fluid, it immediately mixes with the aqueous humour, and there will be no more trouble.

As regards the after treatment, the object, as in the former cases, must be to prevent inflammation. It is better in this operation not to attempt to do much at once; but rather to repeat frequently, than at a single effort to break up the texture at once.

OBS.—In those cases which admit of the operation for solution, viz. *fluid*, *soft*, and most cases of *membranous* cataract, that operation is preferable to any other. Soft, fluid, and membranous cataracts cannot be depressed; they might be extracted, but the operation for solution is considered as more easy, and that it does very little injury to the eye. It is to Dr. Saunders that the profession is indebted for having demonstrated the principle on which he performed this particular operation, its applicability to cataracts in children, and to some cases in adults. In firm cataracts, where it is indifferent whether the operation for depression or extraction be performed, that for extraction, supposing it to be equally well performed, is unquestionably preferable, because the disease is entirely removed by it. There are, nevertheless, cases in which it would be extremely imprudent to attempt the operation for extraction; for instance, where there is adhesion of the iris to the cornea, or where the cornea is very flat, and the anterior chamber necessarily small, or in cases of contraction of the pupil, myosis or arcus senilis. But no judicious surgeon will indiscriminately prefer one operation to another; his opinion must be deduced by the nature of each particular case. For works on consultation on cataract, see *Wenzel's Treatise by Ware*, 8vo. London.

11; *Richter's Treatise on the Extraction of the Cataract*, Transl. 8vo.
 11; *Travers' Synopsis of the Diseases of the Eye*, Lond. 1802;
 11; *on the advantage of an early operation, &c. for the different*
species of Cataract, Edinb. Med. Journ. Vol. XIX. p. 313; *New*
operations for Cataract, by Sir William Adams, 1812, 1817; *Guth-*
rie's Lectures on the Operative Surgery of the Eye, 8vo. Lond. 1823.

CAUSTICS.

Substances which destroy parts by burning, or chemically de-
 composing them. e. g. the potassa fusa, potassa c. calce, antimo-
 niæ muriatum, nitras argenti, hydrargyri nitrico-oxydum,
 ærum sulphuricum, and the cupri sulphas, are those in most
 constant requisition.—See ESCHAROTICS.

CAUTERIES.

These are of two kinds, namely, the *actual* and *potential*. By
 the first is implied a hot iron, by the second is understood any
 caustic application.—See CAUSTICS.

Uses.—In modern practice, the actual cautery has been relin-
 quished in the ratio that surgery has attained a higher degree of
 improvement. On the continent it has still its advocates; at home
 is confined chiefly among those who practise the veterinary art.

CERATES

These are compositions of wax, oil, or lard, with or without other in-
 gredients, e. g.

CALAMINE CERATE.

Prepared calamine,	}	 ℥iv. of each.
yellow wax		
Olive oil		℥viii.

Put the wax in small pieces, and mix it with the oil; they are
 then melted over a slow fire, and when sufficiently cooled, the
 calamine is to be stirred in, being previously in a state of the
 finest pulverization.

Uses.—To ulcers and abrasions; also an external remedy to
 burns and scalds, after the pain and violence of the inflammation
 has been removed. Also in ophthalmia tarsi, smeared on the
 margins of the lids at bed-time, by means of a camel's hair pencil;

in cases where more stimulating applications could not be borne, in which case its efficacy may be augmented by the addition of a little soft extract of opium, in the proportion of 3ss. of the opium to an ounce of the cerate.

N. B. If to eight ounces of the cerate of calamine, be added an ounce of the liquor plumbi acetatis, the *ceratum calaminæ cum plumbi acetatis liquore* will be made; forming a favourite remedy with some experienced surgeons for burns and scalds.

COMPOUND CERATE OF LEAD.

Take	Acetate of lead	℥iiss.
	Yellow wax	℥iv.
	Olive oil	℥ix.
	Camphor	ss.

Rub down the camphor with a small portion of the oil; and the remaining oil and wax being melted over a slow fire, the liquor plumbi acetatis is to be stirred in; and when the mixture is nearly cold, the dissolved camphor is to be added; the whole should then be briskly agitated till perfectly cold.

USE.—Employed as a gentle stimulant and desiccative; and as such, may be used with advantage in some cases of burns and scalds; in chronic ophthalmia of the tarsus; and against the increased secretion of tears, with which the eyes of elderly people are so frequently affected.

SOAP CERATE.

Take	Hard soap	℥viii.
	Yellow wax	℥x.
	Sem. vit. ox. of lead	lbj. in powder
	Olive oil	oj.
	Vinegar	Cong. j.

Boil the vinegar with the oxide of lead over a slow fire, constantly stirring them till they be united; then add the soap, and boil it again in a similar way until the moisture is entirely evaporated, then mix in the wax, previously melted with oil. This is the manner in which the London College directs this cerate to be made. It was originally taken from the practice of Bartholin.

St. Bartholomew's Hospital, and much used and recommended by Mr. Pott, as well as by the surgeons of the present day.

USE.—Resolvent against scrofulous humours, &c. It is sometimes a convenient application in fractures, and may be used as an external dressing for ulcers.

CERATE OF CANTHARIDES.

Spermaceti ointment..... 3vi.

Blistering flies, finely powdered 3j.

Melt the cerate by heat; add the flies and mix them together.

USE.—To keep up a discharge from blistered surfaces.

CERATE OF HEMLOCK.

Hemlock ointment lbj.

Spermaceti 3ij.

White wax..... 3iij.

This is one of the formula of St. Bartholomew's Hospital.

USE.—Occasionally applied to cancerous, scrofulous, phagedenic, herpetic, and other inveterate sores.

CITRINE CERATE. (*Resin cerate.*)

Yellow resin } lbj. of each.
Yellow wax }

Olive oil..... Oj.

Melt the resin and wax together over a slow fire; then add the oil and strain the cerate, while hot, through a linen cloth.

USE.—Digestive.

CERATE OF SAVINE.

Fresh savine leaves, bruised lbj.

Yellow wax lbss.

Prepared lard lbij.

Melt the wax and the lard, boil the savine leaves thereon, and strain through a linen cloth.

USE.—For the purpose of keeping up a discharge from blistered surfaces. It does not produce the inconvenience that follows the constant application of the common blistering cerate.

The thick white layer which the savine ointment forms upon the part, requires to be removed, that it may come in immediate contact with the discharge that is to be made.

CERATE OF HONEY.

Take	Olive oil.....	Oss.
	Clarified honey	lbss.
	Yellow wax	} ℥iv. of each.
	Plaster of lead	

USE.—Used in Bartholomew's hospital as a gently stimulating and somewhat desiccative application.

CERATE OF HONEY WITH TURPENTINE.

Take	Clarified honey	} lbj. of each.
	Common turpentine	
	Fine wheat flower.....	quant. suff.

To the liquified turpentine and honey, stir in a sufficient quantity of wheat flower, to give it the consistency of a cerate.

PHARM. CHIRURG.

USE.—To chilblains, in a state of ulceration, on the hands and feet of children, it has been used with the best possible effect. The chilblains should be kept constantly dressed with it, and renewed night and morning.

CHANCRE.

DEFIN.—A sore, with well-defined, hard, and ragged edges, &c. the consequence of the direct application of the syphilitic poison to any part of the body; occurring, for the most part, on the glans penis, and præputium. Such venereal sores, however, which break out from a general contamination of the system, the consequence of absorption, are called venereal or syphilitic eruptions, and do not have the name of chancre applied to them.

The time at which the effect of the syphilitic poison, that produces chancre, makes its appearance, is uncertain; the chancre however, generally appears three or four days after the connexion and from four to seven days is the average of time.—*Sir A. Cooper*

SYMPTOMS.—The poison first produces inflammation, then ulcers.

tion; the inflammation is attended by a pimple arising from the affected surface, which is like a common pimple, excepting that it is of a deeper colour; instead of being quite florid, it is of a darker hue. The pimple is surrounded by a kind of erysipelatous inflammation; an ulcer forms in the centre, and then a pit opens in the body of the sore, which is often of considerable magnitude, and extends beneath the skin. The surrounding edges of the sore are hard and ragged, its surface is yellow, and the margin is red. And if asked whether it was a chancre or not, the answer would be, I must feel it first. You would then lift up the part between the fore-finger and thumb; and if a hardness was detected, this would be a very good criterion of its being a syphilitic sore; for neither in the ulceration, nor in the yellowness of the surface, nor the raggedness of the edges, but in the colour and hardness of the sore, that the characteristic marks of the chancre manifest themselves. It is from the presence of these that an opinion may be formed, whether the sore be a chancre or not.

TREATMENT.—As soon as the patient applies to the surgeon with his complaint, the blue pill, (five grains with $\frac{1}{4}$ gr. of opium, three or four times a day, at night and morning,) should be immediately ordered; if this quantity is to be exceeded, an additional pill may be taken at bed time. The medicine continued for three weeks will be quite sufficient for the cure of the disease. The opium is combined with the blue pill to prevent the latter from irritating, and producing a sloughing of the chancre, which it would do if exhibited alone.

DIET.—During this treatment the patient may follow his usual avocations; but must refrain from every species of food which is likely to disturb his bowels, as it is desirable to prevent the mercury from acting on the intestinal canal; though his mode of living should be as usual, he ought to avoid acids, because they would purge him, and for this reason he should not take vegetables, which contain much ascendent matter. Two or three glasses of wine a-day would not prevent the action of the mercury; if taken so as to accelerate the circulation, would oppose it; though if used moderately would do no harm.

Much smaller quantities of mercury are given now than formerly; as regards the quantity, all that is required is just to keep

the mercurial action on the constitution, for a short time, instead of making the patient spit at the mouth for weeks and months as formerly was the practice. The black wash is the best local application to a chancre; it lessens the irritation of the sore, and prevents its attacking the neighbouring parts. The use of caustics in the cure of chancres is very objectionable, without, at the same time, a mercurial course. It also irritates the part, and is liable to produce bubo; and its application to a chancre does not render a person safe from its effects, for, if the sore be a chancre, the syphilitic virus must have been admitted into the constitution.

CHEMOSIS.

An inflammation of the conjunctive membrane of the eye, in which the white part is distended with blood, and elevated above the margin of the transparent cornea. *See* CONJUNCTIVA, INFLAMMATION OF.

TREATMENT.—A few drops of æther poured on the palm of the hand, and diffused over the eye, which may be immediately done by pressing the other hand against it. The hand is then to be applied to the eye and kept close to it while the æther is evaporating. This excites and quickens the action of the absorbed vessels, for the dispersion of the blood extravasated under the conjunctiva.—*Ware.*

OBS.—Ophthalmia attended with chemosis requires the most rigorous employment of the antiphlogistic plan of treatment. Astraction of blood, local and general, &c. &c.

CHILBLAINS.

Are painful inflammatory swellings of a deep purple or leaden colour, to which the fingers, toes, heels, and other extreme parts of the body are liable.

CAUSES.—Inflammation arising from exposure to severe cold &c.

SYMPTOMS.—Pain, not constant, but rather pungent, and shooting at particular times, attended with an intolerable degree of itching. In some instances the skin remains entire, in others it breaks and discharges a thin fluid. When the degree of cold has

very great, or its application long continued, the parts affected are apt to mortify and slough off, leaving behind a foul, conditioned ulcer.

TREATMENT.—In common cases, as soon as any part becomes affected, it is usual to rub it with warm spirits of rosemary, to which may be added a small quantity of the spirits of turpentine; afterward apply pieces of soft linen moistened with camphorated oil, soap liniment, camphor liniment, &c. Mr. Wardrop speaks of one part of tincture of cantharides, with six of the soap liniment. Others recommend two parts of camphorated spirit with one of the liq. plumb. subacetat. strong solutions of alum, or sugar. When the swellings break or ulcerate, apply poultices of emollient ointments for a few days; keep down luxuriant inflammation with caustic applied to the edges, and dress the sore with ointment of the nitric oxide of quicksilver, which, if too escharotic, may be reduced by the addition of a small quantity of the spermaceti ointment; afterwards dressed with Mer's cerate.—*See CERATES.*

When suppuration and ulceration ensue, stimulating dressings are then required; such as lint dipped in a mixture of the liq. plumb. subacetat. dilut. and liq. calcis; tincture of myrrh, or of vinegar.

The best method of preventing chilblains is carefully to avoid exposure to wet and cold. Those who are subject to them, on the approach of winter should cover the parts liable to be affected with warm gloves and stockings, and not expose the hands and feet precipitately, when cold, to a considerable degree of heat. The young and children are more apt to be troubled with chilblains; than those of the middle age; and those of a scrofulous habit are observed to suffer severely from them. They are particularly apt to occur in persons who are in the habit of going immediately to the fire, on their return home in the winter season with their fingers and toes very cold. They are also frequent in individuals who go suddenly into the cold, being previously very warm.

A new way of curing chilblains of the milder sort is to rub them with snow, or bathe the feet in ice-cold water several times

in the day, and keep them immersed each time till the pain and itching are alleviated. The parts having been rubbed, or bathed in this manner, they are to be well dried with a towel, and covered with flannel or chamois leather socks.

Chilblains that slough are to be poulticed till the dead part become detached; the sores being previously dressed with some mild stimulating unguent,—as the ung. res. flavæ; with which in a day or two, a little of ung. hydrarg. nitrico-oxydum may be cautiously blended until it is ascertained what the parts will bear for, if the practice here be too bold, immediately the poultices are relinquished, sloughing may be brought on again. See *Thomson's Lectures on Inflammation*, p. 637, et seq. *Pearson's Principles of Surgery*, p. 133, et seq. Also (for a long list of applications to Chilblains) *Rees's Cyclopædia*, art. Chilblains.

CHORDEE.

DEFINITION.—A painful erection of the penis, during which it is drawn either violently back, or to one side.

CAUSE, &c.—Inflammatory condition of the corpus spongiosum. The pain is produced by the dilation of the vessels, from the influx of blood, to cause an erection. The disease is most troublesome when the patient is warm in bed.

TREATMENT.—Poultices, fomentations, and lotions. During the night the penis may be wetted with the lotio plumbi subacutatis. Evaporating lotions may also be employed. An excellent medicine is the following:

Take	Liquor of potass		min. xx.
	Extract of hemlock		grs. iij.
	Camphor mixture		3x.

Make a draught. One to be taken three times a day. Calomel and opium may also be administered with much advantage. The following pill may be given every night. e. g.

Take	Calomel		gr. j.
	Opium		gr. j.
	Camphor		grs. ij.

This will materially abate the pain, and produce considerable

part. Or, grs. x. to xx. of the pulv. ipecacuanh. comp. will nearly, if not quite, the same effect. To disperse the hardness which remains after the painful erections have disappeared, the part may be rubbed with the ung. hydrarg. camphorat., and a piece of the same ointment spread on silk may be applied to the part.

There is a kind of chronic chordee, which occurs sometimes after a person has had a severe gonorrhœa, the particular symptom of which is that the dorsum of the penis becomes so extremely hard, as, upon examination, to feel ossified. To disperse this induration, the penis is to be rubbed, night and morning, with the linimentum hydrargyri, (*see* LINIMENTS,) and it may be kept covered with a plaster made of the soap paste, which acts like a poultice, and when the complaint is resisted answers very well; but when it is of long standing, recourse must be had to the mercurial liniment as above directed: and even this will often fail, in consequence of the extremely thickened state of the tendinous sheath of the back of the penis.

CICATRIZATION.

DEFIN.—The formation of the new skin with which a sore is covered over is called cicatrization, and is produced in the following manner:—The vessels at the edge of the skin form granulations, and these granulations unite with granulations at the edge of the sore. Those produced at the edge shoot forth towards the centre, and those on the edge inosculate with those on the surface of the sore, and are united by the adhesive process. The vessels become elongated from the edge of the sore, and proceed inwards from the circumference to the centre. Day after day an addition is thus made to the cicatrix, until at last the vessels reach the centre from every part of the circumference, when the process of cicatrization is completed. When a cicatrix is formed, in the first instance, it is extremely vascular; but when it has existed any length of time, the blood-vessels become contracted, and the cicatrix whiter than the original skin. Hence the white appearance of the cicatrices after the small-pox; for, although they are more elevated than the original skin, when first formed, in a little time

they lose this vascularity, and are endued with less living power than the surrounding parts.

The readiness with which the surface of a sore is covered in cicatrization depends very much upon its form. A sore of a circular figure requires a very considerable time before it will heal, whereas, a sore of much greater length, but of less diameter, will heal very quickly. The difference is, that the vessels have to elongate from the edge to the centre much less in longitudinal thickness in a circular sore. Sores are very often difficult to heal from the situations. Thus, if a sore be situated at the back of the leg, there will be often great difficulty in healing it. Indeed, such a sore can only be healed by raising the heel, and so loosening the skin, in order to give it a power of being drawn in, to form a narrow cicatrix. By this means the vessels are more readily elongated, and continually draw the skin nearer the centre of the sore.

In cases of severe burns, extensive deformities frequently supervene on the cicatrization of the wounds. The chin has become united to the breast, the arms to the sides, and the upper arm to the fore-arm. Deformities of this kind generally arise after the process of healing is completed; they are the effects of the contraction of the cicatrices, and not of the contraction of the skin at the time of the accident—circumstances that may occur to the ablest practitioner without the possibility of averting them. In the formation of cicatrices the original parts may all be reproduced except two. In the first place, new skin, though differing somewhat in texture and smoothness, is still a substance similar to the original skin. Skin may be defined to be a substance produced by the rete mucosum and cuticle, both of which are produced by the newly formed skin. It has been observed that cicatrices on the negro are at first red; and, after a little time, they turn blacker than the original skin. It may, therefore, be concluded that the skin which is reproduced is true skin; that the cuticle is very quickly reproduced, and the rete mucosum after a short period. The cellular membrane is also reproduced, though it has at first the appearance of a solid fibrous mass, which requires some time before it is drawn into the reticular texture, similar to the original membrane. Tendons are very easily reproduced. If the ten-

illis be divided, it will be reproduced in about a fortnight or weeks; but it will be somewhat longer than the original. Bones are reproduced; not only the shell, but the cancellated structure; not only the salt or phosphate of lime, but the maginous substance in which it is deposited. Nerves are also reproduced; but there is some little doubt whether they assist at the restoration of sensation by anastomosis.

The parts of the body which are not produced are, *first*, muscles. A muscle, when divided, unites by tendons and not by muscular substance. *Secondly*, the cartilages of the ribs unite by bone and not by cartilage. This, however, will in some measure depend on the age of the person; for in very young subjects cartilaginous union will be produced; but in those more advanced in life the cartilages of the ribs invariably unite by bone.

COLLYRIUM.

The name collyrium was formerly given to every medicine applied to check any discharge. The term is now only used to fluid preparations to the eyes, or eye-waters, of which there are a variety of established forms.

COLLYRIUM OF VINEGAR.

Take	Acetic acid.....	℥ij.
	Proof spirit.....	℥ss.
	Rose water.....	℥viii.

Use.—To weak watery eyes, or to remove the pain and sense of itching, experienced in the globes of the eyes, after being excited by close application to one particular object. In chronic ophthalmia, also in the more acute forms, after free evacuations. The strength may be increased or diminished by an increase or diminution of the vinegar.

COLLYRIUM OF THE ACETATE OF AMMONIA WITH CAMPHOR.

Take	Acetated solution of ammonia....	℥ij.
	Camphor mixture.....	℥ij.

Use.—Mildly astringent and stimulating. If ten grains of the extract of opium be dissolved in ℥ij. of hot water, instead of the camphor mixture, and be added to the solution of ammonia, to constitute, when strained through linen, the collyrium of

the acetate of ammonia with opium, which afford relief in the acute stages of ophthalmia, when the pain is considerable.

COLLYRIUM OF AMMONIATED COPPER.

Take Prepared verdigris gr. iv.
 Muriate of ammonia ℥ij.
 Fresh lime-water ℥viiij. Mix.

USE.—Removal of specks on the transparent cornea of the eye, from whatever cause. It is, at best, a doubtful remedy. It is the aqua sapphirina of former writers.

COLLYRIUM OF THE MURIATE OF QUICKSILVER.

Take Muriate of mercury grs. ij. to iv.
 Distilled water ℥viiij. Mix.
 Wilson's P. Chirurg.

USE.—In syphilitic ophthalmia, especially if conjoined with internal exhibition of mercury; also in the scrofulous ophthalmia of children. Mr. Wilson says, in his *Pharm. Chirurg.* that he has often prescribed it with good effects, where the eyelids, and tarsus itself, have been long affected with chronic inflammation, where little troublesome ulcers are situated on its margin. A beneficial in psorophthalmia.

COLLYRIUM OF OPIUM.

Take Soft extract of opium grs. x.
 Camphor grs. vi.
 Distilled water, boiling ℥xij.

Rub the camphor and opium in a mortar till they become well blended together, and add the boiling distilled water; or

Decoction of poppies ℥iv.
 Rose-water, and } of each ℥ij.
 Camphor mixture }

Either of the above may be beneficially used in the early stages of ophthalmia, when accompanied with much pain and swelling, and the latter, at the commencement of the purulent ophthalmia of infants.

COLLYRIUM OF THE SULPHATE OF ZINC.

Take Sulphate of zinc ℥ss.
 Distilled water Oj. Mix.

ANOTHER, OF THE ACETATE OF LEAD.

Distilled water..... $\bar{3}$ vij.

Solution of the acetate of lead ..drops xv to xx.

The strength of this collyrium requires to be regulated according to the irritability of the inflamed eye. It forms a very good astringent wash.

COMPRESSION OF THE BRAIN.

After accidents occurring to the head, symptoms under certain circumstances arise, which indicate pressure on the brain—those symptoms are called by surgeons symptoms of *compression*. It is not at all times easy to say in a particular case, whether they are symptoms of compression, because the cause is not always known by which they are produced. In speaking of compression, therefore, it is implied that the symptoms are of that nature which are commonly found to arise from pressure on the brain. Compression in its most genuine state, may be witnessed in sanguineous apoplexy, where vessels give way, and a large quantity of blood is pressed in the brain, and where the symptoms are such that they cannot be ascribed to any other cause but pressure*.

In a case of sanguineous apoplexy, the patient is immediately deprived of all sensation and voluntary motion; he loses entirely all power over the voluntary muscles, falls to the ground, and remains altogether senseless. The patient is perfectly insensible; and if the eye be opened, or the flame of a candle be presented to it, no perception of light takes place; the pupil is dilated, the iris motionless; the voluntary muscles and the limbs remain in any position in which you place them; the muscular coat of the bladder generally loses its power, so that the patient does not void his urine; and the *sphincter* which should retain the contents of the rectum, losing its power also, excreta pass away involuntarily. The power of sensation and voluntary motion are thus completely suspended—entirely stopped; but the automatic movements go on; the circulation is continued; the pulse is rendered slower than natural; it is performed laboriously, with a degree of difficulty, and in a particular manner which is usually called *stertorous breathing*, a noise being made by the passage of the air through the nose and larynx; the expulsion, in an apoplectic attack be very serious, generally puffs out the lips and cheeks; and in evacuating the lips and cheeks in passing out, the voluntary muscles have lost

CAUSES OF COMPRESSION.—Such pressure may be produced by a fracture of the skull, with depression, or by effusion of blood within the cavity of the cranium in consequence of injury, or by the introduction into the cavity of the skull of extraneous substances, such as gun and pistol shots, pointed weapons, &c. The causes which produce compression are three. 1. Extravasation of blood; 2. Fracture, with depression; 3. Formation of matter within the skull.

SYMPTOMS.—When a person is labouring under compression of the brain, it is known by the stertorous, or noisy breathing, the pulse slow, and dilated pupils; to which may be added the symptoms of concussion (*See CONCUSSION*). Where then a person is labouring under the apoplectic stertor, slow pulse, dilated pupils, it will generally happen that the brain is compressed.

When the brain is compressed by extravasated blood, the symptoms do not directly occur; the person, at the time of the injury is often stunned; recovers himself, and a short time after falls into a comatose state, and then the apoplectic stertor begins. Extravasation with concussion renders the case of a different nature, then the symptoms of concussion come on first, and the apoplectic stertors, with the other symptoms of compression, succeed.

It is found that the extravasated blood, producing compression of the brain, is generally situated in three different parts:—

1. Between dura mater and pia mater.
2. Between the pia mater and the brain; which occurs most frequently.
3. Within the substance of the brain itself.

These are the three situations in which extravasated blood is principally formed. Nor is there any difference of symptoms produced by the different situations of the blood; the compression is produced by the pressure of the blood, and the quantity of blood effused will depend on the size of the vessel of the dura mater

their energy, which is usually considered a very unfavourable sign. Such are the symptoms that are produced by pressure on the brain, when it is a consequence of injury to the head.—*Lawrence's Lect.* See *Lancet*, Vol. VI. p. 524.

is divided: whatever then be the situation of the blood the symptoms of compression are the same. If, however, there should be blood resting on the origin of a nerve, there will be partial paralysis of the part which that nerve supplies.

TREATMENT.—In the treatment of these cases there is little to be done. If extravasation of blood occurs with fracture, trephining may be of use. The patient must be bled freely, for the purpose of preventing inflammation. Irritation is to be lessened, the bowels are to be opened, and the patient kept very quiet. Where there is a bruise near the fracture, indicating the spot where effused blood is, you may trephine that part before symptoms of excitement come on; when they take place, you must deplete, and not think of performing the operation (*See TREPHINE*); to do it under such circumstances would be highly absurd, and the height of madness.”—*Sir A. Cooper*.

In the majority of cases of compression from fracture, we are reduced to the employment of the same means that are adopted in sanguineous apoplexy—that is, we bleed the patient to stop the effusion into the brain, and institute a rigorous antiphlogistic treatment in other respects. By this means the symptoms of compression may be relieved, and ultimately removed. “There are many cases of sanguineous apoplexy,” says Mr. Lawrence, “where patients are completely recovered, and have been examined at some distance of time from the attack, when the evidence of extravasation or effusion of blood into the texture of the brain has still been found, showing that compression, even from very large effusions of blood, is not necessarily fatal, but that patients may be conducted through the attack, and be brought almost to a complete state of recovery. So far, therefore, alleviating treatment remains at our power, although we may not be able to raise the bones or evacuate the blood from the interior of the skull.” *See Lancet*, vol. II. p. 525. 1830. *See also* CONCUSSION—HEAD, INJURIES &c. &c.

CONCRETIONS, MORBID.

Solid substances, formed by disease in the soft parts, or in the cavities of animal bodies. The former are usually called *ossifica-*

tions, as they seem to consist of a calcareous phosphate. They are named according to the part in which they are deposited; e. g. *pineal, salivary, pulmonary, pancreatic, prostatic, gouty, &c.* Deposits in cavities are generally termed *calculi*, from their resemblance to pebbles. These are intestinal, gall-stones or biliary renal and urinary.

CONCUSSION OF THE BRAIN.

Q. What is the difference between concussion and compression of the brain?

A. *Concussion* is simply a shock which the brain has received more or less severe, attended with laceration or not. *Compression* arises from either a depressed portion of bone, the extravasation of blood, or the formation of matter; and from whichever of these causes it originates, the symptoms will be the same.—See COMPRESSION.

SYMPTOMS.—When called to a person in a state of stupefaction but not to a great degree, the pulse regular, tranquil and uniform breathing, and the accident has existed some hours, you will generally be justified in pronouncing that the injury has been trifling. But when the individual has been first seized with vomiting, or is incapable of using any muscular power from loss of nervous influence, a total aberration of the mental faculties, with intermittent pulse and breathing, these will be found the diagnostic symptoms of severe injury, and the case a dangerous one. The diminution of the operations of the mind is often so great in concussion, even where considerable voluntary motion remains, that you cannot, by hallooing as loud as you are capable, get any other answer from the patient than “Eh!” delivered in a gruff under tone.

In simple concussion, where the derangement is not so extensive as that just described,—and where the patient, on being spoken to, raises himself as if awoke from a sound sleep,—and where some power of volition still remains, one of the best diagnostic symptoms is the accelerated action of the pulse upon the patient exerting himself. A man in this state, with a pulse at 70, on being raised, or attempting to walk, will have it inordinately quickened: it will instantly beat 130 in a minute. This is a never-

g symptom; and where the patient can be made to exert himself all, will be found a sure characteristic of the disease. There is, in these cases, a greater action of the carotids than in health: they beat more violently, though not more quickly, if the patient be at rest.

Q What are the best marked symptoms of concussion?

A Increased motion of the carotids; apparent tranquil sleep; instantaneous relapse into that state, after having been roused; remarkable excitement of the pulse upon using exertion; and insensibility having immediately followed the injury.—*See Sir A. Cooper. MS. Lect.*

Q—With respect to the state of the brain under concussion, when the accident is not extremely violent, there is merely a change in the circulation of the brain. A sudden shock will so far disturb the circulation of this organ as to produce a diminution of the powers of the mind, as well as impair the functions of the body. A change of the circulation in the brain alters, in some degree, the powers of mind and body; but if the alteration be very considerable, the powers of the mind will be for a time suspended. For instance, when a person is said to be stunned, there is a sudden alteration of the circulation in the brain, and a corresponding loss of sensibility; but when the circulation is restored by the means properly to be pointed out, the powers of the mind return with those of the body. When the concussion is very violent, a lesion of the brain takes place; but when it is slight, no appearances can be discovered on dissection which indicate any alteration of structure. A person may die from another injury accompanied with concussion, and, on examination after death, not the least alteration may be found in the brain. This is not the case, however, when the concussion is violent: there may be considerable laceration of the organ.

Q What are the effects of concussion, as they may be collected from appearances on dissection?

A When the concussion is slight, it is merely an agitation of the brain, by which the circulation is altered; but when it is severe, the brain itself suffers laceration; which laceration is accompanied with extravasation of blood.

By a knowledge of these facts the practitioner is led, without difficulty, to the principles of treatment.

TREATMENT OF CONCUSSION.—The principal danger to be guarded against, in concussion, is inflammation of the brain. This principle must direct the practice: and, in order to prevent inflammation, a considerable quantity of blood must be taken away. By bleeding largely at first, existing inflammation is not only removed, but that which would otherwise occur is prevented. This practice, however, may be carried to excess. The conduct of the practitioner, in this respect, must be regulated by the symptoms; observing whether there be hardness in the pulse, or if the patient complains of pain in the head, if he have still the power of complaining. The patient must be watched with the greatest possible anxiety; visited at least three times a day; and if there be any hardness of the pulse, supervening after the first copious abstraction of the blood, a tea-cupful of blood may be taken away, but do not go on bleeding him largely; for by this means you would reduce the strength of the patient too much, and prevent the reparative process of nature; for which purpose, a slight degree of inflammation ought to exist. You are to use bleeding in fact, as a means of preventing inflammation; but you are not to resort to it as a matter of course the moment you are called to a patient under concussion. “A man falls from his horse, and the instant he is picked up from the ground, some surgeons think it necessary to take the lancet from their pocket. This conduct is quite irrational; for suppose the pulse could scarcely be felt at the wrist, and the surgeon were, in such a case, asked why he proceeded to bleed? what would his answer be? Either he had no answer to give, or he would, perhaps, say, that he bled the man because the accident had brought a great quantity of blood to the brain; as if the shaking of the head could have any effect in producing determination of blood to the brain. It is not with this view, but with that of preventing inflammation, that bleeding is resorted to in concussion.”—*Sir A. Cooper.*

Emetics are of considerable use; the vomiting produced by them does good, and acts beneficially by relieving the stomach of its contents, as the accident generally happens to persons in a state

vacation; and also by propelling the blood to the brain, and restoring the powers of life; and even the vomiting excited nature restores the patient to his senses for a short time. But, however, emetics are employed in concussion as a remedy, this is only one thing to be apprehended from their use; that is, if there is extravasation of blood in the brain, or any tendency to apoplexy, then they should be employed with caution; "and," observes Sir Astley Cooper, "it is on that account that I wait four or four hours after the accident before I order them."—*Direct.*

With regards the administration of cathartics, the bowels should be kept open with calomel purges, followed by the infusion of castor oil and sulphate of magnesia. The calomel should be given about two hours after the accident; and it will be useful to give the patient, at the same time, a quantity of mild fluids to drink, as this means a disposition to purging is kept up, counter-irritation as it were produced, and the blood is drawn from the brain into the intestinal canal. Submuriate of mercury, with lemon juice diluted in water, should be given. Perspiration on the surface of the body is very desirable; and for this purpose antimonials are employed. The *pulv. ipecac. comp.*, or *Dover's powder*, is not generally used to produce moisture of the skin, on account of the opium it contains, as it confounds the judgment, and prevents the practitioner from seeing what are the effects of the opium, and the course of the disease; for opium produces the same disturbance to the brain as that which takes place in concussion.

Counter-irritation is of use, but not until other means have been resorted to; the object of blisters being to subdue the inflammation, when other means have failed. "I have known a patient," observes Sir Astley Cooper, "with pain in the head, nausea at the stomach, loss of strength, and throbbing of the temples, who had been often relieved by blood-letting, for about a week only after it was done. A person under such circumstances, I have known benefited by the application of a blister, on the principle of not increasing but subduing action, from an excess of which the ill consequences are to be feared. Strict attention is to be paid to the state of the mind; excessive anxiety

must be prevented; for if the mind be disturbed, little or nothing is done towards the recovery. For the symptoms, after concussion, the trephine used to be employed; but it is now a question whether it ever ought to be resorted to as a means of relief under these circumstances. Trephining will do no good, but probably harm, by disturbing the brain."

With respect to the treatment of children labouring under concussion, as they cannot always be bled from the arm, the *submurias hydrargyri*, (calomel,) with mild drink, so as to purge them, must be given; leeches ought to be applied to the temple and the jugular vein must be opened. For the symptoms after concussion, as pain in the head, or sickness at the stomach, an incision must be made through the scalp; issues put in; the head washed with spirits of wine and water; the use of the shower-bath two or three times. These are the best means for giving power to the nervous system, and bringing round the action of the brain into a healthy state.—(See HEAD, INJURIES OF.)

CONJUNCTIVA, INFLAMMATION OF.

The tunica conjunctiva is a thin, transparent, delicate membrane of the eye, that lines the internal superficies of one eyelid, and is reflected from thence over the anterior part of the bulb, thence reflected again to the edge of the other eyelid. That portion which covers the transparent cornea cannot, without much difficulty, be separated from it. It is frequently the seat of inflammation, which, like other inflammations, may be divided into chronic or acute, differing only from them as far as they are modified by the structure of the part, and by the function of the organ. It may exist in various degrees; from the slightest degree of excitement up to inflammation of the most violent and intense character.

CAUSES.—The predisposing causes of this complaint do not differ from those of inflammation in any other part of the body. Extraneous bodies, as particles of dust or sand, a piece of grit, lime, or any of the scoria which often fly off from iron beaten on the anvil. Variation of temperature, especially when accompanied with sudden access of light, will produce this inflammation.

egg in a hot room, where there is much light, and exposed at the same time to a draught of cold air; particular states of the atmosphere, &c. &c.

Symptoms.—The first symptom is redness of the part; which is more remarkable, because the blood, naturally conveyed by the vessels to this part, is colourless. More or less pain, as the vessels are filled at first, is experienced, which goes on increasing till the patient complains of a burning heat, and a sensation as if a foreign body were lodged in the conjunctiva. The admission of the least light or air at the time produces such canceration, that the eye is spasmodically closed. At first there is an abundant secretion of tears, which generally increases until there is a constant flow of water under the eyelids.—*See CHE-
L.*

Treatment.—The antiphlogistic plan of treatment; general venous bleeding, from 8 to 16 ounces, according to age, size of body, and violence of the symptoms. The blood ought to be drawn from a free orifice in a large vein, and continued, till the finger held on the pulse, till some manifest action is produced on the action of the heart and arteries. The application of a sufficient number of leeches; 12 at least will be requisite. Opening the external artery is attended with good effects in this inflammation. Diuretic medicines, such as tartrate of antimony, after blood-letting; the bowels should be freely acted upon by doses of castor oil, combined with jalap, scammony, or cathartic extract; and their effects kept up by the exhibition of neutral salts. A blister to the nape of the neck, after blood has been taken to considerable extent, will be attended with beneficial effects. The head should be raised, and maintained in the elevated position, so as to favour a return of blood from the eyes; and the access of light should also be prevented; at the same time, the room should be well ventilated. As regards the local applications, it will generally be found that moist warmth is most agreeable in acute inflammation of the cornea, applied in the way of fomentations; such as tepid water, decoctions of marsh-mallows, poppy-heads, and especially the steam of warm water, in which opium has been dissolved. Many prefer cold to warm local applications; if the

former be employed, care must be taken that they do not stimulate the part. The choice of these should depend entirely on the feelings of the patient; and if relief be not experienced from the one, the other may be employed. Warm applications, however, must not be continued when the chronic stage has commenced; for they would then do mischief instead of good.

Chronic Inflammation of the Conjunctiva.

SYMPTOMS.—The symptoms of chronic differ from those of acute inflammation of the conjunctiva rather in kind than in degree; so that after they have existed some time in the acute, the disease gradually passes into the chronic.

CAUSES.—The cause of chronic inflammation of the conjunctiva, both exciting and predisposing, are very similar to those of the acute form: the one form, indeed, passes into the other. Chronic inflammation of the conjunctiva is very apt to take place where the patient, for a length of time, has been labouring under a disorder of the digestive organs; it is also very apt to arise from, or to be kept up by, exposure to acrid fumes, or smoke in particular trades. It is often the concomitant of dentition, the measles, or small-pox; and it sometimes accompanies gout and rheumatism; and frequent intoxication, and various other causes, may predispose to it.

TREATMENT.—The change of the inflammation from the acute to the chronic stage should be carefully marked; and at this period all warm applications are to be laid aside, and the plan of treatment altered.

In the chronic stage, the evaculatory plan, to a considerable extent, must be laid aside; the diet, though still not stimulating, must be more generous than in the acute stage. The diaphoretic medicines may be laid aside; nor will it be necessary to evacuate the bowels so freely, though proper attention must be paid to their action. The light is not to be excluded so much as in the acute form. Alterative medicines will often prove beneficial. The local applications ought to be moderately astringent and gently stimulating. For this purpose, various collyria, or eye-waters, are used; such as the solution of alum in water; of the sulphate of zinc, old copper, or the liquor plumbi subacetatis, gradually

raised in strength.—(See COLLYRIUM.) The strength of these washes may be ascertained by the degree of smarting or of itching they may occasion. The best mode of applying an eye-wash is by means of an eye-cup. The syringe, however, is a more manageable instrument. Vinum opii, in the quantity of 1, 2, or 3 drops, is one of the best stimuli in chronic ophthalmia: dropped into the inner canthus of the eye, it acts as a mild astringent, and by its soothing quality, sheathes the effect of the stimulants so that no pain is produced.

CONTUSIONS.

Injuries from bruises, or hard substances coming violently in contact with soft parts, &c. When bruises are of a slight nature, they rarely meet with much attention; but when they are severe, and not attended to, very bad consequences are apt to follow.

In bruises of the latter description, independent of the inflammation, necessarily occasioned by the degree of violence, there follows extensive extravasation, in consequence of the bursting of many of the small vessels of the part. Even vessels of larger calibre are sometimes ruptured, and considerable collections of blood are the consequence. In fine, the violence may have been so great, that the parts injured are from the commencement deprived of vitality.

TREATMENT OF BRUISES.—The three following indications in the treatment of bruises claim, in succession, the attention of the physician.

1. To prevent and diminish inflammation, by retaining the injured parts in a perfect state of rest, in as relaxed a position as is possible, covering the seat of the injury with linen, constantly wet with the liq. plumbi. dilut. And, should the injury be very extensive, general and local bleeding will be necessary. In severe cases the bowels should be regulated with saline purgatives.

2. To promote absorption of the extravasated blood, by means of frictions, which may at once be employed in all ordinary cases of this kind, where there has not been too great a degree of violence applied, by which the tone of the muscular and blood vessels have suffered; since there is no applica-

tion so beneficial as those which elicit a continual evaporation from the bruised part, such, for instance, as some cold saturnine lotion, with the repeated use of a proper number of leeches (*see* LEECHES); and subsequently the soap or camphor liniments.—*See* LINIMENTS.

3. The application of a bandage, if the situation admit of it, support the weakened tone of the parts, which often swell and become œdematous, when the patient takes exercise, or allow them to hang down, as their functions may require. Cold water pumped two or three times a-day on a part thus circumstanced will improve it. These, with the continuation of liniments, at proper intervals, combined with moderate and gradual exercise will speedily bring round the injured part to a state of health.

DIAG.—The results of bruises are not always proportioned to the degree of violence by which they have been caused. When a bruise takes place on a bone which is thinly covered with soft parts, the latter invariably suffers very seriously from having been pressed at the time the injury was received between two hard substances. Bruises which affect the large joints are always serious; the inflammation induced is generally of an obstinate kind; and abscesses, and other diseases which may follow, afford proper ground for serious apprehension.

CORNEA.

The sclerotic coat of the eye is thus called in consequence of its being of a horny consistence. It is of a white colour, dense and tenacious. Its anterior part, which is transparent, is termed the *cornea transparens*. It is into this coat of the eye that the muscles of the bulb are inserted.

DISEASES OF THE CORNEA.—The cornea is subject to inflammation and consequent ulceration.

SYMPTOMS.—When inflammation attacks the transparent cornea, there is a hazy appearance; the cornea loses its natural lustre; and in a short time there may be discovered on its surface vessels carrying red blood, and then the symptoms will be those of inflammation in general; the patient will complain of intolerance of light, and have also effusion of tears. If the inflammation

continues, matter, in yellowish fluctuating spots, forms between the lamellæ of the cornea, and gradually extends till it occupies one-third or one-fourth of it.

ULCERATION OF THE CORNEA.—Is the common consequence of inflammation of this coat; but it is very frequently produced by the contact of matter in purulent ophthalmia, and the irritation of lime, or by sharp pointed bodies insinuated into the cornea; or, indeed, by any irritating substances, chemical or mechanical, that may be introduced into the eye. The inflammation causes the formation of pus; this bursts, and the ulcer is formed.

APPEARANCE OF THE ULCERS.—The edges of these ulcers are irregular, uneven, and elevated, the ulcer itself having an ash-coloured appearance; the patient complains of great pain; there is also be a discharge of a good deal of acrid and irritating matter.

To distinguish these ulcers, the eye must be placed in a dark room, and a side view taken of the organ. Their situation varies; sometimes they are at the superior portion, affecting only the external lamellæ, in other cases spreading over the whole of the cornea, and penetrating into the anterior chamber of the eye; which means the aqueous humour escapes, and the iris is often protruded; sometimes even the opening becomes enlarged, and the crystalline humour escapes.

TREATMENT.—There is no material difference between the treatment of inflammation of the cornea, and that of the conjunctiva, (see CONJUNCTIVA,) or any other part of the eye. Reliance must be placed on the efficacy of a rigid antiphlogistic plan; and when the acute inflammation has been subdued, on the use of the astringent collyria. If ulcers of the cornea be accompanied by acute inflammation, active means must be used. It will be necessary to employ bleeding, by means of leeches, to the temple, and vicinity of the eye, before the use of astringents, and at the same time to keep the bowels open by mild aperients. The ulcers must be closely watched, lest they become everted. The best remedy, and one on which you can depend, in ulcers of the cornea, is the nitrate of silver, in a state of solution, about one or two grains to water ℥j.; though it is better to begin with it in

the first proportion, regulating the strength to the degree of irritation it may produce. Scarpa gives the preference to the caustic in substance, cut to a sharp point, and the ulcer touched with it. An eschar forms, which in the course of two or three days falls off, and the symptoms of the disease return as before; the caustic is again applied, and repeated a third time if necessary. The ulcer by this means loses its ash-coloured appearance, the edges become regular and even, and it rapidly heals.

OBS.—When ulcers of the cornea heal, it is by cicatrization as in every other part of the body, and specks remain, which are nothing more than rounded spots of coagulable lymph, and are denominated *leucoma*, or *albugo*. In these cases the rays of light are not prevented from entering the eye, unless the spots are in the axis of vision, and then they are interrupted.

CORNS

Are small hard tumours commonly seated on the toes, or other parts of the feet; sometimes they affect the hands.

CAUSES.—Pressure, long and continued, arising usually from shoes of too small dimensions.

TREATMENT.—The common method of treating corns, is to bathe the feet for about half an hour in warm water, then to pare them as close as possible without giving pain; and afterwards applying a little adhesive or soap plaster. This process should be repeated from time to time. If the causes occasioning these troublesome appendages be also removed, this treatment generally proves effectual. Another method is to allow the corns to grow to some length, through a piece of leather with a hole in it. They may afterwards be cut round the root, or simply extracted. Should the corn be on the sole of the foot, it will sometimes be expedient to put a felt sole in the shoe, in which a hole may be made large enough to admit the part affected.

Mr. Wardrop, as well as Mr. Lawrence, recommends for the radical cure of corns, to cut or tear away as much of the corn as can be done with safety, afterwards placing the toe for some time in warm water; and when the circumjacent skin has been well dried, to rub the exposed surface of the corn with the nitrate of quick-

er; or moistening it, by means of a camel's hair pencil, with solution of the oxymuriate of mercury in sp. of wine. Either of these applications, says Mr. Wardrop, two or three times repeated, will mostly effect a cure.—*See Med. Chir. Trans. Vol. V. p. 113*; *Lawrence's Lect. in Lancet, Vol. II. 1830.*

As a preventive of corns, and bunions, which require the same treatment, the size and figure of the shoe ought to be strictly attended to. It should be made sufficiently large, and of a shape corresponding to that of the foot. An individual entirely cured of corns, is sure to be affected with them again, unless the causes be carefully avoided.

COUCHING.

A surgical operation, which consists in removing the opaque part out of the axis of vision, by means of a needle constructed for the purpose, so as to procure dispersion and absorption of the cataract.—*See CATARACT.*

CREPITUS.

A word usually employed to express the pathognomonic symptoms of air collected in the cellular membranes of the body; for when air is confined within such media, and the part is pressed, a little crackling noise or crepitus is distinctly heard. Also by crepitus is understood the grating sensation, or *crepitating* noise, occasioned by the disturbed ends of a fractured bone; one of the most unequivocal symptoms of the existence of such an accident.

CUPPING.

The local abstraction of blood, by means of a scarificator and a cup-shaped glass. The scarifying instrument contains a number of lancets—sometimes as many as twenty, so contrived that, when the instrument is applied to any part of the surface of the body and a spring is pressed, they instantly start out, and make the necessary punctures; the depth of which may be made greater or less at the option of the cupper. As by this operation a small quantity of blood only, from the smallness of the vessels wounded,

could be abstracted, were it not promoted by means of what is termed a cupping-glass, the air within the cavity of which is rarified by the flame of a little lamp, containing spirits of wine, and furnished with a thick wick, a plan preferable to that of setting fire to a piece of tow dipped in that fluid, and applied under the glass, which Mr. Mapleson, in his Treatise on the Art of Cupping, stigmatises as "a clumsy expedient, adding unnecessarily to the sufferings of the patient, by cauterising the skin; doing harm also by rarifying the air more than is necessary within the glass; in consequence of which, the edges of the cup compress the cutaneous vessels so much as to obstruct the influx of blood. The larger the glass, if properly exhausted, the less pain does the patient suffer, and the more freely does the blood flow." When the mouth of the glass is placed over the scarifications, and the rarified air within it becomes condensed as it cools, the glass is forced down on the skin, and a considerable suction takes place.

The number of the cupping-glasses judged necessary are to be put in the basin. If sixteen or twenty ounces of blood are to be abstracted, four glasses, of a size adapted to the surface to which they are to be applied, will generally be required. Each glass is then to be held for an instant over the flame of the spirit-lamp, and immediately placed upon the skin; and upon the quickness with which this part of the operation is performed, its neatness and efficacy will depend.

If dry-cupping be only intended, the glasses may be allowed to remain on the skin for a few seconds, and be replaced five or six times, varying their position a little to prevent the skin from being injured by their pressure. If the intention be to scarify and abstract blood, the glass ought not to remain more than a minute, when the scarificator is to be *instantly* applied; for by the quickness with which the application of the instrument succeeds the removal of the glass, the patient is saved a degree of pain which he would otherwise suffer. When the glasses are so full as to be in danger of falling off, or the blood is coagulated within them, they ought to be removed, emptied, and applied again.

"For the sake of neatness," Mr. Mapleson observes, "care should be taken to insert the nail under the upper part of the

and remove it so as to keep its bottom downwards, the scarifications being at the same time wiped with a sponge wet in warm water. The glasses, also, previously to each application, should be rinsed in warm water, but not dried." A common sheet of lint, or bit of rag, is usually used as a dressing for the incisions made with a scarificator; and if a little smarting be not needed, Mr. Mapleson recommends the application of arquebush-water, or spirits of wine, as it immediately stops the oozing of blood, and prevents subsequent itching.

DECOCTIONS.

Decoctions are watery solutions of the active principles of vegetables, obtained by boiling, intended to afford more powerful remedies than can be procured by the simple infusion of the same substances in cold, or even boiling water. Some of the principles of this class are, the

DECOCTION, COMPOUND OF ALOES; the medicinal properties of which are stomachic, cathartic, and emmenagogue. It is exhibited in jaundice, chlorosis, hypochondriasis, &c. In doses from $\mathfrak{z}\text{ss.}$ to $\mathfrak{z}\text{jss.}$

DECOCTION OF MARSH MALLOW.—Its properties are demulcent; and it is exhibited, *ad libitum*, in calculous and nephritic complaints, strangury, &c.

DECOCTION OF CINCHONA.—Tonic and astringent; and exhibited in the same cases as the bark itself, for those whose stomachs will not bear the powder. In doses of $\mathfrak{z}\text{j.}$ to $\mathfrak{z}\text{iv.}$

DECOCTION OF HARTSHORN.—In this preparation a mucilaginous liquid only is prepared, but not a particle of the hartshorn is dissolved. It has been employed in diarrhœas, &c. Dose, $\mathfrak{z}\text{ss.}$

DECOCTION OF MEZEREON.—Stimulant, diaphoretic, alterative. In venereal, rheumatic, glandular, and cutaneous affections, in doses of $\mathfrak{z}\text{ij.}$ to $\mathfrak{z}\text{iv.}$, three or four times a day. It possesses very little, if any, antisyphilitic power.

DECOCTION OF FOXGLOVE.—Diuretic and narcotic. In dropsy, humoral asthma, phthisis, and inflammatory fevers, to

diminish the action of the heart and arteries. Dose, ʒij. to ʒij. or more, three or four times a day.

7. DECOCTION OF WOODY NIGHTSHADE.—Diuretic, narcotic, diaphoretic. In cutaneous, venereal, and rheumatic affections, humoral asthma, dropsy, &c. Dose, ʒss. and ʒij., three or four times a day, with aromatic tinctures, milk, &c.

8. DECOCTION OF CABBAGE BARK TREE.—Anthelmintic, cathartic, narcotic. In worms, particularly lumbrici. Dose, in children, ʒij. to ʒss.; to adults, ʒj. to ʒij. Vomiting, delirium, and fever, are sometimes the consequences of an over dose, or drinking cold water during its action. These effects may be relieved by castor oil, warm water, and diluted vegetable acids.

9. DECOCTION, COMPOUND OF GUAIACUM.—Diaphoretic, stimulant. In chronic rheumatism, cutaneous and venereal affections; indolent, scrofulous, and venereal ulcers; thickening of the ligaments, periosteum, &c. Dose, ʒiv. to oss., three or four times in the day.

10. DECOCTION OF LIQUORICE-ROOT.—Demulcent, *ad libitum*.

11. DECOCTION OF SARSAPARILLA.—Alterative. Diaphoretic. In rheumatic cases, cutaneous affections, and some of the sequelæ of syphilis, scrofula, &c. Dose, ʒiv. to oss., three or four times a day. *Note.* The compound decoction of sarsaparilla, which is an improvement of the once celebrated Lisbon diet drink, is used also with the above intention.

12. DECOCTION OF BARLEY, SIMPLE AND COMPOUND.—Nutritive, emollient, and diluent. In the inflammatory stage of gonorrhœa, ardor urinæ, strangury, febrile, and other acute diseases, *ad libitum*.

13. DECOCTION OF POPPIES.—Anodyne. Emollient. For fomentations and clysters.

14. DECOCTION OF OAK-BARK.—In gargles, with alum in cynanche; also as an injection in leucorrhœa, remaining after mercurial course, prolapsus ani, hemorrhages from the uterus, &c. The proportion of alum is ʒss. to ʒj. to each Oj. of the decoction.

15. DECOCTION OF WHITE HELLEBORE.—Externally as wash in tinea, lepra, psora, &c. It sometimes requires dilution.

The proportions necessary to constitute these decoctions, to bring them under the officinal form of the Pharmacopœias, accurately laid down in the "NEW LONDON POCKET DISPENSATORY."

DIGESTIVE ORGANS, SYMPATHY OF.

ILLUSTRATION.—As local diseases become the source of constitutional derangement, so (observes Mr. Abernethy), on the other hand, *local disease* is often the result of a *general disturbance of the system*; and these reciprocal actions are produced through the medium of what has been called an universal sympathy. If the local disease, which acts as an irritation to the general system, be extensive, or be seated in an important part, the sanguiferous and excretory functions are disordered, and this disorder is characterised by the term fever, in the nature of which peculiarities are met with according to the particular state of the constitution at the time. Hence we find that the glands are affected with inflammatory fever, that there is languor in the hectic, and sensorial derangement in the irritative fever. It is called a state of fever, because it is somewhat marked by the fulness of the pulse, and the variation of the temperature of the body.

The sanguiferous system is not that alone which is affected—the nervous system is likewise thrown into a similar disorder.

SYMPTOMS.—There is great agitation, restlessness, irritability, &c. The nervous system is in a state of excitement, by which the functions of all the organs of the body are very much influenced, and the secernent system very much disturbed. There is, in fact, an immediate connection of all the parts of the body, through the medium of the nervous system, therefore the less wonder why the whole should more or less suffer from the injury of a part. But whether the brain first influences the stomach through the nervous system, or whether the stomach being first disturbed, irritates, through the same medium, the brain, is a question not so easily determined. There is, however, a reciprocal action established, both of disorder of the digestive organs on the nervous system, and of the nervous system on the digestive organs. It is, in fact, by a universal sympathy that we find the digestive organ af-

fect, as well as other parts of the body; and this was noticed by John Hunter; who observed that violent local irritation was followed by a general reaction which is excited, produce violent disorder in the digestive organs.

To illustrate the force of this sympathetic action, let us suppose an operation is performed, and the patient put to bed; but during the night he becomes restless and uneasy; then flatulency and pain in the stomach, nausea, and perhaps vomiting; his skin becomes hot and dry, and the bowels constipated. What is to be done in this case? Relieve the turbulence of the system, by evacuating the secretions from the inflamed organs; and medicines given with such a view should not be given in irritating doses, but in moderate quantities, and at regular intervals. But these medicines will not act.—What is then to be done? They are to be continued until they do act. The patient may resist their influence, even until the second or third day, when he will begin at length to feel some gurgling in his bowels, after which, about twenty or thirty fetid evacuations may take place. Relief soon follows, yet the patient has probably taken nothing but a little toast and water during the whole time; and this large quantity of fluid, therefore, which is discharged, is the morbid secretion from the alimentary canal, and the other abdominal viscera.

The various affections of the mind, as perplexity, fear, anxiety, and grief, never fail to disorder the person's stomach and bowels. The brain influences the stomach, and the stomach the brain. This subject is one of the greatest professional importance. "The disorders of the stomach and bowels are the fruitful parent of a very numerous and dissimilar progeny of local diseases."—*Abolition of the Nethy*. If the stomach cannot digest what it receives, what is retained there must be creating compounds of a most irritating kind, and prove a source of contamination rather than nourishment to the system. The secretions are generally disordered when the sanguiferous system is in a disturbed state. Between the sanguiferous and secerning functions there is a very close relation, as may be instanced in the office of the kidney in particular, which acts as a very powerful drain to the mass of circulating fluid, and gets rid of a large quantity of matter which would otherwise become

of inconvenience, and perhaps injurious to the constitution. The state of the mind must frequently have been observed when the digestive organs have had their functions disturbed; and this morbid sympathy may probably be explained by attending to the source from which they derive their nervous influence; and they do from the splanchnic nerves, or from the ganglia connected principally of those nerves. This is what Mr. Abernethy and Mr. Hunter's physiology—it is the science which looks to the organs associated in their functions, and to their liability to be disordered by certain causes.

TREATMENT.—The treatment necessary to be pursued when the digestive organs are deranged, unless from local causes, consists in adopting a moderate diet, as regards quantity, that should be wholly animal nor vegetable, but of a light nutritious partaking of a proper proportion of each. The functions of the alimentary canal should be regularly performed; and the nature, as well as the quantity, of the secretions and excretions regulated, by the occasional interposition of some gentle laxative compound, such as a little senna tea with some manna, or a little decoction of rhubarb, sufficient to move the alimentary canal. When the functions of the brain are deranged, the result will be observed in the functions of other organs, associated with it in its being impeded. "Yet a blue pill," says Mr. Abernethy, "doses of this kind, will sometimes do wonders, if the regulation of the diet be at the same time attended to." Mercury, when administered in small doses, and influencing the secretion of such an important organ, without disturbing the function of any, has been when thus employed, alterative. There are a variety of medicines which have, from their influence on the liver, and increasing its secretion, been called anti-bilious; but, observes Mr. Abernethy, "I should call them pro-bilious;" and justly so, when they are calculated to promote a preternatural secretion of bile. When the appetite flags and the stomach feels weak, the exhibition of a tonic, such as an infusion of calumba and cascarilla, in combination with some of the mineral acids. The decoction of cascarilla exerts a very beneficial influence on the irritable state of the system, and it appears to do so by acting on the nerves of

the stomach, and thus producing a tranquillizing effect. When an individual has palpitations of the heart, and uneasiness, with flatulence and distension, the consequence of deranged digestive organs, carminatives will be of great service, and afford much relief. Purgatives, be they of what kind they may, cannot succeed in procuring the wished for result by mere force, but by repeated solicitation. The medicine should be given in doses of moderate quantity so as to act mildly; it should also be mild in its nature and given at regular periods, say every four hours, and this is what is called soliciting the secretions. In deranged digestive organs from local diseases, the practitioner's aim is to remove the cause by such means as may be indicated by combating the symptoms as they arise.

DIPLOPIA.

Diplopia, or double vision, is of two kinds. One, for instance, where the individual either beholds an object treble, or more only when he regards it with both eyes, and, no sooner is one eye shut, than the object is viewed single, as it ought to be—or he sees every object double, whether it be surveyed with one or both eyes. This disorder is sometimes of short duration, and may be caused in a healthy eye by some accidental circumstance—generally some irritation affecting the organization. The causes, however, of this action of the eyes are divided by oculists into four classes,—for a knowledge of which Haller, Richter, Hunter, Beer, Home, and others, may be consulted.

DISLOCATION, OR LUXATION.

DEFINITION.—“A dislocation is the removal of the articulating portion of a bone from that surface to which it is naturally connected.”—*Sir A. Cooper.*

“This (dislocation) consists in the permanent separation of one, two, or more bones, that are mutually articulated together—a separation that is generally produced by external violence.”—*Mr. Lawrence, see Lancet, Vol. II. p. 496.*

All the union of bones admit of being separated, so that, perhaps, it may be said, that every bone in the body is liable to

located; yet some of them are so very strong that they do not give way, except on the application of excessive force, which produces other effects more important, in all probability, than the separation of the bones; so that the separation of the bones, under these circumstances, becomes a matter of inferior importance.

The various bones which, for instance, compose the skull, may admit of being separated, except by external force of this very serious kind. In like manner, the bones of the pelvis, and bones connected together by plain surfaces, these being generally what are called short bones,* which are thick, and where the articular surfaces are as broad as the bones themselves; such as the vertebrae, various bones of the tarsus and carpus which are connected together by very strong ligaments; they are articulated by surfaces which are very large compared with the bones themselves; and although, in point of fact, they can actually be separated by external force, yet the separation takes place very rarely; and when it does occur, it is by means of some excessive force applied in such a way as to destroy the general connexion of the parts.

The articulations then, which are principally subject to dislocation, and the dislocation of which constitutes the greatest number of accidents we have to treat, are the ginglymoid, or hinge-like joints, and the orbicular, and the latter are by far the most subject to luxation in consequence of not being so mechanically locked together as the former; neither are they surrounded by such strong ligaments to restrain them in certain

viewed with regard to form, bones have been arranged under three classes, viz. the *long*, the *broad*, and the *short* bones. The first, in general, belong to the parts of locomotion, where they become levers moved in various directions by the muscles. The second are little connected with locomotion, serving chiefly for the insertion of muscles which proceed to the long bones. They also form cavities, such as those of the skull and pelvis. The third, the *short bones*, are situated in those parts in which solidity and motion must be united, as in the spine, the wrist, and the instep, where their number unites these two properties, viz. solidity, because the force of external mechanical shocks is expended in the wide surface by which they are connected; and mobility, because from their individual partial motions, there results collectively a very extensive general one.

directions; so that the ginglymoid joints require more force to displace them than the orbicular, and is also more serious when it does happen. The dislocation of the elbow, which is one of the ginglymoid joints, is usually attended with much more laceration of the soft parts than that of the humerus, which is an orbicular joint.

Dislocations may be *complete* or *incomplete*; that is, the articular surfaces may be completely or only partially luxated. Practically speaking, however, but little is known of incomplete luxation. Perhaps the orbicular joints, which are the most commonly luxated, hardly admit of incomplete luxation. Instances have occurred where the head of the humerus has rested on the edge of the glenoid cavity of the scapula; but it is difficult to suppose it could possibly rest there; and indeed, if it could, the case does not differ in point of treatment from a complete luxation. The ginglymoid joints, however, particularly the ankle joint, do admit of partial dislocation. There is another kind of luxation mentioned by surgical writers, called *spontaneous*, or *consecutive* luxation. This is an accident happening in consequence of disease. When the ligaments which connect the bones together are altered by disease of the joint, one of the bones may be thrown out of its situation by the action of the muscles, the ordinary ligamentous restraints then presenting no opposition to such an event—an occurrence which not uncommonly takes place in the hip joint; and is occasionally seen in the knee. It is, however, a phenomenon connected with the disease of the joint, and not to be considered in connexion with the object now in view, viz. the separation of the articular ends of the bones from external violence.

CAUSES OF DISLOCATION.—The causes of dislocation are chiefly the application of some considerable external force, which moves the end, by which the bone is articulated with the trunk of the body, beyond the limit of the motion which the part naturally admits. A person, in stretching out his arm to save himself from falling, will receive the weight or force of his body upon the hand, and this will throw the head of the humerus from the glenoid cavity into the axilla. Luxation may take place in consequence of muscular action; but this is a rare occurrence, because there is such an exact

relation between the configuration of the joints and the movements which a part is capable of executing by means of its muscles.

In the lower jaw, we see that dislocation takes place without external violence, probably in consequence of one or more of the muscles. Dislocation, therefore, may be produced by muscular action, without external violence, and certainly by the concurrence of both of these it may and actually does take place. And although dislocations may arise with or without violence, and in the former case be attended by laceration of the ligaments of the joint, yet they sometimes happen from relaxation of the ligaments, more especially when there has been an abundant secretion of synovia, which must have the effect of extending the capsule consequently of weakening the articulation. The patella is sometimes dislocated from this cause. If muscles are put and kept upon the stretch, their power of contraction is in a great measure lost; or if, from paralysis, they lose their action, a bone may be easily dislocated and reduced as quickly. Dislocations are sometimes accompanied with fracture. At the ankle joint a dislocation seldom occurs without fracture of the fibula. Sometimes the acetabulum is broken in dislocation of the hip joint. When a bone is both fractured and dislocated, it is best to reduce the dislocation without loss of time, taking care that the fractured part is strongly bandaged in splints, to prevent any injury being done to the muscles; for, if this be not done at first, it cannot afterwards, without, in all probability, disuniting the fracture.

Symptoms of Dislocation.—In the first place, pain is experienced in the joint, and there is either great difficulty or absolute inability to execute any motion. But these are equivocal signs, because they belong also to other kinds of accidents. A serious bruise, a strain, or a fracture, will be attended with pain and with difficulty, or inability of motion. Further symptoms, therefore, are necessary to convince us that dislocation has taken place. These are principally to be sought for in the change and appearance of the joint which the dislocation produces, as well as in the configuration or position of that part of the limb in which it is situated. In the former place, there will, of course, be alteration in the figure of the joint; there will be alteration in the various bony points, or

prominences, that enter into the articulation. The situations of these must be essentially changed. These alterations are more distinct in the early state of the joint; swelling comes on pretty soon, and often obscures the points now alluded to, so that if some hours have elapsed after the accident, you do not get so clear an evidence respecting the configuration and the changes as you do immediately after it has taken place; there is also a corresponding change in the condition of the limb. The limb may be lengthened, or it may be shortened, according to the position in which the head of the dislocated bone may be carried; or the axis of the limb may be altered in its direction, in relation to the bone, or in relation to the body. These appearances first strike the eye on contemplating the limb. Then again with these alterations in the configuration, in the appearance, in the direction, in the axis of the limb, the limb itself is so fixed in the unnatural position into which it is thrown, that the patient cannot move it, nor can it be moved for him, except, indeed, in a very slight degree, and with considerable pain. The limb has all the appearance of being mechanically confined in the situation of the displacement. This fixation, however, is less complete immediately after the accident than when some little time has elapsed, the muscles having then so adapted themselves to the position of the bone as to hold it more firmly in its unnatural place. The degree of immobility, too, differs in particular cases. In dislocation of the hip joint the limb has far less power of motion than in dislocations of the humerus.

TREATMENT OF DISLOCATIONS.—The general treatment of dislocations consists in reduction of the joint, and retaining it in its natural situation. The difficulty in reducing a dislocation is in proportion to the time which has been allowed to elapse after the accident. In recent cases it is easily effected; but if it has happened a few days, it is reduced with great difficulty. Still, however, difficulties arise from other causes. If the muscular power be very great, the exertion necessary to reduce the dislocation must be very great also. In such a person the reduction of the humerus ought never to be attempted after three months; but, if the patient be less muscular, four months should be the utmost

In dislocation of the thigh, two months may be fixed on the time, beyond which it would be wrong to make any attempt to reduce it in a person of very relaxed fibre, when a little more time may be allowed. In those cases where it has been said the dislocations have been reduced a long time after the accident, the patient has never been able to use the joint extensively. Difficulties likewise arise from the head of the bones catching against the articular cavity, as in the dislocation of the thigh bone into the foramen ovale and ischiatic notch, where it is necessary to move the head before it can be returned; or where the head of the bone is longer than its cervix, or in dislocations of the radius, it is thought that the opening in the capsular ligament was too small, and therefore impeded the return of the bone; "but such persons must have looked over the circumstance that the ligaments are elastic, and as the opening in it was sufficiently large to allow the head of the bone to pass out, so it must also allow it to be re-duced through the same aperture."—*Sir A. Cooper, on Dislocations.* The peculiar ligaments of joints sometimes prevent the reduction of dislocations, as in the knee, where the bone should be moved in such a direction as to relieve that ligament which remains entire. The ligaments of the ankle joint are of extraordinary strength; and the bones of this joint will often rather break than their ligaments give way.—*Ibid.*

In dislocations, as in fractures," says Pott, "our chief attention ought to be paid to the muscles belonging to the part affected. These are the moving powers, and by these the joints, as well as the moving parts, are put in action: while the parts to be moved are in the right order and disposition, their actions will be regular and assist, and generally determinable by the will of the agent (at least in what are called voluntary motions); but when the said parts are disturbed from that order and disposition, the action or motion of the muscles does not therefore cease—far from it; they continue to exert themselves occasionally, but instead of producing regular motions at the will of the agent, they pull and move the parts they are attached to, and which, by being dislocated, cannot perform the functions for which they were designed. These, principally, arise the trouble and difficulty which attend

the reduction of luxated joints." And hence the great advantage of considering the power and direction of the larger muscles previous to making any attempts at reduction.

Unaided by constitutional remedies, the most powerful mechanical means would fail. The constitutional means to be employed for the purpose of reduction are those which produce a tendency to syncope; and this necessary state may be best induced by one or other of the following means:—

1. Nausea;
2. Bleeding; or,
3. The warm bath.

The second means is considered the most powerful, though, in recent cases, it may not be required. That the effect may be produced as quickly as possible, the blood should be drawn from a large orifice, and the patient kept in the erect position; for by this mode of depletion fainting is produced before so large a quantity of blood as might injure the patient is lost.

a. Where the warm bath is preferred, it should be employed at the temperature of 100 to 110; and as the object is to produce syncope, the patient should be kept in it till this effect be produced; he should then be immediately wrapt in a warm blanket, and the mechanical power applied.

b. It may also be accomplished by giving nauseating doses of tartarised antimony; as a quarter or half of a grain every five minutes. And a good proof of the effect of nausea is, the man being unable to lift his hand on a level with his shoulder. As the action is rather uncertain, it is better to use it with a view to keeping up the nausea first produced by the preceding measures.

c. The reduction of the bone is to be attempted, after diminishing the power of the muscles, by fixing one bone and drawing the other towards its socket. The force should be gradually applied, and it is in this way only that that state of fatigue and relaxation is produced which is sure to follow continual extension. The most effectual mode of tiring the muscular power is by the pulleys, because, then, the force may be made *gentle* and *continued*,—the proper manner in which it ought to be applied, and which may be gradually increased; whereas the exertions of assistants, when

mode is adopted, are sudden, violent, and often ill directed; much a force is more likely to produce a laceration of the parts than to restore the bone to its natural situation.

APPLICATION OF THE PULLEYS, AND MODE OF REDUCTION.—Pulleys may be so constructed as to consist of a single, a double, or treble purchase; admitting of still further increase of power, in proportion to the number of sheaves or rollers in the blocks. A single purchase consists of a block and sheave at each end of the cord; a double purchase is a twofold block; that is, with double sheaves or rollers at the upper end, or that end which is hooked and made fast to the fulcrum, or purchase-post, and a single-sheaved block at the opposite end, which is that end applied to the substance to be moved; a treble-purchase pulley has a three-sheaved block at the fulcrum or standing end, with a double one at the opposite, and is a remarkably powerful purchase. The single or double purchase will, however, answer the purpose for the reduction of dislocations.

Before applying either of these levers, a wetted roller is to be placed round the limb, and over this the leather with the rings, to which the running block is to be fastened or hooked on. These being fixed the cord is to be drawn very gently until the muscles begin to make some resistance: you are then to rest two or three minutes, and then extend again; and so on, till the muscles begin to relax, when, by a little further gradual extension, they will be overcome, and the bone will slip easily into its socket. Sometimes the bone goes into the joint without producing any noise; care, therefore, is necessary, that the extension be not kept up too long.

Remarks.—In recent dislocations, the use of pulleys is not necessary, unless in those of the thigh, and of the shoulder which have remained long unreduced. The most proper place to apply the pulleys is on the bone to be reduced. At the same time the bone, with which the dislocated head is naturally articulated must be kept motionless by counter-extension, or a force almost equal to that applied, but made in a contrary direction. Without this, extension would prove worse than useless. And the extension should be first made in the same direction in which the

dislocated bone is thrown ; but, in proportion as the muscles yield the bone is to be gradually brought back into its natural situation. The part from which the bone was dislocated must be well secured after the reduction, as, without the aid of bandages, the bone will not remain in its place, particularly where much relaxation exists, until the surrounding muscles resume their conjoint tone. After the reduction, rest is necessary for some time, to allow the ruptured ligaments to unite, which exercise or motion would retard if not prevent. Excess of inflammatory action is to be guarded against in the joint and neighbouring parts, by an evaporating lotion, as the white wash (*see* LOTIONS); and, if necessary, by the application of a sufficient number of leeches.

I. DISLOCATION OF THE SPINE, OR VERTEBRAL COLUMN.

“ If,” says Sir Astley Cooper, “ dislocation of the spine ever happens, it is a very rare accident ; and I have never met with a case of it. Still it is possible, that dislocation of the cervical vertebræ might happen, as the articulating processes are more oblique in them than in the other vertebræ. Dislocations of the spine seldom occur without a fracture of the articulating processes, or of the arches of the vertebræ. Whenever fracture happens, displacement is generally the immediate result, and the spinal marrow becomes compressed by the arches of the vertebræ.

“ When the cervical and dorsal vertebræ are fractured, the spinal marrow is generally torn ; but in the lumbar vertebræ the medulla spinalis* becomes firmer, and is not so easily lacerated. The symptoms produced by pressure on the spinal marrow are a loss of

* The spinal marrow; a continuation of the medulla oblongata, which descends into the specus vertebralis, from the foramen magnum occipitale, to the third vertebræ of the loins, where it terminates in a number of nerves, which, from their resemblance to a horse's tail, are called *cauda equina*. The spinal marrow is composed, like the brain, of a cortical and medullary substance; the former is placed internally. It is covered by a continuation of the dura mater, pia mater, and tunica arachnoidea. The use of the spinal marrow is to give off, through the lateral or intervertebral foramina, thirty pairs of nerves, called (8) cervical, (12) dorsal, (5) lumbar, and (5) sacral nerves.

ability and of motion in the parts supplied from that portion of the medulla below the accident. The extent of the effects of the injury must, therefore, depend on its approximation to the

If the upper vertebræ be injured, sensation is lost in the upper extremities; if the dorsal vertebræ, or upper lumbar, the lower extremities become insensible; and if the lumbar be injured, the bladder passes involuntarily, and the urine is retained;—phenomena which are accounted for in the following manner, viz.: the nerves of sensation supplying the sphincter ani are injured, and the power of contraction is lost, whilst the involuntary peristaltic action continues; the nerves supplying the *acceleratores urinæ*, being in part derived from the *cauda equina*, have their functions destroyed; the will has no influence over the bladder; and the passage of urine is prevented, being arrested by the elasticity of the urethra. When the patient becomes very weak, and is almost dying, the urine passes off stillatitiously, *i. e.* drop by drop, from the elasticity of the urethra being diminished. Persons live three or four weeks after an accident of this nature to the lumbar vertebræ, though they have been known, in some instances, to survive no longer.

When the injury has been received on the dorsal vertebræ, the lungs are very much distended with air, and the functions of the thoracic vertebræ are very much disturbed. A person having a fracture of the *dorsal* vertebræ commonly lives about a fortnight or three weeks: the time, however, that the patient may be expected to live will depend very much whether the injury be near or distant from the cervical vertebræ; whether the displacement be slight or otherwise; and upon the degree of injury the spinal marrow has received.

If the *cervical* vertebræ be broken, death soon follows. Paralysis of the upper extremities is sure to be the result, and also of the lower parts of the body; but this paralysis is not complete.

The fourth and fifth cervical are most commonly fractured: the intercostal muscles are paralysed; respiration is very difficult, and is performed by the diaphragm; and the patient dies sometimes

in about thirty hours; but generally in about from three to seven days. The abdomen is also distended from flatulency; as when the dorsal vertebræ have been injured. The other symptoms are the same as in fractures below the cervical, as regards the lower extremities, the bladder, and the sphincter ani.

If any of the cervical vertebræ be fractured above the fourth, death is the immediate result; the phrenic nerve* being paralysed, and the action of the diaphragm consequently suspended: respiration can be no longer carried on.

Obs.—Fractures of the vertebræ sometimes occur without displacement, and by admitting unnatural positions of the spinal column, produce symptoms of irritation; and sometimes, by allowing pressure, cause death. Sometimes portions of the spinous processes are broken off, but these affect the spinal marrow in no other way than that a blow, necessary to accomplish the one, usually produces a concussion of the other. Extravasation sometimes takes place in the spinal canal, from very severe blows upon the vertebræ, and if in any considerable quantity, produces

* Mr. Cline was the first man who took a scientific view of fractures of the vertebræ, attended with displacement. By an experiment made on the spinal marrow of a dog, he found that it reunited, after dividing it by pressure. He proposed removing the arch of the displaced vertebra by means of Hey's saw. He performed the operation once, but not successfully; and he had not an opportunity of repeating it. Mr. Tyrell, of St. Thomas's Hospital, lately performed the same operation: he made an incision on the depressed bone, the patient was lying on his chest, and removed the arch: the patient lived three weeks afterwards. On a post mortem inspection, extensive peritoneal inflammation was found; but from what cause it was difficult to say. There is a greater degree of probability of recovery in the lumbar, than when the injury is received in the dorsal vertebræ. "There is no reason," says Sir A. Cooper, "why the operation should not be performed; it is not difficult; it gives no pain; and the patient cannot recover unless it be tried: it gives him, therefore, the best possible chance."

Q. On finding a separate vertebra, or joint of the spine, how do you know to which class it belongs?

A. By the following rule, viz.:—The peculiar characteristic of a cervical vertebra is the perforations in the transverse process. The dorsal are distinguished by having articular surfaces for the heads of the ribs. The lumbar by their size, and the length of the transverse processes.

usual symptoms of compression. From the cause mentioned the spinal canal is also liable to concussion. The lower extremities become paralytic in a degree proportioned to the violence of the injury. The patient is in great pain, and unable to raise himself; if he be desired to draw his thighs towards his abdomen, he does so with great difficulty.

CASE.—A case of this kind was taken to Guy's Hospital; the patient was cupped repeatedly in the loins; and afterwards had a leech applied, which was kept open by the unguentum sabinæ (**OINTMENTS**); his bowels kept open by calomel and other purgatives, and a stimulating liniment rubbed daily on the lower extremities. In six weeks the motion and sensation of his legs returned, and he completely recovered at the end of ten weeks.

In another case of concussion, it was found, on dissection, that the spinal marrow was lacerated, and the patient died with paralysis of the lower extremities and abdomen.

II. DISLOCATION OF THE RIBS.

These cases have been described by several surgical writers; they are, however, extremely rare, and must also be very difficult to detect when they do occur. The heads of the ribs are said to be thrown from their articulations on the bodies of the vertebrae.

There is frequently a great irregularity of the cartilages, which is mistaken for dislocation. This arises from constitutional thinness; and is generally the result of rickets; the arch of the ribs is diminished, the sides flattened, and, therefore, the extremities of the ribs with their cartilages thrust forward. "Very often a cartilage may be torn from its connection with the sternal end of the rib, and project over its surface."

TREATMENT.—The same treatment here would be necessary as in fracture of the ribs. Desire the patient to make a deep respiration; then depress the projecting cartilages; put a wetted pasteboard splint upon the part, and apply a flannel roller.

REMARKS.—Sir Astley Cooper, Mr. Abernethy, and Mr. Lawrence, state that they have never witnessed a case of dislocation of the ribs. The articulation, which connects the ribs with the dorsal process of the spine, is so completely covered by muscles and other

soft parts, that if a dislocation of a rib were to take place, it is doubtful whether it would be possible to recognize it. The elasticity of the cartilages in front, and the firmness of the ligaments connecting them to the sternum, are probably reasons why the cartilages of the ribs are not dislocated from the sternum in front.

III. DISLOCATION OF THE PELVIC BONES.

The bones of the pelvis admit of being separated from each other in consequence of external violence; but the accident which thus takes place is hardly to be assimilated with those separations of a bone from its corresponding articular surfaces to which the name of dislocation is more commonly applied. The strength of the connexions between the various bones of the pelvis is such that they cannot be separated, except under the application of a very great degree of force, such as that of a loaded carriage passing over the lower part of the body; and if a separation of the bones takes place, it is generally attended with fracture of the bones, rupture of the vessels, and extensive injury of the parts, so that those accidents are usually fatal.

TREATMENT.—The separation of the pelvic bones, when it occurs, does not admit of being restored; no means can be employed of bringing them back to their natural situation. All that can be done in an unfortunate case of this kind is to bleed, consign the patient to rest, and keep him perfectly quiet, &c.

OBS.—From the position of the lower extremity, dislocation of the pelvis might be mistaken for dislocation of the hip joint; consequently it is necessary to guard against such an error. “I have seen,” says Mr. Lawrence (see *Lancet*, Vol. II. p. 467, 1830) “the os innominatum * separated from the sacrum behind, and fracture of the pubis and ischium in front at the same time.”

* The two large, broad, and irregularly shaped bones called *ossa innominata*, or hip-bones, constitute the fore part and sides of the pelvis or basin, and the lower part of the sides of the abdomen, the upper edge of which is frequently called the hip. Each bone is usually described as three bones from its having been composed of three distinct bones in the first period of life: these portions retain the same name, though united into one broad bone.

that the lower extremity was drawn up somewhat into the position into which it would be thrown, in consequence of luxation of the hip upwards and outwards; and, in fact, extension was actually applied in that case. The patient, however, died within twenty-four hours. In truth, a luxation, with fracture of the pelvis, is usually attended with such serious symptoms, as sufficiently show the nature of the case to be much more important than mere dislocation of the hip.

IV. DISLOCATION OF THE OS COCCYGIS.

This dislocation is also of rare occurrence, and there may be no means of reducing it. The same bone may also be liable occasionally to fracture.

V. DISLOCATION OF THE CLAVICLE, OR COLLAR BONE.

The clavicle may be dislocated at either of its extremities (at its sternal end or the capsular end), but the ligaments which connect it both with the breast-bone and the shoulder are so strong, that the accident is much more uncommon than fracture of the bone itself. The sternal end admits of being dislocated forward, and the acromial extremity upward, so that it rides above the acromion,* the acromion is situated below it. The latter is more frequently dislocated than the former. The dislocation of the clavicle backward is a rare occurrence.

SYMPTOMS OF DISLOCATION OF THE CLAVICLE.—As the clavicle is covered on its superior surface merely by the integuments, the change of figure which results from dislocation from either end is so obvious, that the nature of the occurrence is immediately recognised.

REDUCTION.—It is not difficult to reduce a dislocation of the clavicle, but it is by no means an easy matter to retain it in its position when replaced. If the upper extremity be brought into the same position as is done when reducing a fracture of the clavicle, the dislocation will be reduced; but a dislocation of the clavicle

* A process of the scapula, or shoulder-blade; it extends over the glenoid cavity, protects the joint, and forms the point of the shoulder, to which the collar-bone is attached.

cannot take place without a rupture of the strong ligaments that hold the clavicle to the sternum or breast-bone; and, therefore, when the force which is employed for the purpose of retaining the parts *in situ* is removed, the bone immediately separates again. The only apparatus, probably, that can be trusted to is that which is employed in fracture of the clavicle—namely, the clavicular bandage, and a thick wedge-shaped cushion placed in the axilla which would then draw the arm outwards over the cushion, so as to prevent it from falling forwards, and in front of the trunk. This, however, like every other apparatus for the same purpose is usually found ineffectual. The arm does not require to be supported, though a short sling is necessary to keep the scapula well up.

The mode of reduction in dislocation of either ends of the scapula may be effected as follows: place your knee between the patient's shoulders, and draw them backwards and upwards, and the clavicle will immediately fall into its place. The cushion and clavicular bandage, as above directed, are then applied; the latter with straps broad enough to keep upon the clavicle and scapula.

OBS.—These accidents, with the best treatment, will generally leave some deformity; and it is better, therefore, when first called to the accident, to state this to the patient, as he may otherwise suppose it has arisen from some negligence or ignorance. At the same time he may be informed that a very good use of the limb may be restored, although a slight alteration of the natural form of the parts may remain—such as a little projection of the sternum or on the sternal extremity of the scapula.

VI. DISLOCATION OF THE SHOULDER.

The humerus is liable to be dislocated in four directions. The first and most common of these is downwards and inwards into the axilla; and in this case the bone rests on the inner side of the inferior costa of the scapula.

CAUSES.—The common causes of a dislocation of the humerus into the axilla are—falls upon the hand, while the arm is much raised; or by a fall upon the elbow, when the arm is raised from the side, by which the head of the bone is thrown downwards.

but the most frequent cause of this accident is a fall directly on the shoulder on some projecting body, by which the head of the bone is suddenly driven downwards.

SYMPTOMS.—This dislocation may be known by the projection of the acromion, by the natural rotundity of the shoulder being lost, by the deltoid being flattened and dragged down with the head of the bone. The arm is rather larger than the other, and the elbow is carried from the side. Although the arm be longer than natural, in a recent dislocation, yet, if the accident has been of some duration, the head of the bone becomes embedded in the soft parts, and the limb is then shortened. The elbow is with difficulty brought to the side, from the head of the bone being, in this attempt, pressed upon the axillary plexus of nerves, and the patient will generally come to you supporting the arm with the other hand, to prevent its weight pressing upon these nerves. If the elbow be carried outwards, nearly at right angles with the trunk, the head of the bone can be distinctly felt in the axilla; but this cannot be done if the elbow be allowed to remain close to the side. The raising of the elbow throws the head of the bone downwards, and more into the axilla, and, therefore, can be more easily felt in the axilla. The motion of the joint upwards and forwards is in a great measure lost, and, therefore, the patient cannot raise his hand to his head. The patient can swing his arm a little forwards and backwards as it hangs by his side. The neutral axis of the limb may also be observed to run into the axilla. There is usually a numbness of the fingers, from the pressure of the head of the bone on the axillary plexus. The principal marks, then, of this accident are, the falling of the shoulder, the pressure of the head of the bone in the axilla, and the loss of the natural motions of the joint; in a short time, however, these appearances are less decisive, from the extravasation and tension which follow.

REDUCTION.—If the muscular power be considerable, or if the accident has occurred a few days, the reduction of the shoulder is usually accomplished in the following manner:—Place the patient in a chair, and let the scapula be well secured by a bandage passed over it, with a slit in it to receive the arm, and buckled

over the acromion: this keeps the bandage close up in the axilla and more completely fixes the scapula; or it may be done by a towel folded round the scapula, and tied close above the acromion. Pass a wetted roller round the arm just above the elbow, to protect the skin, and upon this a strong worsted tape is to be fastened with what sailors call a clove-hitch; the arm should be raised at a right angle with the body, or a little above it, to relax the deltoid and supra-spinatus. Two persons should now make extension from the bandage fastened to the arm, and two from the scapular bandage, with a steady and equal force. After extension has been kept up for a few minutes, the surgeon places his knee in the axilla, resting his foot on the chair, on which the patient is seated, and raises his knee by extending the foot; at the same time placing his hand on the acromion, he pushes downwards, when the head of the bone usually slips into its place. During the extension, a gentle rotatory motion will diminish the counteracting power of the muscles, and assist the reduction. The fore-arm should be bent to nearly a right angle with the upper arm.

OBS.—If the limb has been a long time dislocated, and if the muscles are so firmly contracted that the force to be applied in the manner above recommended does not succeed, the reduction must be attempted by means of the pulleys; more on account of employing the force gradually and equally than for increase of power.

There is a mode of reducing recent dislocations of the shoulder which has very frequently been employed, and which is strongly recommended by Sir Astley Cooper; and is performed by the surgeon placing his own heel in the axilla. The patient is placed in the recumbent position, either on a floor or on a couch, and the surgeon places himself on the same seat; he then places his heel in the axilla, and grasps the patient's fore-arm above the wrist with his hands, or he has a handkerchief or a towel rolled immediately round the inferior end of the humerus, by which he draws or extends the arm, his heel being in the axilla.—*Sir Astley Cooper on Dislocation.*

TREATMENT AFTER REDUCTION.—When the humerus has been replaced, the limb should be kept quite quiet; indeed,

arm should be braced by the side of the body, in order to keep it motionless, while the fore-arm and hand are supported in a sling. This should be continued for some days, in order to allow the rent in the orbicular ligament through which the dislocation has taken place to be united, and admit of the repair of any muscular hurt, or any contusion about the joint being completely healed, before the use of the joint is resumed.

(OBS.—It ought to be remembered that a dislocation of any joint cannot occur without very considerable injury to the surrounding soft parts—without extension, laceration, straining, and tearing of the tendons and muscular fibres; and it must be very obvious that the repairing of such an injury must be a work of some time, and occasionally the employment of the antiphlogistic treatment, for if these be neglected, inflammation of the part may be in excess. And, unless these precautions be adopted, the reproduction of the injury, particularly in the shoulder, will take place very easily.

VARIETIES OF HUMERAL DISLOCATIONS.—2. The humerus may be dislocated in other directions—namely, forwards, beneath the clavicle, upon the second rib, and having the coracoid process on its outer side.

SYMPTOMS.—This accident is more easily detected than the one into the axilla. The projection of the acromion appears greater, the depression of the deltoid being more considerable. There is a prominence beneath the middle of the clavicle; and on rotating the arm, the head of the bone may be felt: the elbow is drawn down from the side, and at the same time carried backwards; the motions of the arm are more confined than in the dislocation into the axilla, and the pain attending it is slighter.

REDUCTION.—The reduction in this case is to be effected by the same means as that adopted for the dislocation into the axilla, with the exception, that the direction in which the bone is drawn is the principal circumstance to be attended to. The extension must first be made obliquely downwards and backwards, until the head of the bone has passed the coracoid process; then it may be raised in a horizontal direction, and, by the pressure of the hand in the axilla, the bone will slip into its place.

3. The third dislocation of the shoulder joint is backwards the dorsum of the scapula, just beneath the spine; and is readily distinguished by the projection of the head of the bone, and by following the movements of the elbow when rotated. It is a dislocation of rare occurrence. In the reduction, the bandages are to be applied in the same manner as in the dislocation into the axilla; and the extension made in the same direction, rotating, at the same time, the head of the bone inwards.

4. The fourth way in which the humerus may be dislocated is only partial, and is an accident of frequent occurrence. The head of the bone is thrown forwards against the coracoid process; there is a hollow at the back of the shoulder joint; the axis of the arm is thrown inwards and forwards; the under motions of the arm are still performed; but it cannot be raised, from its striking against the coracoid process. The head of the bone may be felt to rotate. The reduction is the same as for that of the dislocation forwards, but the shoulders should also be drawn back, to bring the head of the bone to the glenoid cavity. After the reduction, the shoulder must be secured by the clavicular bandage, or the bone will again slip forwards against the coracoid process.

Obs.—An injury of great violence may occasion the head of the bone to be forced through the integuments in the dislocation forwards: in which case the reduction should be immediately effected as was before recommended in the dislocation forwards. A sutures should be introduced, and lint, dipped in blood, applied to the wound; and adhesive plaster, to retain the edges of the wound in due opposition: the limb should be kept close to the side by a roller, including the arm, in order to prevent the least degree of motion. By this treatment, the suppurative inflammation may be prevented, and the patient's life not endangered.

ACCIDENTS.—Accidents about the shoulder joint, with which dislocations are liable to be confounded, are—1. Fracture of the acromion. 2. Fracture through the neck of the scapula. 3. Fracture through the neck of the humerus.—See FRACTURES.

VII. DISLOCATIONS OF THE ELBOW.

The elbow may be dislocated in five directions:—

1. *Of both Bones backward.*—**SYMPTOMS.**—This accident is strongly marked by the alteration in the form of the joint, and by a great loss of motion. There is a considerable projection formed posteriorly, by the ulna and radius. On each side of the olecranon there is a hollow; a large hard swelling is felt at the part of the joint immediately behind the tendon of the biceps, which is the extremity of the humerus. The hand and fore-arm are in a state of supination*, and they cannot be turned in prone.

CAUSE.—The cause of the accident is generally as follows:—A person, when falling, puts out his hand to save himself; but the arm not being perfectly extended, the whole weight of the body is thrown upon the radius and ulna, and they are forced behind the axis of the humerus.

REDUCTION AND AFTER-TREATMENT.—This dislocation is to be reduced in the following way:—Seat the patient on a chair, take hold of his wrist, and place your knee on the inner side of the elbow-joint; then bend the fore-arm, and at the same time press upon the radius and ulna with the knee, so as to separate them from the humerus, and so as to throw the coronoid process of the ulna from the posterior fossa of the humerus, where it is engaged. Whilst the pressure is being kept up by the knee, the arm is, at the same time, gradually bent, and then the bones will go into their respective sockets. After the reduction, the arm is to be retained in the bent state, and a bandage applied, which should be kept wet with an evaporating lotion, and the arm supported in a sling. The fore-arm should be bent at rather less than a right angle with the upper arm.

2. *Lateral Dislocation.*—The elbow may be dislocated laterally, when the ulna will be thrown either on the external or internal condyle; the radius forming a protuberance behind, and on the outer side of the humerus, so as to produce a hollow above it: on moving the hand, the radius may be felt to move. The ulna is

* Supination is the act of turning the palm of the hand upwards, by turning the radius upon the ulna by means of the supinator muscles. Pronation is the act of turning the hand downwards, and is performed by rotating the radius upon the ulna by means of several muscles which are termed pronators.

sometimes thrown upon the external condyle; but it projects posteriorly, as in the dislocation outwards; and the head of the radius is situated in the posterior fossa of the humerus.

SYMPTOMS.—This dislocation may be known by the great projection of the external condyle of the humerus, and by the hollow above the olecranon, on the inner and back part of the arm.

REDUCTION.—The reduction in this case is effected as in the preceding instance; namely, by bending the arm over the knee without turning it directly outwards or inwards; for as soon as the radius and ulna are separated from the humerus by the pressure of the knee, the biceps and brachialis internus, which have been before kept powerfully on the stretch, give the bones the proper direction for reduction.

3. Dislocation backwards of the Elbow.—The ulna is sometimes thrown backward upon the humerus, whilst the radius remains in its proper place. In this case the deformity of the limb is very great, by the fore-arm and hand being twisted inwards, whilst the olecranon projects considerably backwards. The fore-arm cannot be extended, nor can it be bent to more than a right angle. This is rather more difficult to detect than the other dislocations of the elbow; but it may be known by a projection of the ulna, and twisting inwards of the fore-arm.

REDUCTION.—This case of dislocation backwards is more easily reduced than when both bones of the fore-arm are dislocated: it may be readily effected by bending the arm over the knee, and drawing the fore-arm downwards. In addition to the action of the brachialis internus, the radius, by resting on the external condyle, will act as a lever to the fore-arm, in pushing the olecranon backwards on the ulna when the arm is bent.

4. Separation of the Radius with the Coronoid Process of Ulna.—The radius is sometimes separated from its connexion with the coronoid process of the ulna, and is thrown forwards into the hollow above the external condyle of the os humeri, and upon the coronoid process of the ulna.

CAUSE.—The accident happens in consequence of a fall upon the hand when the arm is extended, and the radius receives the weight of the body.

SYMPTOMS.—The fore-arm is slightly bent, but cannot be brought to a right angle with the other, nor can it be perfectly extended: when bent suddenly, the flexion is checked by the head of the radius striking against the fore-part of the os humeri. The hand is between pronation and supination, but neither can be done perfectly; but it is nearer pronation. By carrying the thumb to the fore-part of the elbow joint, and at the same time rotating the hand, the head of the radius will be felt to rotate also; and this, with the sudden bending of the fore-arm, are the best marks of the injury.

REDUCTION.—In attempting to reduce this dislocation, the hand should be turned supine, the fore-arm bent, and extension made from the hand, without including the ulna.

OBS.—Numerous and powerful attempts have been made to reduce this dislocation, and frequently without success; but, by attending to the circumstances just mentioned, "I have," says A. Cooper, "succeeded in two or three cases; I have only seen six of these accidents, and one of them was a patient of Mr. Cline's. Of the *dislocation of the radius backwards*, I have never seen a case in the living body; but a subject was brought to our dissecting-room with this accident. I have no doubt but that it might be easily reduced, by bending the fore-arm: a bandage should afterwards be worn."—*On Dislocations, &c.*

VIII. DISLOCATIONS OF THE WRIST JOINT.

Dislocations of the wrist are of three kinds. First, of the dislocations of both bones: this is not a very frequent occurrence; the bones may be either thrown backwards or forwards, according to the direction of the force applied. If the weight in falling be received upon the palm of the hand, the carpal bones are thrown backwards, and the radius and ulna forwards; and the marks of the accident are—swelling, produced by the radius and ulna, on the fore-part of the wrist; with a similar swelling on the back part, with a depression above it: the hand is forcibly bent back. If a person fall on the back part of the hand, the carpus is pressed under the flexor tendons, and the radius and ulna are thrown upon the back part of the hand. These two projections

become the diagnostic marks of the accident, and will distinguish it from a swelling on the fore-part of the hand, about the flexor tendons, in consequence of a violent sprain; as in this case there is only one swelling, and it does not appear immediately after accident, but gradually increases in size.

REDUCTION.—Grasp the patient's hand with your right, support the fore-arm with your left hand, while an assistant places his hands firmly round the arm, just above the elbow. Then flex the wrist both extend, and the bones are soon replaced. As soon as extension is sufficiently made, the muscles will direct the bone into the proper situation. A roller should be applied round the wrist, wetted with an evaporating lotion, and a splint placed before and behind the fore-arm, reaching to the extremities of the metacarpal bones.

2. The radius only is sometimes thrown forwards upon the carpus: in this case, the outer side of the hand is thrown backwards, and the inner forwards. The extremity of the bone forms a protuberance on the fore-part of the wrist. The extension necessary to reduce this dislocation, and the after-treatment, are the same as when both bones are displaced.

3. The ulna is sometimes separated from the radius by the rupture of the sacroform ligament; and it usually projects backwards. It is known by its projection above the level of the os cuneiforme, and by its being easily returned, by pressure, to its former situation, and by its rising again when the pressure is removed. After the head of the bone has been replaced, a compress of leather should be put on its extremities, to keep it in a line with the radius. Splints should be placed along the fore-arm, and a roller applied over the splints to confine them with firmness.

IX. DISLOCATION OF THE BONES OF THE CARPUS.

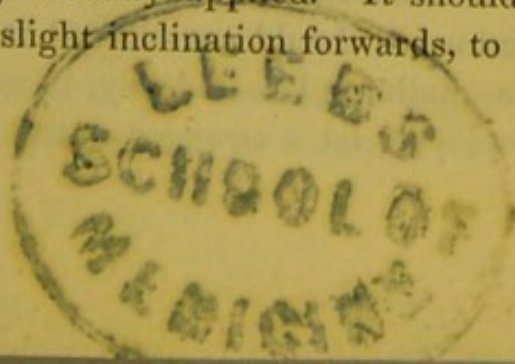
Dislocation of a carpal bone is of very rare occurrence, and generally happens to a person, when falling, receiving the weight of the body on the part: and it is also, sometimes, attended with fracture of the radius: it has happened, also, from relaxation of the ligaments of the carpus. The os magnum, and the os cuneiforme, have been thrown out of their natural position from

use, and form a projection at the back part of the wrist on the back of the hand. This accident deprives the individual of the power of using the hand, unless the wrist at the same time be supported. In these cases, straps of adhesive plaster should be placed rather tightly about the wrist, to support and strengthen it; and over these a bandage should be passed, which affords it additional support. Pumping cold water upon the hand from a considerable height is also very useful; and rubbing the parts afterwards with a coarse towel gives vigour to the circulation, and increases the strength of the joint.

Sometimes ganglia are mistaken for dislocations of the carpal bones: but these are easily removed by striking them smartly with the flat surface of a book, when the supposed dislocation immediately disappears. A compound dislocation of the carpal bones frequently happens, and generally is the consequence of the bursting of guns, or the hand being caught in machinery, or the passing of heavy bodies over it. In these cases, one or two of the carpal bones may be dissected away, and the patient recover without losing his hand, and also preserve a considerable degree of motion in the part. If, however, greater injury is done, amputation is generally necessary.

X. DISLOCATIONS OF THE FINGERS AND TOES.

These accidents are of rare occurrence; for in addition to their collateral and lateral ligaments, they have their articulations powerfully strengthened by the extensor and flexor tendons. When an accident of this kind does happen, it is more frequently found between the first and second phalanxes, than between the second and third. It can be readily ascertained by the projection of the proximal phalanx backwards, while the head of the second can be felt on the fore-part, although less distinctly. If it has not been dislocated many hours, it can be easily reduced; but if it has been neglected at first, the reduction can only be accomplished by long continued extension very steadily applied. It should be recollected to give the wrist a slight inclination forwards, to relax the muscles.



XI. DISLOCATIONS OF THE THUMB.

The joint formed between the os trapezium, and that bone which some anatomists call the first metacarpal bone, and others call the first phalanx of the thumb, is susceptible of dislocation. This accident is described as the dislocation of the *first metacarpal bone* upon the os trapezium; and the only dislocation of this bone that can take place is a dislocation *backwards*, when it forms with the articular end an unnatural and conspicuous prominence on the back of the thumb, which is immediately recognised. The nature of the accident, in fine, cannot be mistaken; and if the thumb is pulled slightly, at the same time that pressure is made with the fingers on the head of the bone, it will be forced into its place. The more common dislocation is one of the *second joint* of the thumb, that is, of the articulation between its first phalanx and first metacarpal bone. This, like the former, takes place posteriorly. It is easily reduced in the recent state, by making slight straight extension of the thumb, and pressure with the fingers on the head of the dislocated bone. In this way the extremity of the first phalanx of the thumb, which has become placed posteriorly to the first metacarpal bone, is usually brought back.

EXTENSION.—The mode of applying the extending force is as follows:—In order to relax the parts as much as possible, the hand should be soaked for a considerable time in warm water. A piece of wash leather is afterwards to be applied, as closely wrapped as possible round the first phalanx; on which a tape of about six yards in length is to be fastened with a knot in the form of one which is called by sailors a clove-hitch. An assistant is now to pull firmly on the metacarpal bone, by placing the middle and ring fingers between the patient's fore-finger and thumb, for the purpose of effecting counter-extension; whilst the surgeon, assisted by others, draws the first phalanx from the metacarpal bone, inclining it, at the same time, a little towards the palm of the hand. If the efforts made in this way, after having been continued for ten or fifteen minutes, should not succeed, it will be necessary to have recourse to another plan—namely, in addition to the apparatus already employed, let a strong worsted tape be carried between

the metacarpal bone and the first finger; bend the fore-arm round the bed-post, to which the tape is to be firmly tied, so as to prevent the hand yielding while extension is being made. To the tape extending the first phalanx a pulley is to be applied, and extension made, which will generally succeed.

OOBS.—The well-known difficulty experienced in replacing this dislocation, after a little time is elapsed from the period of the accident, renders it very advisable that great attention should be paid to dislocations occurring in this joint, and the displacement recognized shortly after it has taken place, at which time the reduction may be accomplished with comparative facility.

A dislocation of the second phalanx of the thumb, when simple, will be best reduced by grasping firmly the back of the first phalanx with your fingers, and placing the thumb on the fore-part of the dislocated phalanx, then bending it on the first as much as possible. In this way the second phalanx may be lifted over the first, the surgeon making his thumb the fulcrum.

* When there is a compound dislocation of this joint, in addition to sawing off the ends of the bone, Sir Astley Cooper recommends paring the ends of the tendon smoothly with the knife, and then, by bringing them together, they will unite. Passive motion should be begun at the end of a fortnight or three weeks.

XII.—DISLOCATION OF THE LOWER JAW.

The lower jaw is subject to two species of dislocation—the *complete* and *partial*. When the jaw is completely dislocated, both its condyles are advanced into the space between the surface of the temporal bone and zygomatic arch. When it is partial, one condyloid process only advances, whilst the other remains in the articular cavity of the temporal bone.

CAUSES.—A blow upon the chin when the mouth is widely opened will cause this accident; and yawning or gaping very deeply will sometimes produce the same effect. The jaw has also been dislocated in the attempts made to draw teeth, by a sudden motion of the hand when the mouth has been too widely opened. An imperfect dislocation of the jaw sometimes happens from a relaxation of the ligaments, something in the same way in which the

thigh bone is thrown from the semilunar cartilages. The jaw appears to quit the interarticular cartilage of the temporal cavity, slips before its edge, and fixes the jaw, the mouth being at the same time slightly opened.

SYMPTOMS.—In the partial dislocation of the jaw, the mouth is not so widely opened as in the complete dislocation, but the patient cannot close it, in consequence of the condyloid process on one side being advanced under the zygoma. This accident is easily distinguished by the chin being thrown to the opposite side of the dislocation; the incisor teeth are advanced upon the upper jaw, but are no longer in a line with the axis of the face. The jaw is known to be completely dislocated by the mouth being open and the patient not being able to shut it by any pressure that can be made on the chin. The lower teeth will be found in a line anterior to the upper. The jaw will admit of being depressed a little, but to a very inconsiderable extent. The appearance is just that of a person when yawning. There is a depression just before the meatus auditorius, in consequence of the absence of the condyloid process from its cavity; and there is a projection of the cheeks from the coronoid processes being advanced towards the buccinator muscles. The pain, although severe, is not attended with any dangerous consequences; a considerable degree of motion is recovered by time, and the jaws nearly approximate. The saliva is very much increased in quantity, in consequence of the irritation of the parotid glands, and it dribbles over the mouth.

REDUCTION.—These dislocations are generally reduced by wrapping a handkerchief round the thumbs, and placing them on the coronoid processes; by depressing the jaw, forcing it backwards as well as downwards, the bone suddenly slips into its place. This accident may be reduced in vanos; "and there are some who say Mr. Abernethy, "who say you had better put a piece of transverse wood into the patient's mouth, then depress, and so on. For my own part, I never found any difficulty in reducing a dislocation of the jaw in the whole course of my life, and I have reduced a vast number. I have reduced one condyle and not the other, and things of that kind, but I never found any difficulty, so as to require the use of complex measures, never."—*Surg. Lect.*

XIII. DISLOCATION OF THE HIP JOINT.

The thigh bone may be dislocated in four directions: namely,

1. Upwards, on the dorsum of the ilium.
2. Downwards, into the foramen ovale.
3. Backwards and upwards, or into the ischiatic notch.
4. Forwards and upwards, or on the body of the pubis.

1. *Of the dislocation upwards, or on the dorsum of the ilium.* This accident happens more frequently than any other dislocation of the hip joint, and may be known by the following

SYMPTOMS.—The toe rests against the tarsus of the opposite leg, the knee and foot are turned inwards, and the knee is a little advanced upon the other—the limb is about an inch and a half or two inches and a half shorter than the other,—a difference that may easily be detected by comparing the malleoli interni, when the foot is bent at right angles with the leg. Separation of the leg from the other is completely prevented, though the thigh may be bent a little over the other. The trochanter is less prominent on the opposite side, in consequence of the neck of the bone and the trochanter lying in a line with the surface of the ilium—the roundness of that side will therefore have disappeared.

DIAGNOSIS.—Dislocation of the hip joint being liable to be confounded with fracture of the neck of the bone, within the capsular ligament, it may be distinguished by the following symptoms:—in the fracture of the neck, the *knee and foot are turned inwards*; the trochanter is drawn upwards and backwards, rests on the dorsum of the ilium; the thigh may be bent towards the abdomen, although it occasions some pain. But one of the principal marks of the accident is, that although the limb may be shortened one or two inches, according to the duration of the accident, yet, by extension, it may be restored to the natural length of the limb, though it will be immediately shortened again on the extending force being removed. If when you have drawn from the bone any rotation be made, a crepitus will be distinctly felt. In the gradual progress of the symptoms, the pain in the knee, the apparent elongation at first, and the real shortening afterwards, the power of motion remaining, yet that motion producing pain,

especially under the extremes of rotation, are marks of difference sufficiently characteristic between disease of the hip joint and dislocation. The consequence of a disease of this kind, when it has existed a length of time, is such a change in the situation of the parts, from ulceration of the ligaments, head of the bone and acetabulum, as to make the limb appear like a dislocation, but the history of the case at once points out the difference.

CAUSES.—The dislocation on the dorsum of the ilium is produced by the individual falling when the knee and foot are turned inwards, or by a blow received while the limb is in that position.

REDUCTION.—In this reduction there are three points to be attended to:—1. The fixing of the pelvis; 2. The extension, which is to be made in a manner calculated to draw the head of the bone down to the acetabulum; 3. And, the elevation of the upper end of the bone in a manner calculated to lift it over the margin of the socket. Previous to attempting the reduction it is recommended to bleed the patient to the extent of $\bar{3}x.$ to $\bar{3}xx.$ more, if the patient be a very strong man; then to place him in a warm bath, at 100° gradually increased to 110° , until he begins to feel faint. Whilst in the bath, a grain of tartarised antimony may be given to produce nausea; he is then to be wrapped in a blanket, and placed on a table, between two strong posts, in which staples, or lashings, have been fixed: or if a more convenient place cannot be occupied, on the floor, with ring-bolts or screws, at proper distances at each end, to apply the pulley and screw for counter-extension. A strong girth is to be passed between the pudendum and thigh, and this fixed to one of the staples. A wetted linen roller should be applied just above the knee, which a leathern strap is to be buckled, the latter having two straps with rings at right angles with the circular part. The knee should be slightly bent, not quite at a right angle, and brought across the opposite thigh a little above the knee. The pulleys are to be hooked to the rings on the circular strap, and fixed to the opposite staple or other hold-fast. The pulleys are not to be tightened till the bandage is on the stretch, and the patient begins to feel pain—then wait a little, without yielding any more to the extension made, to give the muscles time to fatigue; then p

tain gently and uniformly, until the muscles yield; and so on, until the head of the bone is brought just opposite the acetabulum. At this period, let the required extension be sustained by an assistant taking the string of the pulleys, then rotate the limb gently, and the bone usually slips into its place.

OBS.—When the head of the bone returns into the acetabulum, you must not expect to hear a snap, as, by using the pulleys, the muscles are become so much relaxed that they cannot act with sufficient violence; and the reduction can only be ascertained by loosening the bandages, and comparing the length of the limb. If there be any difficulty in bringing the head of the bone over the edge of the socket, the surgeon may pass his hand or a napkin under it, and lift it over. Great care is necessary in removing the patient to his bed, as, from the relaxed state of the muscles, the dislocation would recur, and that from a cause so trifling that it might pass unnoticed. This is the most frequent dislocation of the hip joint; namely, that which takes place upwards and outwards on the dorsum of the ilium.

b. Dislocation downwards, or into the foramen ovale.

SYMPTOMS.—In this case the limb is two inches longer than the other. The foramen ovale is situated rather below the acetabulum, so that, when the head of the thigh bone rests upon it, there is a slight increase in the length of the limb. The foot and lower extremity, generally, are either in the state between inversion and eversion; or, perhaps, are a little everted—thrown a little into the direction in which the limb is seen in the case of fracture of the neck of the thigh bone. There can, however, be no mistake here between those two descriptions of accidents; for in fracture of the neck, the limb is shortened; whereas in the present dislocation, the limb is lengthened. There is a flattening of the hip on the dislocated side: the body is bent forwards, owing to the psoas magnus and iliacus internus being put upon the stretch. The knee is considerably advanced towards the trunk, the patient standing upright, &c. The foot, in this dislocation, is not so much trusted to as a mark of it: the increased length of the limb, the separated knees, the bent position of the body, are such diagnostic appearances as sufficiently point out the

nature of the injury. The head of the bone is situated on the obturator externus muscle, at the inner and back part of the thigh.

REDUCTION.—In recent cases, this dislocation is easily reduced. Place the patient on his back, separate the thighs as widely as possible, and place a girth between the pudendum and upper part of the thigh; fix the girth to the staple in the wall, then lay hold of the ancle of the dislocated side, and draw it over the other leg; or, if the thigh be very large, behind the sound limb when the head of the bone usually slips into the socket; or the thighs might be divided by a bed-post being received between the pudendum and the upper part of the limb, and the leg be carried inwards across the other. The best plan, in general, according to Sir Astley Cooper, is to fix the pelvis, by a girth passed round it, and crossed under that which passes round the thigh, to which the pulleys are to be attached, otherwise the pulleys move in the same direction as the thigh. If the dislocation has existed three or four weeks, it is better to place the patient on his sound side and fix the pelvis by one bandage, and carry another under the dislocated thigh, to which the pulleys are to be fixed perpendicularly; then draw the thigh upwards, and, at the same time, press down the knee and foot, to prevent the lower part of the limb being carried with the thigh; thus the limb is used as a lever with considerable power. Care must be taken not to advance the leg too much, as the head of the bone would be forced behind the acetabulum into the ischiatic notch, from which position there would be considerable difficulty in removing it.

c. Of the Dislocation backwards, into the Ischiatic Notch.—The ischiatic notch is placed behind the acetabulum, but, at the same time, above its level. The situation of this notch, with respect to the acetabulum, in the natural position of the pelvis, should be accurately borne in mind in the reduction of the dislocation where the head of the bone is placed on the pyriformis muscle between the edge of the upper part of the notch and the sacro-sciatic ligaments. This is the most difficult of all the dislocations of the thigh bone to detect, because the length of the limb differs but little, and its position is not so much changed, as respects the

knee and foot, as in the dislocation upwards. It is also the most difficult to reduce, in consequence of the head of the bone being lodged behind the acetabulum, and requires to be lifted over its edges, as well as to be drawn towards it.

CAUSES.—This accident is produced by the knee being pressed forwards, whilst bent at right angles with the abdomen, or whilst the trunk is bent forwards on the thigh.

SYMPTOMS.—The symptoms or characteristic signs of this dislocation are as follow:—The limb is from half an inch to an inch shorter than the other, but usually not more than half an inch. The toe rests against the ball of the great toe of the opposite limb. The natural prominence formed by the trochanter major is lost, but it still remains nearly at right angles with the dorsum, and has an inclination towards the acetabulum. Except in very thin persons, the head of the bone cannot be felt, and then may be felt by rolling it a little forward. The knee and foot are inverted, but less so than in the dislocation upwards; the knee is only very slightly bent, and, therefore, is not so much advanced as in that dislocation. The toe touches the ground when the patient is standing, but not the heel. Flexion and rotation are, in a great degree, prevented, from the limb being so firmly fixed.

REDUCTION.—As already observed, the reduction of the dislocation into the ischiatic notch is, for the most part, extremely difficult, but is best effected in the following manner:—namely, the patient be placed upon a table, on his side, and a girth passed between the pudendum and inner part of the thigh, to fix the pelvis; then pass a wetted roller round the knee, and buckle the strap over it; carry a napkin under the upper part of the thigh; next, bring the dislocated thigh over the middle of the opposite one, and then commence extension with the pulleys. During the extension, an assistant should grasp firmly the napkin at the upper part of the thigh, with one hand, and, resting the other on the pelvis; he should raise the thigh as much as possible towards the acetabulum, so as to get the head of the bone over its edge. Sir Astley Cooper directs a round towel to be used for this purpose, which is passed beneath the upper part of the thigh, and then carried over an assistant's shoulders, who then

resting both hands on the pelvis, and raising his body gently raises the thigh with it.

OBS.—This dislocation has been reduced by making extension with the pulleys, in a right line with the body; and at the same time this extension was made, the trochanter-major was thrust forward with the hand. The former method certainly appears to be the most easy.

d. Dislocation on the Pubes.—This accident admits of being more easily detected than any other dislocation of the thigh.

CAUSES.—If a person, in the act of walking, puts his foot in some unexpected hole, he throws his body suddenly backwards to preserve his equilibrium, and the head of the bone starts forwards on the pubes.

APPEARANCE OF THE LIMB.—The limb is an inch shorter than the other, and the knee and foot are turned outwards, and cannot be rotated inwards. But the most striking mark of dislocation is, that the head of the thigh may be felt upon the pubes, above the level of Poupart's ligament, to the outer side of the femoral artery, and feels like a hard ball there, which will not readily move, on rotating or bending the knee. This circumstance alone will point out to the most superficial observer the nature of the accident, so that it cannot possibly be taken for a fracture of the neck of the bone; though Sir Astley Cooper remarks, that "Easy as it is to detect this dislocation, I have known three cases in which it has been overlooked, until it was too late."

REDUCTION.—To effect the reduction of this dislocation, the patient is placed upon a table on his side; a girth is carried between the pudendum and the inner part of the thigh, with a strap fixed in it, a little before the line of the body. The roller is to be passed round the thigh, and the pulleys fixed, as in the dislocation upwards, and the extension made in a line behind the axis of the body, the thigh bone being drawn backwards. After this extension has been continued for some time, a napkin is to be passed under the upper part of the thigh, whilst an assistant resting one hand on the pelvis, lifts the head of the bone over the pubes and edge of the acetabulum.

OBS.—As regards the proportionate numbers in which these several dislocations of the hip joint occur, it is stated by Sir J. Crisp, that in twenty cases you may find twelve in which the head of the bone rests on the dorsum of the ilium; two of dislocation on the ischiatic notch; two on the foramen magnum; and one of dislocation upwards.

XIV. DISLOCATIONS OF THE PATELLA.

The patella may be dislocated in three directions: 1. outwards; 2. inwards; and 3. upwards.

SYMPTOMS.—The bone is most frequently thrown into the external condyle, where it produces a great projection; the patient is also unable to bend the knee, and these circumstances readily point out the nature of the injury. The dislocation on the internal condyle is less frequent.

CAUSES.—It is most frequently produced by a person falling on his knee turned inwards, and his foot, at the same time, turned outwards; and the action of the muscles, in the attempt to prevent the fall, draws the patella over the external condyle of the femur. The dislocation of the inner condyle happens from a blow on the outer side of the patella, received in a fall or from some projecting body.

REDUCTION AND AFTER-TREATMENT.—To reduce either of these dislocations of the patella, the patient is to be placed in the recumbent posture, and the leg raised by lifting it at the heel, by which the exterior muscles of the thigh are relaxed in the greatest possible degree. Pressure is then to be made on the edge of the bone which is farthest from the articulation; and this raises the inner edge of the bone over the condyle of the femur, and it is directly drawn into its proper position, by the action of the muscles. Evaporating lotions of spirit and water are to be employed, and in two or three days afterwards bandages applied.

Of the Dislocation of the Patella upwards.—In this accident, the ligamentum patella is torn through, and the patella is drawn to the upper and fore part of the thigh bone. The marks in this case are at once decisive; for, besides the easy motion of the patella from side to side, a depression is felt above the tubercle

of the tibia, from the laceration of the ligament. The patient loses the power of leaning on the limb, and a considerable inflammation usually succeeds.

TREATMENT.—In the treatment of this case, leeches, and afterwards evaporating lotions, are to be applied from four to six days; a roller is then to be applied round the foot and leg, which are to be kept completely extended, by a splint behind the knee, and a leathern strap is then buckled above the knee, and to this another strap is fastened, which is to be passed under the foot, and buckled to the opposite side of the counter strap. In this manner the bone is drawn down to the ruptured ligament, and a consequent union is thereby effected. The patient should, at the time, continue in the sitting posture, in order to relax the extensors of the leg, which are inserted into the patella.

XV. DISLOCATIONS OF THE TIBIA AT THE KNEE JOINT.

These dislocations are four: two complete, two incomplete. The articular surface, by which the femur is joined to the tibia, is so broad, and the bones are tied together by ligaments of considerable strength, that dislocation of the knee joint is an uncommon accident. It may, however, take place, particularly dislocation backwards, which is the most frequent. It may also be dislocated forwards, though this accident can hardly take place completely, although it may be completely dislocated backwards. Partial dislocation also may take place from one side to the other, in either direction, all these accidents being the result of great force, and attended with violent bruising, perhaps laceration, and even fracture of the thigh bone. Each of these dislocations may be reduced by simple extension, for, as soon as the surfaces of the bones are removed from each other, the muscles give them the direction necessary to be restored to their proper situations.

XVI. DISLOCATION, PARTIAL, OF THE FEMUR, &c.

In these cases, namely, *partial dislocations of the femur, from the semilunar cartilages*, where the secretion of the synovia into the joint has been very much increased, the ligaments become so much relaxed, as to allow the cartilages to glide on the surface of

a, especially if the edge of the cartilage be pressed by the h bone*.

CAUSES.—The manner in which this accident happens is as follows:—The ligaments, uniting the semilunar cartilages to the head of the tibia, become relaxed: the cartilages are easily pushed in their situations by the condyles of the femur, which, there- come into contact with the head of the tibia. When an attempt is made to extend the limb, the edges of the semilunar cartilages prevent it. The most common cause of this accident is a person striking his toe against some projecting body, when the foot is everted; he immediately feels pain in the knee, and it cannot be completely extended. It has also been known to happen from a sudden twist inwards, when the foot is turned out.

TREATMENT.—In order to restore the parts to their natural position, it is necessary to bend the limb back as far as possible, which the pressure made by the thigh bone is removed, and enables the cartilage to slip into its place; and thus the condyles of the femur are again received on the semilunar cartilages. PREVENTION.—This accident is particularly liable to happen again; and its return is best prevented by a bandage, made with a piece of cloth, having four straps attached to it, and these bound tightly above and below the patella.

XVII. DISLOCATION OF THE ANCLE JOINT.

The lower end of the tibia may be dislocated in three directions, viz., *inwards*, *forwards*, and *outwards*; and a fourth, *backwards*, is said to occur. The ancle joint is so well protected by various strong ligaments, and the union of the fibula, in particular, is so firm to the tibia and the tarsal bones, it generally, in consequence, happens that the bone will rather break than the ligaments give way.

Dislocation of the Tibia inwards.—This form of dislocation is the most frequent occurrence, and generally happens as a consequence of a person jumping from a considerable height, or in running violently with the toe turned outwards, the foot

*This accident was first accurately described by Mr. Hey, of Leeds.

being suddenly checked in its motion, whilst the body is carried forwards on the foot, and the ligaments on the inner side of the ankle give way.

SYMPTOMS.—The foot is thrown outwards, and its inner side rests upon the ground; and the internal malleolus projects much against the integuments as to threaten their laceration. The foot easily rotates on its axis; there is also a depression above the external angle, attended with great pain; and at three inches above the lower end of the fibula, a crepitus may be felt by grasping the leg at this distance above the ankle, and rotating the foot.

REDUCTION AND AFTER-TREATMENT.—In replacing this dislocation, the patient is directed to be placed on a mattress, on the injured side, and the leg bent at right angles with the thigh, to relax the *musculi gastrocnemii*; when an assistant grasps the foot, and gradually draws it in a line with the leg; at the same time the thigh should be fixed, and the tibia pressed down to force it on the articulating surface of the astragalus. After reduction, the limb is to remain on its outer side, in the bent position, with the foot well supported with foot-piece splints; a many-tailed bandage should be applied, and kept wet with spirit wash. The patient, at the end of five weeks, may leave bed, and walk on crutches. Friction and passive motion ought to be used at the expiration of two months; and two months will elapse before the perfect motion of the joint be restored. *Sir A. Cooper.*—*MS. Notes from Lect.*

OBS.—The recurrence of this dislocation is, from the extensive laceration of the ligaments, rendered very easy.

2. Dislocation forwards.—This accident happens from the falling backwards whilst the foot is confined; or from a person jumping from a carriage in rapid motion, with the toe pointed forwards.

SYMPTOMS.—The foot appears much shortened and fixed, the toes pointed to the ground. The lower end of the tibia is surrounded by a hard swelling on the middle of the tarsus, the heel appears lengthened, and there is a projection before the tendo-Achillis. On dissection, the tibia is seen resting on the navicular and in

the cuneiform bones; the fibula is broken, and carried forwards at the side of the tibia, and it is fractured about three inches above the malleolus.

REDUCTION AND AFTER-TREATMENT.—In order to replace this dislocation, the patient lies in bed on his back; an assistant grasps the thigh at its lower part, and draws it towards the body, whilst the other pulls the foot in a line from the leg; the surgeon then pushes the tibia back, to bring it to its proper place, observing the same rule, in order to relax the muscles, and the same plan of after-treatment, as in the preceding dislocation. The patient is afterwards to rest his leg on the heel, to have splints applied to the side of the leg, with foot-pieces to support the foot at right angles with the leg. In five weeks he may be allowed to get out of bed, and use passive motion, as the fibula will by that time have healed.—*MS. Lect. Sup. Citat.*

SIGNS.—In the partial dislocation forwards, the tibia rests half on the naviculare and half on the astragalus: the fibula is broken, and there is not any very considerable projection of the heel. The toe is pointed downwards, and there is great difficulty in placing the foot flat upon the ground.—*Ibid.*

Dislocation outwards.—This luxation of the ankle joint is by far the most dangerous of the three; it requires a greater degree of violence for its production, is attended with more extensive laceration of ligaments, and more contusion of the integuments.

CAUSES.—This accident happens from the wheel of a carriage passing over the leg, or by the foot being twisted in jumping or falling.

SYMPTOMS.—The foot is thrown inwards, with its outer edge resting on the ground. The malleolus projects very much, and forms such a well-marked prominence that the nature of the injury is not likely to be misunderstood. The toes are pointed upwards, and the malleolus internus is obliquely fractured.

REDUCTION AND AFTER-TREATMENT.—Place the patient on his back, bend the thigh at right angles with the body, and the leg at right angles with the thigh: the foot is held firmly by one assistant, while the thigh is grasped under the ham by another.

The foot is then to be extended in a line with the leg, and the tibia pressed inwards towards the astragalus.

As regards the after-treatment, the limb is to be laid on the outer side, supported by splints and foot-pieces, and a pad placed on the fibula, above the outer ankle, extending a little way up the bone, so as to support that part of the leg. The further after-treatment will be the same as in former cases. Passive motion should be used in about six weeks.

Q. What is the best evidence of dislocation having been reduced?

A. The complete restoration both of the power of bending and extending the joints, with that of pronation and supination.

XVIII. DISLOCATIONS, COMPOUND.

By compound dislocations are understood, those which are attended with a wound communicating with the cavities of the injured joints. Some joints are more disposed than others to compound dislocations. This accident scarcely ever takes place at the hip, and is more frequent at the ankle, elbow, and wrist. The opening in the skin, in most instances, is caused by the extrusion of the bone; but sometimes by the part having been struck by some hard or angular body. These accidents are frequently attended with danger; and require the same nice judgment, in determining for or against immediate amputation as in cases of compound fractures and bad gun-shot wounds.

TREATMENT.—In compound dislocations the reduction is to be effected without delay, and with as little violence or disturbance as possible. When the end of the bone protrudes, and is smeared with dirt or sand, as frequently happens from its having touched the ground, it should be washed with warm water, as the least extraneous matter admitted into the joint will produce and supply a suppurative process. If the bone be shattered, the finger should be passed into the joint, and the detached pieces removed in the most gentle manner; and if the wound be so small as to admit the finger with difficulty, and small loose pieces of bone even be felt, the integuments should be divided with a scalpel, to

them to be removed without violence. If any difficulty of reduction arise, from the bone being girt by the integuments, the opening in them should be dilated. The wound being freed from all extraneous substances, its lips are to be accurately brought together with strips of adhesive plaster; the limb is then to be placed in splints, with the necessary pads, eighteen-tailed bandages, &c. For the first dressing, Sir A. Cooper considers lint, dipped in the blood which oozes out, as the best. Blood-letting, if the patient be young and healthy; and an anodyne the first night or two may be proper; purgatives should be used with caution, for fear of disturbing the adhesive process. That which is required to be done by bleeding and emptying the bowels, should be effected within an hour or two after the accident, before the adhesive inflammation commences. When the symptomatic fever and first inflammatory symptoms are over, and much discharge prevails, accompanied with signs of approaching debility, the patient is to be allowed more food; and bark, and cordials—as wine, porter, &c. prescribed. If the patient's nights be restless, opiates; if perspiration profuse, sulphuric acid; and, in short, all such medicines as particular symptoms require. When the inflammation in a compound luxation runs high, or extends, general and topical bleeding, fomentations, and poultices, will be the most likely means of arresting its progress. It is only, however, in strong constitutions that venesection to any extent can be prudently practised in large cities or crowded hospitals.

As regards the local treatment, if the patient complains of considerable pain in the part, in four or five days the bandage may be raised, and the wound examined; and if there be much inflammation, a corner of the lint, or other dressing, may, with the greatest precaution, be lifted from the wound, to suffer any matter that may have formed to escape. By this means it will occasionally happen, that the wound closes by the adhesive process; but in a few days, this does not take place, and suppuration ensues, the matter should be allowed to escape, and simple dressings applied. “After a week or ten days, if there be suppuration, with much surrounding inflammation, poultices should be applied upon the wound, and leeches in its neighbourhood and upon the limb,

at a distance from the wound, the evaporating lotion should still be employed; but as soon as the inflammation is lessened, the poultices should be discontinued."—*Sir A. Cooper. Surg. Essay. Part II. p. 121.*

OBS.—If the case takes a favourable turn, the constitutional fever will not run high, neither will the pain and inflammation of the limb be excessive; but in certain cases the most judicious treatment of compound dislocations proves unavailing. The joint and limb are attacked with considerable pain, the sympathetic fever runs high, delirium follows, and the patient may even perish from the violence of the first symptoms, the limb being usually at the same time attacked with gangrene. And if these dangers are avoided, the wound may nevertheless not heal favourably; the inflammation may be considerable, or of an erysipelatous nature; large abscesses may form under the fasciæ; the bones may be affected with necrosis; and the hectic symptoms, and sinking state of the patient, leave the only chance of recovery to depend upon amputation. But the temperaments of some persons are so irritable that whether an attempt be made to save the limb, or amputation be at once performed, the case terminates with a fatal rapidity. In young subjects, and in a healthy air, many cases will do well; which, in people advanced in life, in the atmosphere of large towns and crowded hospitals, would be fatal without amputation.

XIX. DISLOCATIONS, COMPOUND, OF THE ANCLE JOINT.

These accidents may occur in the same manner and direction as the simple dislocations; and the bones and ligaments suffer in the same way. Great local inflammation and constitutional disturbance attend the accident; the cause of which is the wound made into the joint, and the great efforts of nature made to repair it.

TREATMENT.—The principle to be observed in the treatment of these compound accidents is, to reduce the dislocation in the same manner as described in simple cases; and close the wound as completely as possible, to assist nature in the adhesive process: thus rendering suppuration and granulation less necessary for the union of the opened joint. Apply a little lint, dipped in blood, to the

ound: put on a many-tailed bandage, to be kept wet with an evaporating lotion, made of spirits of wine and water: the limb should be placed on the outer side. But in the dislocation *outwards*, the foot is best supported on the heel, with a splint and t-piece on the outer and inner side of the leg. The knee should be slightly bent, and attention paid that the foot does not become anted. Sometimes there is a comminuted fracture of the tibia, fibula, in conjunction with an accident of this kind. A comminuted fracture of the tibia, in conjunction with a compound luxation, would not of itself be a reason for amputation. In a person of good constitution, where the laceration of the external parts is not very considerable, and where no artery of importance is wounded, an attempt might be made to save the limb. It might be necessary to remove portions of bone, if any were completely detached, adopting, afterwards, the treatment previously mentioned.

REMARKS.—In compound dislocation of the ankle joint, with the bone projecting, and you cannot get the bone back again, and it is closely girded by the edges of the wound, the wound might perhaps be enlarged a little: but there are instances, where the bone cannot be replaced, or in which, after replacement, it becomes detached again. In some of these cases, Sir A. Cooper has strenuously recommended the protruded portion of the bone to be sawed off with a view to preserving the limb, and, at all events, to render it preferable to a wooden leg.

The following are the circumstances which Sir A. Cooper has known to give rise to the necessity for amputation in compound dislocations of the ankle:—1. The advanced age of the patient. 2. A very extensive lacerated wound. 3. Difficulty of reducing the ends of bones, he considers rather as a reason for sawing them off than for amputation. 4. Extremely shattered state of the bones. 5. Dislocation of the tibia, outwards, cause greater injury to the bones and soft parts than those inwards; and more frequently require amputation. 6. Sometimes the bone cannot be retained after it is reduced, owing to the tibia in the dislocation being obliquely fractured. 7. Division of a large

blood-vessel, attended with an extensive wound of the soft parts. 8. Mortification. 9. Excessive contusion. 10. Excessive suppuration. 11. Necrosis, where the sequestra do not admit of removal. 12. Very great and permanent deformity of the foot. 13. When tetanus comes on, Sir Astley Cooper does not approve of the operation. 14. A very irritable state of constitution; such as is often met with in very fat subjects, who take no exercise.—(*On Dislocations, &c. p. 332, et seq.*)

ECCHYMOSIS.

This is a Greek term, and is equivalent to effusion, or spreading of blood into the cellular tissue. It is present whenever the contusion is sufficiently violent to produce the rupture of a blood-vessel, and it communicates a colour more or less vivid to the skin. Ecchymosis differs from *thrombus* in being less circumscribed, and possessing the characteristics of a tumour in a less distinct degree.—*See Sugillation.*

Ecchymosis is one of the symptoms of contusion; but contusion may exist without ecchymosis; though the latter is always the consequence of the former, and both originate from some external cause.—*See BLEEDING, p. 85.*

TREATMENT.—Common cases of ecchymosis may, in general, be easily cured by the application of discutient lotions, and the exhibition of some mild purgative salt. The best local applications are the lotion made of the muriate of ammonia, or lemon camphorated spirits of wine, soap liniments, vinegar, &c.

OBS.—In medico-legal investigations it is important, in doubtful cases, to make an accurate distinction between ecchymosis and sugillation. Zacchias has suggested the following:—"When this discoloration (*ecchymosis*) is the consequence of external violence, a coagulation of thick *concrete* blood will be found; but in the spontaneous spot, or sugillation, the blood in the incision will be seen fluid. There is probably a considerable degree of truth in this, though observers have not in all cases proved the difference. Stoll, at Vienna, examined the bodies of two females who died of petechial fever, and observed spots which extended to a considerable depth.

had contained a large quantity of extravasated blood. They had the appearance, he adds, of having been caused by external violence.—*Mahon, Vol. II. p. 210, 211.*

As the value of this sign in infanticide, ecchymosis, or extravasation of blood on the body of the child by blows or other injuries, serves to prove that it enjoyed vitality at the time they were inflicted; in a dead child, as the blood has ceased to circulate, it could not flow to the injured part, and therefore there would be no appearance of extravasation. Professor Mahon mentions another possible cause of such extravasations, which should not be overlooked. He says they may result from putrefaction, which, by means of the air that has generated, bursts the veins, and then blood from very distant parts of the body is insensibly carried along to this outlet, so as to form a considerable extravasation.—*Id. Cit. Vol. II. p. 389.*

ECTROPIUM.

An eversion of the eyelids, so that their internal surface is outermost, is thus named.

Scarpa enumerates two species of this disease; one produced by an unnatural swelling of the lining of the eyelids, which not only everts their edge from the eye-ball, but also presses them so forcibly that they become everted; the other is a consequence of contraction of the skin covering the eyelid, or of that in the vicinity, by which means the edge of the eyelid is first removed for some distance from the eye, and afterwards turned completely outward, together with the whole of the affected eye.

CAUSES.—Congenital laxity of the membrane, afterwards increased by chronic affections of the eyes, particularly of a scrofulous nature in relaxed unhealthy subjects; or from the small-pox affecting the eye,—of which the second species is not unfrequently a cause, in consequence of puckered scars, consequent on the confluent type; also from deep burns, or the excision of tumours without saving a sufficient quantity of skin.

TREATMENT.—This disease is only to be cured by a surgical operation. The nitrate of silver, and other caustics, have been used by Ware, Scarpa, and many other intelligent surgeons; but

they admit the effect of their use to be uncertain. The operation proposed and practised by Sir W. Adams is that now generally resorted to. It is performed, first, by removing the whole of the fungous growth by means of a small curved bistoury; secondly, by stripping away a piece of the edge of the tarsus, in the shape of the letter V; afterwards, to separate the eyelid from the cheek whenever it adheres to the latter; and, lastly, by supporting the lid, now raised into the proper place, and confining the edges of the cut eyelid in a state of juxta-position by a proper bandage. The divided edges heal by the first intention; and the cure is frequently completed in a fortnight, with a restoration of the eyelid to its healthy form.—See *Practical Observations on Ectropium, &c.* pp. 1 and 5. Lond. 1812.—*Guthrie's Operative Surgery of the Eye*, p. 7. 8vo. 1823.—*Travers' Synopsis of Diseases of the Eye*. Lond. 1820, &c.

ECZEMA.

A cutaneous disease, characterised by an eruption of small vesicles on various parts of the skin; usually set close, or crowded together, with little or no inflammation at their bases, and unaccompanied with fever. It is not contagious.—See *Bateman's Synopsis*, p. 250. Ed. 3.

CAUSES.—There are several varieties of this eruption, which is generally the effect of irritation internally or externally applied, and is occasionally produced by a great variety of irritants in persons whose skin is constitutionally very irritable. 1. *Eczema solare*, which takes place in the summer season, and is the effect of irritation from the direct rays of the sun, or from the heated air. 2. *Eczema impetiginodes*, a local eczema, produced by the irritation of various substances; and when these are habitually applied, it is constantly kept up in a chronic form, differing from the impetigo only in the absence of pustules. 3. *Eczema rubrum*, which is the most remarkable variety, and arises from the irritation of mercury; whence it has been called *eczema mercuriale*, *erethema mercuriale*, and *hydrargyria*, which, however, is often limited to a small space.

SYMPTOMS.—It is preceded by a sense of stiffness, burning

at, and itching, in the part where it commences, which is most frequently the upper and inner surface of the thighs, and about the scrotum in men; though it sometimes makes its appearance first at the groin, arm-pits, or bend of the arm, or about the neck. These sometimes are soon followed by an appearance of redness, and the surface is somewhat rough to the touch, occasioned by innumerable minute and pellucid vesicles, which have been mistaken for papulæ. In two or three days these vesicles, if they are ruptured, attain the size of a pin's head; and the enclosed serum then becoming somewhat opaque and milky, the character of the eruption is obvious. It soon extends, and is accompanied by a considerable swelling of the integuments, such as is seen in small-pox and other eruptive fevers, and by great tenderness of the skin, and much itching, &c.

TREATMENT.—The irritation of the skin will be greatly alleviated by frequent ablution, or fomentation with warm gruel, milk and water poultices, &c. or the frequent use of the warm-bath. Where the cuticle has exfoliated, Mr. Pearson recommends the application of a mild cerate, consisting of litharge plaster, oil, and oil, spread thickly on linen rollers, and renewed twice a day.

With this intention, the bed and body linen of the patient, which becomes hard and stiff as the discharge dries upon it, should be frequently changed. Stimulating food and drink should be allowed; the bowels regulated by occasional laxatives; and some diaphoretic, or an antimonial, given regularly; with an occasional opiate, to soothe the sensations of the patient. The sulphuric acid, sufficiently diluted, is grateful and refreshing, and the decline of the swelling and the discharge may be advantageously combined with the liberal use of cinchona and sarsaparilla.

EMBROCATION.

An external application used for sprains, bruises, &c.

EMBROCATION, SPIRITUOUS, OF VINEGAR.—Acetic acid, and proof spirit, Oss. Used as a stimulating astringent application; and is often found highly beneficial in phlegmonic inflammations of the skin, in incipient scirrhi, in bruises, and

ecchymosis. With the addition of two drachms of alum it has been much praised as an effectual remedy for recent chilblains.

2. EMBROCATION, SPIRITUOUS, OF VINEGAR, WITH CAMPHOR.

Take	Vinegar	Oij.	
	Rect. spirits	Oijj.	
	Distilled water	Oj.	
	Camphor	℥ij.	Mix.

Dissolve the camphor in the spirits of wine, and add the vinegar and water previously mixed.

USE.—Painful rheumatic swelling of the joints; also for relieving sprains and bruises, and for exciting the absorbents in cases of extravasation of blood from local injuries, particularly after the symptoms of high excitement have been removed by topical or general bleeding, and by other suitable means.

Wilson.—PHARM. CHIRURG.

EMBROCATION OF AMMONIA.—This embrocation is often very efficacious as a stimulant and rubefacient, for relieving painful affections of the face and other parts; also for removing thickening and enlargements of the joints, consequent upon gouty and other inflammations. It is made as follows:—

Take	Solution of ammonia	℥j.	
	Sp. of sulph. æther	℥ss.	
	Comp. sp. of lavender	℥ij.	Mix.

3. EMBROCATION OF THE ACETATE OF AMMONIA.—This is a common embrocation of Guy's Hospital, and is used as a general application for the relief of sprains and bruises, and other injuries where the skin remains entire.

Take	Prepared Ammonia	℥iv.	
	Acetic acid,	ad saturationem.	
	Proof spirit	Oijj.	Mix.

Mix the ammonia with the vinegar, and after the effervescence ceases add the spirit.

Mixed with linseed meal, and applied warm in the form of a cataplasm (renewing it once or twice in the day), it is often of great utility in slow chronic inflammations of the joints, &c.

1. EMBROCATION, COMPOUND, OF OPIUM.—This embrocation is made with the same intentions as the embrocation of ammonia and soap embrocation with camphor.

Take	Tinct. of opium	} ana.	℥ij.
	Spir. sulph. æther		
	Spir. camphor		℥ii. Mix.

In some painful affections of the muscles this embrocation sometimes acts as an immediate specific. In odontalgia it will soon give instant ease; in sciatica it is frequently of great benefit; and in deep-seated pain, in the neighbourhood of the joint it generally relieves sooner than any other application.

2. EMBROCATION OF SOAP WITH CAMPHOR.—This embrocation is similar to the celebrated anodyne liniment of Bates.

Take	Soap liniment	℥ij.	
	Spirit of camphor	℥j.	
	Oil of origanum	℥ij.	
	Tinct. of opium	℥ss.	Mix.

In painful rheumatic swellings of the joints, in arthritic pains, sciatica, lumbago, and chronic rheumatism, this embrocation has been prescribed with considerable benefit. If a piece of lint be dipped in it, and applied to an aching carious tooth, it often acts as an immediate remedy.

3. EMBROCATION OF CANTHARIDES WITH CAMPHOR.—This is composed of equal parts of the tincture of cantharides and spirit of camphor; and may be used in any case where the object is to stimulate the skin; bearing in mind, too, at the same time, that the absorption of the Spanish fly will sometimes induce strangury.

EMPHYSEMA.

DEFIN.—Distension of the cellular membrane, produced in consequence of a collection of air having accumulated there.

CAUSE.—A fractured rib is the common cause, by which the vessels of the lungs are wounded, so that the air escapes from them into the cavity of the chest. It has also been known to arise from a rupture of the larynx and trachea, produced by a blow or kick.—See *Edinb. Med. and Surg. Journal*, No. 72.

SYMPTOMS.—Considerable tightness of the chest, with pain

principally in the situation of the injury, accompanied with great difficulty of breathing, which gradually increases and becomes more and more insupportable. The patient soon finds himself unable to lie down in bed, and cannot breathe unless when his body is in the upright position, or when the patient is sitting a little inclined forward.

PROG.—Wherever the emphysematous swelling is situated it may be easily recognised from œdema, or anasarca, by the crepitation or crackling noise which occurs on handling it. The tumour is colourless, and free from pain. It does not descend in the depending parts, though it may be made to change its situation by pressure. It yields to pressure, but resumes its form again when the force is removed: the swelling never pits. The part affected is not heavy: it makes its appearance in one particular part, but soon extends itself over the whole body, producing an extraordinary distension of the skin.

TREATMENT.—Mr. Hewson recommends making an opening in the chest, for the purpose of giving vent to the air confined in the cavity of the chest, in the same manner as is done for the discharge of pus in cases of empyema, or of water, as in drops of the thorax. The necessity of the operation is indicated by the violence of the symptoms, such as oppressed breathing, &c.; when these are not considerable, and the air passes out of the chest with sufficient freedom, the operation is not called for. If the disease be on the right side, Mr. Hewson says, the best place for performing the operation will be on the fore-part of the chest between the fifth and sixth ribs; for there the integuments are thin, and, in the case of air, no depending drain is required. If the disease be on the left side, it will be more eligible to make the opening as small as possible between the seventh and eighth, eighth and ninth ribs, so that the surgeon may be certain of avoiding the pericardium.

The principal object for making an opening into the thorax when the symptoms of suffocation are violent, is to remove the pressure caused on the opposite lung by the distension of the mediastinum, and at the same time to diminish the pressure of the air on the diaphragm.

The following practice is recommended by Mr. John Bell:—
 "When," says he, "the crackling tumour begins to form over a fractured rib, small punctures should be made with the point of a lancet, as in bleeding; and if the point be struck deep enough, the air will rush out audibly. But as (supposing the lung is not adherent to the inside of the chest,) this air was in the thorax, before it came into the cellular substance, it is plain that the thorax is full, and that the lung of that side is already collapsed and useless, and must continue so. The purpose, therefore, of making these scarifications, and especially of making them so near the fractured part, is not to relieve the lungs, but merely to prevent the air spreading more widely beneath the skin. 2. If the air should have spread to very remote parts of the body, as to the abdomen, and down the thighs, it will be easier to make small punctures in those parts, to let out the air directly, than to press along the whole body till it is brought up to the punctures made in the chest over the wounded part. 3. If, notwithstanding free punctures, and pressing out the air in this way, you should find by oppression that either air or blood is accumulating within the cavity of the thorax, so as to oppress not the wounded lung only, which was of course collapsed and useless from the first, but the diaphragm, and through the diaphragm to affect also the sound lung; then a freer incision must be made through the skin and muscles, and a small puncture should be cautiously made through the pleura, in order to let out the air or blood confined in the thorax."

REMARKS.—In all these cases copious and frequently repeated blood-letting is for the most part proper. The application of a bandage is highly spoken of in emphysematous cases by Mr. Abernethy; he says he, "it not only hinders the air from diffusing itself through the cellular substance, but serves to prevent it from coming out of the wounded lung, and of course facilitates the healing of the wound, which would be prevented by the constant emission of air. Its early application, therefore, will often prevent a very troublesome symptom, whilst, at the same time, by holding the fractured ribs from motion, it generally lessens the

sufferings of the patient.”—*Abernethy's Surgical Works, Vol. I. p. 179.*

Mr. Abernethy, however, does not recommend the application of a bandage in all cases of emphysema. “Patients,” he observes, “will not be always able to wear a bandage, when one lung is collapsed, particularly if any previous disease has existed in the other, as it equally confines the motions of the ribs on both sides, and as every possible enlargement of the chest becomes necessary for the due admission of air into the lung which still performs its functions. Under these circumstances, if the emphysema continues, (and its continuance must always denote that the wound in the lung is not closed,) I should esteem it the best practice to make a small opening into the chest, so that the external air might have a free communication with that cavity; and that the injured lung must remain motionless till its wound is healed, and the mediastinum will, in every state of the thorax, preserve its natural situation.”—See *Op. Citat. p. 183.*—Also *Hewson's Papers in Med. Observ. and Inquiries, Vol. III.*—*Dr. Hunter, idem, Vol. I.*—*Burns on the Surgical Anatomy of the Head and Neck, p. 52.*—*John Bell on Wounds. Edit. 3. Edinb. 1812.*—*Halliday on Emphysema. 1807.*—*Hennen's Principles of Military Surgery. Edit. 2. p. 376; &c. &c.*

EMPYEMA.

The word empyema was used by the ancients to express every description of internal suppuration; though it was restricted by *Ætius* to collections of purulent matter in the cavity of the pleura, or membrane lining the thorax—a meaning which the best modern surgeons still attach to the term. It is one of the terminations of pleuritis.

SYMPTOMS.—There is reason for believing that matter is contained in the cavity of the chest, when after a pleurisy or inflammation of the thorax, the patient has a difficulty of breathing, particularly when lying on the side opposite the affected organ, and when an œdematous swelling is externally perceptible, expansion of that side of the chest where the empyema lies, &c.

(CAUSES.—Inflammation of the pleura costalis—external injuries, such as the perforation of the sternum with a sword. (Zanderwel, *Obs.* 29. cent. 1.) Petit met with an abscess, the consequence of a gun-shot wound in the situation of the sternum. It is sometimes caused by a penetrating wound in the chest; and occasionally it proceeds from the bursting of one or more *emphymata*.

(TREATMENT.—It is occasionally cured by the operation of making an early and depending opening into the chest at the most painful or tender part, or between the sixth and seventh ribs. The motions of respiration then both promote the exit of the matter, as well as the contraction of the cavity, in which it is lodged; and the disease, if unattended with caries of the ribs, generally terminates favourably.

ENCANTHIS.

A disease of the eye consisting in an alteration of the structure of the caruncula lachrymalis*; and neighbouring semilunar fold of the conjunctiva.

(APPEARANCES.—Enlarged caruncula, having a granulated appearance at the commencement, which it loses as it increases, and then becomes similar to a hazel nut, ash-coloured, and streaked with various vessels. The enlargement of the caruncula prevents the lids from closing, and allows extraneous matter to enter, which keeps up inflammation of the eye, and also presses on the puncta lachrymalia, and turns them out of their place—being thus prevented from getting into the lachrymal sac, are discharged on the cheek.

(TREATMENT.—The best treatment is to remove the enlarged caruncula. The operation is simple, and is performed as follows:

The lachrymal caruncule—a little fleshy conical glandiform body, red externally, situated in the internal canthus or angle of each eye, before the inner edge of the eyelids. It appears to be formed of numerous sebaceous or mucous glands, from which many small hairs grow. The hardened smegma observed in this part of the eye in the morning, is secreted by this caruncule.

OPERATION.—An assistant lifts the eyelid—the tumour raised with a pair of forceps, and removed with a pair of curved scissors with convex edges.

OBS.—The operation ought not to be performed when the encanthis has assumed a malignant form, and put on the cancerous appearance; which cannot fail to be recognized by the dull red colour of the excrescence; its excessive hardness; lacerating pains extending to the eye-ball and forehead, particularly when touched; foul ulcers, with irregular edges, having all the appearance of cancer in any other part of the body. But when it has not assumed the malignant form, it is always removable by excision.

ENTROPIUM.

An inversion of the eyelids, which may consist either in the turning inwards of the cilia alone, without change of position in the eyelid, or inversion of the lid itself. Both kinds are sufficiently common.

CAUSES.—This disease generally takes place during inflammation and swelling of the conjunctival lining of the lid. During violent inflammation of the lid, the conjunctiva and integument are much swollen, and bulge out externally; by the projection the margin is forced mechanically towards the ball, and entropion takes place. But in this state of matters, should the lid be any chance everted, and not replaced, then the bulging is from the conjunctival surface, which prevents the margin from regaining its proper site, and permanent eversion or entropion occurs. More permanent entropion is caused by the contraction which follows removal of tumours from the under surface of the lid, or destruction of large portions of the conjunctiva. The disease is most frequently met with in the upper lid. Great irritation is caused by friction of the hairs and edge of the lid on the sensitive surface of the eye-ball. Inflammation is frequently kindled, and kept up by the continued irritation, accompanied by its usual distressing symptoms when seated in that organ, and too often followed by a greater or less number of its untoward consequences. But all these bad effects may occur without any change in

position of the edge of the lid, from irregular growth of the cilia. Sometimes only one or two hairs are at a fault; in other cases, the half of the eye-lash grows inward; and sometimes there is a double row of cilia; one set being in the usual position, while the other projects against the eye-ball. If proper means are not taken to remedy the evil, and moderate the irritation which it produces, the cornea becomes thickened and changed in structure; and vision, at first impaired and indistinct, may be entirely lost.

TREATMENT.—The symptoms may be for a time palliated by picking out the faulty hairs, abstracting blood from the loaded vessels, and subsequently using ointments, or collyria—the best of which, perhaps, is the solution of the nitrate of silver. In some cases it may be necessary to employ counter irritation, as blistering the nape of the neck; and in all the general health must be strictly attended to. The permanent cure of the disease is effected either by removal or by destruction of the roots of the cilia. The whole edge of the eyelid, or the offending part of it, is removed with a sharp narrow bistoury, the operator steadying the parts by laying hold of the cilia with the fingers of his left hand. It is necessary to remove the mere edge only, the cilia and their roots, and not the whole of the tarsal cartilage, as has been proposed. Or the hairs may be extracted by good forceps, such as are used for securing arteries, and a heated needle passed into the canal which contains them, so as to destroy the secreting part, and prevent their regeneration.

Inversion of the lid, from contraction of a cicatrix in the conjunctiva, may be counteracted, by destroying it with caustic, or removing with cutting instruments a portion of the outer integuments, corresponding to the internal cicatrix. Forceps with broad points are used for taking up a fold of the skin, and an oval portion is then excised with a knife or scissors, cutting instruments being less painful and more precise than caustics—of the latter the sulphuric acid has been particularly recommended for this purpose. The contraction of the wound releases the cilia from the power of the internal cicatrix, and the parts are restored to their healthy state.—*See* ECTROPIUM, p. 223.

ERESTHISMUS.

Increased sensibility, and irritability, a term variously employed by modern authors. Mr. Pearson has described a state of the constitution produced by mercury acting upon it as poison. He calls it the mercurial erythismus, and mentions that it is characterized by great depression of strength, anxiety about the præcordia, irregular action of the heart, frequent sighing, trembling, a small, quick, sometimes intermitting pulse, occasional vomiting, a pale contracted countenance, a sense of coldness. The tongue, however, is seldom furred, nor are the vital and natural functions much disturbed. In this state any sudden exertion will sometimes prove fatal.

ERYSIPELAS.

St. Anthony's Fire. This affection is known by a diffused redness or inflammation on some part of the skin, attended with fever, mostly of the inflammatory type, but occasionally typhoid.

CAUSES.—“I'll be hanged,” says Mr. Abernethy, “if erysipelas is not always the result of a disordered state of the digestive organs. I never see it come on if the digestive organs be right.” Richter, the German surgeon, is of the same opinion; he says it arises from “gastric irritation.” Dessault, a French surgeon, says that it is the result of a “*bilious cause*.” “I do not know,” says Abernethy, “what they mean by the gastric irritation and the bilious affection; but I know that there is a peculiarity of the general health on which the disease very much depends, and that it is wrong to repel it. For whenever a disease comes on locally without immediate injury, it is, as it were, a fixation of the constitutional disease; it is a focus in which the diseased action is to be concentrated; and if it be seated in an unimportant part, in the name of God let it go on there.”

The following are the received varieties of erysipelas:—

I. *Erysipelas Phlegmonoides*.—A form most frequently occurring in the face, affecting usually one side of it only; sometimes it attacks one of the extremities; and in both cases it is ushered in by a smart feverish attack.

2. *Erysipelas Œdematodes* is less severe in its attacks than the preceding; the tumour is more gradual in its rise and extension; of a paler red, or of a yellowish brown colour; and is accompanied by less heat and local distress. Its surface is smooth and shining, and if it be strongly pressed with the finger a slight mark remains for a short time.

3. *Erysipelas Gangrænosum* commences sometimes like the one and sometimes like the other of the above species; and most commonly occurs in the neck, face, and shoulders. It is always a tedious and precarious disease, and irregular in the period of its termination.

Very little is known of the *immediate cause* of erysipelas. The most prevalent notions of the *predisposing* causes are themselves extremely vague; and only such as are known under the designation of *exciting* causes appear to be entitled to any degree of consideration. These are—

1. Violent mental emotions; as anger, acute grief, and the like.
2. Exposure to the sun's rays in any intense degree, or that of fire too long continued.
3. Cold damp atmospheres.
4. The action of various vegetable, mineral, and animal poisons.
5. Wounds, fractures, bruises, stings of reptiles and insects,

In the plurality of cases, erysipelas would appear to depend very intimately on the state of the constitution: as may be exemplified in persons of drunken and other intemperate habits, who, while in a state of intoxication, meet with local injuries; in consequence of which they have often erysipelatous inflammation. Others, again, who lead more regular lives, when they meet with similar accidents, experience inflammation of the healthy phlegmonous kind.

TREATMENT.—Common cases of acute phlegmonous erysipelas yield to mild purgatives and a light vegetable diet, with which are usually exhibited diaphoretics and the saline mixture. In the milder species, venesection appears to be unnecessary; but in this

respect the practitioner is to be guided, notwithstanding the discrepancy of opinion on this subject, by the symptoms, and state of the pulse, the patient's age, constitution, and other considerations. The patient will stand bleeding better in the country and in an open pure air, than in a large city, and especially in hospital. And unless there be considerable tendency to delirium or coma, blood-letting can seldom be repeated with advantage, least in large towns.

Cullen, who regarded erysipelas as a species of putrid fever, combined with evacuants the use of bark, wine, and other antiseptics; and in confirmation of this practice, the view taken of it by Dr. Bateman, quinine, a preparation of bark, is now beginning to be much prescribed in cases of erysipelas. In bilious erysipelas, whatever might be the degree of heat and fever, Dessault gave, in the first instance, a grain of tartarized antimony, dissolved in a considerable quantity of fluid, and the symptoms generally diminished as soon as the effects of the medicine ceased. In phlegmonous erysipelas, Dessault was an advocate of the lancet at the commencement of the disorder; and this followed up with the exhibition of emetic tartar.

In idiopathic erysipelas, whether phlegmonous or bilious, external applications have been deemed useless, or injurious, by a great majority of practitioners; among whom was Dessault. Bateman, at the commencement or early stage of the disease, found powdery substances, such as flour, starch, chalk, and like, increase the heat and irritation; and, afterwards, when the fluid of the vesications oozes out, produce still greater irritation by forming with the concreting fluid hard crusts upon the delicate surface. Mr. Pearson also condemned this plan, preferring warm poultices.

ERYTHEMA.

This term is variously applied. 1. Simple redness.—(*Hippocrates.*) 2. Rash, or inflammatory blush without fever.—(*Cullen.*) 3. A lesser degree of erysipelas.—(*Callisen.*) 4. A nearly continuous redness of some portion of the skin, attended with disorder of the constitution, but not contagious.—(*Willan.*)

Dr. Willan has described six varieties of erythema, which will include all the ordinary forms of the efflorescence.

Erythema fugax, consisting of red patches, of an irregular shape, and short duration, resembling the redness produced from pressure. These appear successively on the arms, breast, and face, in various febrile disorders, and in bilious diarrhœa, generally denoting, as Hippocrates and others have observed, a dangerous disease. They sometimes also occur in chronic affections, particularly those in which the primæ viæ are deranged, as dyspepsia, hysteria, hemicrania, &c.

Erythema læve, exhibiting an uniformly smooth, shining surface, and appearing chiefly on the lower extremities, in confluent patches, and generally accompanied by anasarca. It affects young persons of sedentary habits, with slight fever, and terminates gradually, after an uncertain period, in extensive discoloration as soon as the anasarca has disappeared. Exercise, diuretics and corroborants, contributes to shorten its duration in this class of patients. It occurs also in elderly persons, during under anasarca, especially in those accustomed to constant drinking. It takes place sometimes without œdema, when the bowels have been much disordered; and occasionally in women at the menstrual periods. Relief is afforded by the horizontal position of the limbs, by the use of diuretics and bark, and also by a weak spirituous lotion applied to the surface.

Erythema marginatum, occurring in patches, bounded on one side by a hard, elevated, tortuous, red border, in some places purely papulated; but the redness has no regular boundary on the open side. These patches appear on the extremities and face of old people, and remain for an uncertain time, without causing any irritation on the skin. They are usually connected with some internal disorder.

Erythema papulatum. This form shows itself chiefly on the face, neck, and breast, in extensive irregular patches, of a bright red hue, presenting not an inelegant painted appearance. A day or two before the colour becomes vivid, the surface is rough, or imperfectly papulated. The redness continues afterwards for about a fortnight; and, as the eruption fades, it as-

sumes a blueish hue, especially in the central parts of the patches. This disorder of the skin is sometimes attended with considerable disorder of the constitution. Light diet, with diaphoretics and mineral acids, and attention to the state of the bowels, include all that is necessary for its removal.

5. *Erythema tuberculatum*. This type resembles the last variety in the large irregular patches of red efflorescence which it exhibits; though there are small slightly elevated tumours interspersed through the patches, which subside in about a week, leaving the erythema, which becomes livid, and disappears about a week more. It sets in with fever, and is accompanied with great languor and irritability, restlessness, and followed by hectic fever.

OBS.—In the only three cases of this species of erythema which Dr. Willan witnessed, the medicines employed did not appear to alleviate the symptoms, or to prevent the subsequent hectic.

6. *Erythema nodosum*. This is a more common and milder form, and appears to affect females only, showing itself on the fore-part of the legs. It is preceded by a slight febrile attack which continues for about a week or more, and which generally declines when the erythema appears. It shows itself in large oval patches, the long diameter of which is parallel with the tibia, slowly rising into hard and painful protuberances, which regularly soften and subside in the course of nine or ten days. The red colour of the erythema turns of a blueish colour on the eighth or ninth day, exhibiting the appearance as if the leg had been bruised.

OBS.—This former has always gone through its course mild, under the exhibition of laxatives, followed by the mineral acids and other tonics.

ESCHAROTICS.

DEFINITION.—The term *Escharotic* is given by surgeons to those substances which have the power of eroding or dissolving animal solids, which they do, either by combining with animal matter, and forming a soft pulp, or a species of eschar, or by

altering affinity causing the elements of the soft fluids to enter into new combinations; whence their cohesion is subverted, and their composition is changed.

USE.—Escharotics are principally to remove excrescences, to establish an ulcer, or to change the surface of an ulcerated part, converting it into a simple sore; and the principal distinction among them is that founded on the energy of their action, some acting merely the cuticle or external surface to which they may be applied, as nitrate of silver, or sulphate of copper; others, as arsenic, producing the decomposition of the animal matter to a greater depth. The action of some of them, too, that of arsenic, for example, appears to be so far specific, that effects are obtained in their operation, not easily procured by others. The principal escharotics are:

Acetate of copper,	Potass,
Acids, mineral,	Savine,
Arsenic, white oxide of,	Subnitrate of quicksilver,
Muriate of antimony,	Sulphate of copper,
Muriate of quicksilver,	Supersulphate of alum and
Nitrate of quicksilver,	potass.

USES.—The operation of these bodies may, in general, be considered chemical: for having destroyed the life of the part to which they are applied, they cause, as if by a species of resulting affinity, the elements of the animal matter to enter into a new mode of combination, each in its peculiar way. The action of them is peculiar in some instances; for when applied to the cornea of the eye, it completely destroys its transparency, and mixes the animal substances with which it comes in contact with a fine powder: it renders the cornea as completely opaque as a portion of marble. The peculiar effects of the nitrate of silver are well known; it produces a whitish film over the part. The truth is, that nitrate of silver is decomposed when it comes in contact with any animal discharge; for all the animal fluids contain muriatic acid, and the muriatic acid decomposes the nitrate of silver, so that a muriate of silver is formed, which is the whitish kind of substance that is seen after nitrate of silver has been applied.

EXFOLIATION;

From the Latin verb *exfoliare*, the separation of a leaf—surgically speaking, the separation of a dead piece of bone from the living by the process of absorption.

PROCESS.—It is found, as in the case of mortification of the parts, that a *groove* is formed between the dead and the living part; it seems as if a portion of the substance were eaten away, and from the groove which is thus formed granulations spring up, and these granulations form one mass with those arising from the adjacent soft parts. Thus there is a sort of ridge or line of granulations surrounding the denuded bone. The absorbent process gradually eats into the bone, deepening the groove before mentioned, extending it under the dead part of the bone, and, in fact, continuing that extension till the dead part of the bone is completely undermined and separated from the living. When this is complete, the exposed dead part is found to be loose when touched, or it will become loose with a very little force applied to it, then the separation is complete. When it comes away, you do not find that the portion of bone which remains behind is rotten and hard like bone. On the contrary, when the dead part is separated, this remains behind in a bed of granulations, which gradually passed, from the original groove that separated the living from the dead parts, under the dead part, and accomplishes the separation. There is a complete bed of soft points or granulations; and the portion of bone which has been separated from the exfoliated portion, bears evident marks of that action of the absorbent vessels which belongs to those granulations. If a piece of bone, thus detached, be examined, you see that it presents a number of irregular large sharp prominences which correspond to the intervals between the soft granulations. The process, then, of the separation of the dead, or exfoliated part, from the living portion, is a process of *absorption*. The bony substance is taken up by the absorbents of the granulations; and thus there is an actual vacancy made between the dead and the living parts.—

WOUNDS OF BONE.

Exfoliation is not a necessary consequence of a bone being

re, and deprived of its periosteum; because the separation of the latter from a portion of bone does not naturally cause its death, in consequence of the periosteum not being the sole source from which the bone derives its supply of blood-vessels, since there are openings for the admission of arteries, which, from their nature, anatomists call *interosseous* arteries, which ramify in the medullary cavity, and inosculate on the bone, with the small branches that proceed from the periosteum.

A dead bone acts on the system in the same manner as every other foreign substance; and when any part of a bone is once diseased, it is propelled to the surface in the same manner as most other inanimate bodies would be, and this stage is partly mechanical, and partly a continuation of ulceration.—See *Wilson on the Skeleton and Diseases of Bones*, p. 281. 8vo. Lond.

TREATMENT.—According to the late Mr. John Hunter, neither caustics, nor the actual cautery, which used formerly to be applied, hasten exfoliation; they only produce death in a part of the bone, which is the first step towards exfoliation; and if even they do hasten exfoliation, when the bone is already dead, it must be by producing inflammation in the adjacent living bone,—a change that makes it exert a power of which it was previously incapable. If there be any efficacious application at all to an exfoliating portion of bone, it should be one which will stop the putrefaction in the affected bone, and promote the absorption of those particles of phosphate of lime which form the connexion between that which is living and that which is actually dead. As the bone dies from the same cause that the soft parts putrefy, the same principles in practice should be at least followed, which are adopted in the latter instance; and though, from the inferior vascularity and vital power of bones, surgery cannot be expected to have as much control over their affections as over those of the soft parts, yet, every good will thus be obtained, which it is possible to acquire.

The most approved mode of attempting to prevent exfoliation is not taking place at all in a bone that has been exposed by a wound, is to cover over the part again as soon as possible with

the flesh that has been detached from it; and where the exposed bone cannot be so covered, it should be dressed with the mildest and simplest applications, with plain lint, or lint spread with thin spermaceti ointment. The dead pieces of bone, when the process of exfoliation is tediously carried on, when wedged in the substance of the living bone, and when so situated as to admit of being safely sawn, or cut away, may occasionally be very advantageously removed in this manner. In such operations Mr. Hey's saws may be employed with great convenience; and where these are not applicable, that invented by Mr. Machell, as described in Sir Astley Cooper's *Surgical Essays*, or another devised by Graefe, and explained by Schwall, deserve to be recollected.—See *Art. Necrosis*. SUPPURATION OF BONE. *Latton's Essay on Caries, &c. in Edinb. Med. Journ. No. 78.*—*Wilson*—*Op. Citat. &c.*

EYE, DISEASES OF.

In former times, all disorders of the lachrymal passages, and of the neighbouring parts, were denominated *fistula lachrymalis*, and were all treated in nearly the same manner, by opening the sac, and inserting probes, knives, terebræ, scalpra, caustics, and red-hot irons; the structure of the various parts being then but indifferently understood, and the opinions relative to the origin and nature of the disease being formed on erroneous principles, regarding the defluxion of acrid humours, formation of imposthumes, fungous growths, &c. The term, however, which was indiscriminately applied to all diseases in the inner corner of the eye, accompanied with derangement of the lachrymal secretion, is now confined to a distinct form of disease, as will be found, including those that follow, mentioned under their respective heads.

Under the present may be simply noticed—1. Simple inflammation of the tunica conjunctiva, its modifications, consequences, and treatment. 2. Simple inflammation of the deeper-seated tunica. 3. The diseases of the lens, and particularly that of the crystalline lens, which terminates in cataract, and the operation necessary

try to be performed for that affection. 4. Diseases of the appendages of the eye, their treatment, and the operations necessary for their cure. For these see

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| 1. Amaurosis. | 11. Hordeolum. |
| 2. Cataract. | 12. Hydrophthalmia. |
| 3. Conjunctiva. | 13. Iritis. |
| 4. Cornea. | 14. Ophthalmia. |
| 5. Ectropium. | 15. Psorophthalmia, see ophthalmia. |
| 6. Entropium. | 16. Fistula Lachrymalis. |
| 7. Encanthis. | 17. Trichiasis. |
| 8. Eye, Cancer of. | 18. Districhiasis, &c. |
| 9. Eye, Fungus of. | |
| 10. Glaucoma. | |

EYE, CANCER OF.—By cancer of the eye is meant, not cancer of the globe of the eye, for it rarely or ever commences in it; but begins in the appendages and conjunctiva, and then extends to the globe; cancer rarely ever making its appearance here, having its common seat in the conjunctiva.—*Sir A. Cooper.*

SYMPTOMS.—At the commencement, cancer of the eye resembles a warty tumour, with an ulcer on its surface, which has exactly the same appearances as ulcers in other parts of the body, extending then only to the palpebral lining, the lachrymal gland, the periosteum of the bones forming the orbit, and the antrum; at length, the globe and its appendages become ultimately one enormous mass of disease.

TREATMENT.—The early removal of the cancer with the knife; and until this be done, no good can be expected. The operation is performed in the following manner.

EYE, EXTIRPATION OF.—The best mode of performing this formidable operation is thus: the patient is to be placed in the sitting posture, or, at any rate, with the head elevated; in order to steady the eye, or shift its position, if necessary, a needle, armed with a ligature, is to be passed through the fore part of the globe or ball of the eye. If the lids are contracted, or the eyeball is exceedingly large, it will be necessary to divide the inner angle, in order to facilitate the operation. An assistant

raises the upper lid, and the operator then introduces a double edged straight knife through the conjunctiva, and divides the cellular membrane as extensively as he can. The next cut through the oblique muscles; this having been done, the recti muscles and the optic nerve are to be divided. To complete the last step of the operation, a curved knife, adapted for the purpose is to be used; after which the globe of the eye is easily removed.

AFTER-TREATMENT.—It seldom happens that any hæmorrhage takes place in this operation, which may not be stopped by dressings of lint. The lids are to be brought in apposition, and a compress of linen applied over the eye. Inflammation is to be guarded against, and the patient otherwise attended to; for although inflammation does not frequently supervene after the operation, it nevertheless does occur, extends to the membrane of the brain, and proves fatal.

EYE, FUNGUS HÆMATODES OF.—When this disease attacks the eye, it may be recognized by the following

SYMPTOMS.—The patient's vision is impaired. The pupil becomes dilated and immoveable. On looking into the eye, at the commencement of the disease, there is seen, opposite to the pupil and deeply seated in the posterior chamber, an appearance like a mirror, or plate of polished iron, resembling an opacity of the lens, from which it is difficult to distinguish it. The pupil, instead of its natural deep black colour, is of a dark amber and sometimes of a greenish hue. The change of colour becomes gradually more and more remarkable, which at length is discovered to be occasioned by a solid substance, which proceeds from the bottom of the eye towards the cornea. The iris remains immoveable. As the prominence enlarges, the iris becomes protruded, and the cornea distended. The conjunctiva becomes inflamed, the eyelids vascular, and in a diseased state; and in process of time the cornea sloughs, an opening is formed, and a discharge of a ropy mucus first takes place. The fungus does not always protrude through the cornea, but sometimes through the sclerotic, and then it has a purple, livid hue, and is covered by the conjunctiva.

When the fungus increases in size, it assumes a dark red colour, its surface is unequal and irregular, it bleeds at the slightest touch, the parts slough, and then there is a foetid sanious discharge. During the progress of the complaint, the health becomes affected, the countenance assumes a sallow hue, and the patient becomes emaciated; there is disorder of the digestive organs; impaired appetite; and there are present all the other marks of derangement of the general health. When the strength and health are broken up, the disease very soon comes to a close; the termination of which is preceded by hectic fever; the same as in most other diseases where the general health has suffered much during their progress.—*See FUNGUS HÆMATODES.*

In fungus of the eye, the rest is completely destroyed; there is an affection of the nervous system; and, in children, convulsions come on, which terminate their existence. In all stages of the disease, there is a tendency to them, and they generally prove destructive.

DIAG.—If the appearances of the eye be examined, little difference will be found in them from those of fungus in any other part. There is a grumous appearance on the surface, and the fungus bears a striking resemblance to the medullary matter of the brain—not unlike cream to the sight. The appearances, however, vary in different forms of the complaint. No one texture of the eye is free from it. It frequently commences from the optic nerve, extends to the retina, sclerotic, and choroid coats; and, on examining a fungus of the eye, it would be difficult to say where it began, the disorganization is so complete; the retina is destroyed, the humours are absorbed, the choroid protrudes, and very little of the natural texture is left. There is one appearance at the earlier stage of the disease, as soon as the prominence becomes apparent, and enlarges, by which it may be distinguished from cataract, that is, branches of arteria centralis may be seen ramifying upon the opaque substance, or retina, of which its covering consists.

TREATMENT.—The only chance of effecting a cure in this disease is the early extirpation of the diseased organ. (*See EYE, EXTIRPATION OF*, p. 243.) It must however be confessed, that most of

the operations in which the diseased eye has been removed have hitherto proved unsuccessful, owing to a recurrence of the disease, the reason of which is to be attributed to the optic nerve, and other parts, being almost invariably found in a morbid state before the operation be attempted.—See *Scarpa on the Principles of Diseases of the Eye*, Chap. XXI.; also some cases in *Saunders' Treatise*, and *Travers' Synopsis*.

EXTRAVASATION.

A term used by surgeons to express the escape of fluids out of their proper vessels or receptacles: as, for instance, when blood is effused on the surface, or in the ventricles of the brain; or from the vessels into the cavity of the peritoneum, in wounds of the abdomen—there is then said to be extravasation. The urine is also said to be extravasated, when, in consequence of a wound, or of sloughing, or of ulceration, it makes its way into the cellular substance, or among the viscera of the abdomen. Also when the bile is effused among the convolutions of the bowels, or in wounds of the gall-bladder, it is a species of extravasation.

FEVER, SYMPATHETIC IRRITATIVE.

CAUSES.—The same as SYMPATHETIC INFLAMMATORY FEVER, namely, local injury.

SYMPTOMS—Suppose the wound (a compound fracture, for instance) has gone on badly; that it has discharged very profusely, so that in dressing it in the morning it is necessary to remove the matter with a sponge; that it appears flaccid and flabby; that there are no granulations; and that every thing indicates a want of energy in the constitution, to repair the injury. The patient gets weaker and weaker; still a hope is entertained of a favourable change; when, on a sudden, the discharge from the wound, which has been so profuse, ceases altogether, or at least very little remains. The wound becomes dry on the surface, and an inflammation is set up about it, which is called erysipelas. Corresponding with this change in the local affections, an equally important one takes place in the state of the constitution, or malady. The pulse becomes strong and firm again; there is

burning sensation in the skin, and occasionally considerable perspiration; the urine is again scanty, and high-coloured; the tongue dry, and covered with a brown fur; and there is great excitement of the nervous system, indicated by wandering of the mind, agitation, delirium, picking of the bed-clothes, and *substitus tendinum*—a class of symptoms, one of the general effects of local injury, called by Mr. Hunter “symptoms of disorganization;” and Mr. Abernethy, from the resemblance of these symptoms, terms the disease, “sympathetic typhoid fever;” or, “sympathetic irritative fever;” for great irritation, with diminished power of the constitution, is its essential characteristic. This kind of fever sometimes occurs, in the first instance; thus, in opening lumbar abscess, there will be restlessness, delirium, brown tongue, and all the symptoms of typhus, preceding the hectic fever.

TREATMENT.—The fever being the necessary consequence of the state of the local disease, if that be altered, the constitutional symptoms will also be altered; without this it is out of our power to do any thing. The disease cannot be cured, it can only be mitigated; and with this view, attention should of course be paid to the regulation of the bowels. Cordials, and any medicines that give strength, should be administered, to lull the general agitation, and mitigate the severity of the excitement, which the local disease imparts to the system.

In inflammatory fever, if the cause were suddenly removed, it is not likely, though there is no proof of this, that the disease would cease. In hectic or habitual fever, which is a teasing excitement of the general system, from the operation of the local affection, if you remove the cause, the fever will generally cease. The sympathetic irritative fever more resembles the inflammatory fever; for, though you remove the cause, the effect will not cease; and when the limb has been amputated, the irritation is known to continue; especially in cases where the operation has been too long delayed. These febrile affections are sometimes of an intermittent character. A regular paroxysm of intermittent fever is not unfrequently produced by local disease, injury, or irritation. This most generally occurs

when the irritation exists in the urinary organs. Passing a bougie for the first time will occasionally be productive of a paroxysm of intermittent fever; in these cases, however, the paroxysm does not generally recur, but the cold fit is often extremely severe; the hot fit is so excessive, that the patient is frequently delirious, and the subsequent sweating very profuse. A fit of rheumatic fever has been known to have been brought on by irritation of the urethra, produced by the application of a caustic. These and other irregular affections will occasionally be met with in practice. The effect of local irritation in the production of febrile disease, and other affections, is subject to considerable variety, as it may induce those disorders to which there is a predisposition in the system. A person may be, it were, on the brink of a disease, which may be brought into activity by his catching cold, or any other trivial occurrence; hence, it is essentially necessary that a surgeon should understand the morbid conditions of the general health, which may be concomitant with the local malady. Local disease, injury, or irritation, may occasion pain, sickness, fainting, rigors, convulsions, delirium, and other affections of the brain and tetanus. Sudden sickness is often occasioned by accidents. It was the opinion of Mr. Hunter that the stomach had a direct sympathy with the remote parts of the body; hence he termed this viscus the centre of sympathies. Faintness, the consequence of an affection of the stomach producing its effect on the brain, is often occasioned by local injury. This affection may occur on the introduction of a bougie for the first time without the production of actual pain; consequently the patient should be observed, to see how he bears it. With respect to shivering, Mr. Hunter imputes it, in every instance, to an affection of the stomach; it is a symptom of suppuration which is invariably preceded by inflammation. It also ushered in other changes in local diseases; in some instances it precedes ulceration. Delirium is frequently a consequence of local injury or irritation, in which a man is utterly unconscious of his situation, but goes on imagining things as in a dream, and acting in consequence of such imaginings. It often takes place

an consequence of an accident of no very momentous kind ; it may occur without fever, or it may be accompanied with the same just described, and which, as Mr. Abernethy expresses it, is often the "last stage of all that closes the sad eventful history of compound fracture." Delirium is a very curious affection ; in this state a man, though unconscious of his disease, will give rational answers to any questions put to him when aroused, but soon relapses into a state of wandering, and his actions correspond with his dreaming.—*See DIGESTIVE ORGANS, SYMPATHY OF.*

FEVER SYMPATHETIC, INFLAMMATORY.

CAUSES.—Accidents, or injuries done to vital, or other less important parts of the body, as compound fractures, local irritations, &c.

SYMPTOMS.—Unusual excitement of the whole system, characterised by the following circumstances. The pulse is increased in all its attributes ; it is more strong, more full, more firm, and more frequent than usual. If blood be taken from the patient in this disorder, it will not be in its ordinary state ; it coagulates more slowly than usual, the crassamentum is pale on the surface, red-coloured and cupped ; it has, in short, the character of inflammatory blood. If vital parts are injured, the same bold action in the sanguiferous system will not be found ; the pulse is not so full and strong, but it is more frequent, and seems, as it were, oppressed. The secretions are diminished ; the urine scanty, and high-coloured ; the skin is dry, and rather hot ; the tongue is dry, and white ; the bowels have a tendency to costiveness : in fine, it appears that all the secretions are diminished. The patient is watchful ; he does not sleep, or if he forgets himself, and dozes for a short time, he wakes suddenly in agitation and alarm ; he has a sort of consciousness of strength ; the pupils of the eyes are contracted, and there are, in short, all the symptoms indicating an excited state of the nervous system. The respiratory system partakes of the general constitutional disorder. The disorder of the stomach and bowels is indicated by a white and dry tongue, defective appetite, thirst ; and, if

there be any disposition to take food, it is of the vegetable kind and acids. When these symptoms are aggravated, they will then assume the character of **HECTIC FEVER**.

TREATMENT.—This disease being the necessary and natural consequence of the injury, it must inevitably take place; it may be mitigated, but cannot be cured. If you bleed to diminish the sanguiferous excitement, you rob the patient of a vital fluid. Suppose, for instance, the case of a man with a compound fracture, where considerable constitutional vigour is necessary for the reparation of the injury; “Do not take away his blood, which is his life, for you may find, after a certain time, that he will stand in need of every degree of vital energy to recover from the injury.” (*Abernethy*.) The only warrant for bleeding is, that the action of the fever may perchance induce greater debility than the loss of blood. The fever so uniformly subsides on a discharge taking place from the injured part (that is, in three or four days, when suppuration is established) that it was long known by the name of the suppurative fever. Mr. Hunter, however, has shown that the sympathetic fever arising from local injury is not essential to suppuration. As the fever subsides spontaneously on the third or fourth day, when suppuration takes place, the patient must not be bled if it can possibly be avoided. Give him diluent drinks and acids, such as lemonade. Keep the bowels gradually lax, in order to tranquillize the system, and which is of itself a mode of depletion by promoting the secretions, consequently diminishing the fulness of the blood-vessels. Inducing perspiration has the same effect, by promoting secretion from the superficial vessels of the body; with this view antimony may be given in small doses to restore the general perspiration, and in some degree to deplete at the same time the sanguiferous system. The treatment that will consist in giving the patient vegetable food, with toast and water, and other diluent drinks; keep the bowels gently soluble and administer saline medicines with small doses of antimony. See **FRACTURES, COMPOUND**.

* * “It may be said,” observes Mr. Abernethy, whose treatment we have adopted here, “that patients are sometimes bled, and bled largely, and that this profuse bleeding appears to do the

wood. Undoubtedly there are cases in which we are obliged to bleed most profusely; but this is not on account of the fever, but the cause which produces it. If a man has been shot through the body,—if an internal and vital organ has been injured, and inflammation comes on in that organ, the pulse will not be so full and strong, but it will be very frequent; and in bleeding the patient, the blood will be found cupped and highly inflammatory. The pulse will rise on bleeding, and the patient will be in some degree relieved; the inflammatory symptoms, however, will return, and you must bleed him again and again, until you diminish the inflammation of the vital organ. In such cases the patient can only be saved by the most resolute conduct on the part of the surgeon, in pursuing a mode of treatment which would otherwise appear most outrageous. In such a case, a surgeon is justified in adopting the alternative: this, in fact, is to say—‘I will rather be the executioner myself, than suffer the disease to kill the patient.’ In such cases the patient should be bled in the erect posture until fainting ensues: a stop is to be put to all action of the heart and arteries for a time; and when this is renewed, the patient is to be bled again till he faint. Open veins in both arms, nay, open more vessels if necessary; for it is by such resolute conduct alone that you can save the patient.”—*Abernethy*.

FISTULA.

Fistula, a cane or reed; in surgery means a sore with a narrow opening, running very deeply; is callous, and manifests but very little disposition to heal. It commonly leads to the situation of a chronic disease, and keeps up a suppurative action from whence the matter cannot readily escape.

FISTULA IN ANO.

DEFIN.—When matter has formed in the neighbourhood of the anus, if the abscess be left to open of itself, it very commonly passes into the state of *fistula*, and forms the case called *fistula in ano*. There is a small opening, situated either near the margin of the anus or at some little distance from it, and through this a dis-

charge takes place, sometimes constantly, and sometimes occasionally. The opening is so small that it sometimes becomes closed externally, until the secretion distends the cavity, and makes its way out. On introducing a probe into the opening, it is found to pass to a considerable depth under the skin, towards the rectum: the probe, thus introduced, passes into the cavity of the bowel—perhaps for an inch or so from its external aperture, and that constitutes a complete fistula; that is, a cavity which has an external opening in the skin, and an internal one opening into the cavity of the large intestine. More frequently, however, there is merely the external aperture, and that is called an *incomplete external fistula*. Sometimes there is no external aperture, but only an internal one, opening into the bowel, and from which mucus occasionally escapes; and this is called an *incomplete internal fistula*. In the latter case there may be a small degree of redness of the external integuments, indicating that the fistulous cavity approaches to the skin, although it may not have penetrated the integuments.

Fistula in ano is a disease which the surgeon is called to operate upon, perhaps, more frequently than in any other. It is a disease which is often very difficult to treat, and not unfrequently baffles the skill of the best surgeons. It will hardly ever heal of itself, after the operation is performed, without the utmost attention on the part of the surgeon. The sphincter ani is the source of the difficulty in this complaint: every time the patient has an evacuation the contraction of the sphincter ani separates one side of the abscess from the other, and thus the process of adhesion and inosculation of the granulations is continually interrupted. Understanding this, the principle of treatment will be found to consist in the division of the sphincter, without which the attempt to treat the patient had better not be made at all.

CAUSES.—The causes of this disease are various; it sometimes arises from a costive habit of body; frequently from the pressure of hardened fæces passing through the intestines, and sometimes from absolutely opposite causes; for instance, fistula in ano is frequently the consequence of long continued diarrhœa, producing irritation in the mucous membrane, which extends to the cell

ue. It is often the result of some distant complaint, as disease of the liver, or derangement of the alimentary canal, producing an accumulation of blood in the mesenteric vessels, and a congestion which is determined to the anus. Persons who lead a sedentary life, take little exercise, and feed highly, are particularly subject to this disease. It is often the result of disease of the chest, and very commonly occurs at the close of phthisis pulmonalis. It becomes necessary, therefore, to inquire whether the patient labours under cough, dyspnœa, and whether his constitution be greatly impaired. No operation will avail without attention to the state of distant parts; "and this is the reason," says Sir A. Cooper, "why surgeons have so often lost their reputation by performing an operation for this complaint at an improper time. The sinus, indeed, may be divided; but if the fistula depend on a disordered state of distant parts, it will never heal without attention to the constitution of the patient."

There is considerable variety in the size and complication of fistulæ: when there is an opening on each side, it is best to perform the operation first on one and then on the other. The fistula sometimes extends to the nates, and burrows to a great distance behind the glutei muscles. Fistulæ are called blind, when the matter has made its way into the rectum without making an opening externally; they are then extremely difficult to treat.

TREATMENT.—The medical treatment of fistulæ in ano will depend on their cause. If they arise from costiveness, the remedies are obvious; if from disease of the liver, calomel and saline purges; if from disease of the chest, as hydrothorax, the medicine to be recommended does not so clearly present itself. These cases almost always prove destructive of life. It is of great importance to give such medicines as will bring the disease into a healthy state: with this view, the balsam of copaiba may be used with advantage; and if there be much irritation, give soda, which has great efficacy in diminishing the irritability of the rectum. Aromatic medicines should be given, especially the medicine now used to be called Ward's Paste, and which has been very properly introduced into the last edition of the London Pharmacopœia, having been found by experience to produce excellent

effects in this disease. The composition of this paste is follows:—

Take, of pepper, two drachms ;

of elecampane and fennel seeds, each, half an ounce.

This is directed to be mixed up with honey, so as to form an electuary ; and a tea-spoonful of it is to be taken two or three times a day. This medicine, in a short time, brings the fistula into a healing condition ; healthy granulations shoot out from the surface ; and the discharge, instead of being serous or bloody, consists of good pus. Submuriate of mercury, with saline purgatives should be occasionally given during the use of the above aromatic confection, with the view of promoting the secretions of the liver and intestines.

OPERATION.—The operation of dividing the sphincter ani is simple in proportion as a ready opening into the rectum is found. A small probe-pointed bistoury is passed into the fistula, and a finger is introduced up the rectum to meet the instrument, and carrying the point downwards, the intervening parts are divided. If the fistula be very extensive, the surgeon will be under the necessity of placing his finger on the extremity of the instrument, and drawing the knife downwards. If the fistula does not open into the rectum, the instrument is to be passed up the sinus until it reaches the extremity ; the finger is put into the rectum to meet the knife, and placed along the end of it, and the rectum moved for some little time with the finger nail ; and then, cutting through the cellular tissue, the point of the instrument is brought into the rectum. A very copious hemorrhage generally follows the division of the intestine ; the patient must not therefore be left, and every effort is to be made to arrest the flow of blood by introducing dossils of lint into the wound.

No union of the sphincter ani will take place until granulations have arisen at the parts of the wound most distant from the rectum. The lint ought not to be changed for several days, but to apply poultices, and merely introduce a probe from day to day, to see that there is no improper adhesion. If fresh lint were applied immediately, it would excite inflammation, and produce fresh abscesses in the surrounding cellular tissue. On the fourth

On the fifth day, a small quantity of fresh lint may be inserted; in about a fortnight, healthy granulations will arise under the treatment already pointed out; lint, dipped in a solution of the sulphate of copper, may then be applied. The sore will frequently assume an indolent state, when one might be led to think it was at the point of healing.

Injectations are sometimes successfully employed for the purpose of healing fistulæ in ano; *e. g.* an injection of port wine and water; in which cases adhesion takes place, as in hydrocele. They are, also, sometimes cured by the introduction of a ligature, which gradually cuts through the part: a thread is passed through the sinus, brought out by the rectum, and tied very tightly.

** Many persons will not submit to the operation of being cut for fistula, but prefer to endure pain much greater than any occasioned by the operation. In such cases, the introduction of a ligature will sometimes prove successful.

FISTULA LACHRYMALIS.

By the term fistula lachrymalis is understood all obstructions of the lachrymal passage preventing the natural flow of tears anducus from the eyes to the nose.

CAUSE.—The most common cause of this complaint is a closure of one of the puncta, and then there is epiphora, or a watering of the eye, together with suffusion of the tears, and the surgeon subsequently discovers that one of the puncta is closed.—(See EPIPHORA.) The most important source of this complaint is obstruction of the *ductus ad nasum*. The original seat, then, is the duct leading from the lachrymal sac to the nose, and the tears, instead of finding their way to the nose, flow down the cheek: this symptom, however, may arise from a polypus in the nose, and then it may be relieved by the removal of the polypus.

SYMPTOMS.—One of the symptoms of malignant fungus of the nose is suffusion of tears from pressure in the nasal canal. This disease terminates fatally; and, if removed, it returns. In this complaint the flow of tears is a very unimportant symptom, compared with the original disease which gives rise to it; but sometimes there is inflammation of the bones of the nose, or periosteum covering

them, and the membrane lining the duct, which is thickened, and then the duct becomes more or less obstructed. It not unfrequently takes place in persons of a scrofulous habit, and those who are subject to affections of the coverings of the bones. It is occasionally a consequence of the abuse of mercury.

Fistula Lachrymalis may be divided into three stages.—

1. Where there is only simple distension of the lachrymal sac.
2. Where there is inflammation and suppuration of the sac.
3. Where there is a fistulous opening leading from the sac to the cheek.

a. *Simple Distension of the Lachrymal Sac.*—The first symptom which leads the patient, in this stage, to observe any thing amiss with the eye is, that, on reading or exposing it to the wind, there is a watering of the eye: in a short time this becomes constant, and then a swelling appears at the inner corner of the eye, arising from distension of the lachrymal sac—the tears collecting in it. These produce irritation; mucus and purulent matter are secreted, but when the sac protrudes, pressure made on it pushes the tears or mucus either through the puncta, over the face, or down the nose. The complaint sometimes remains in this stage for many years (pressure being occasionally made on the sac to empty it) with only little inconvenience. From the pressure of the distended sac, and obstruction of the nasal duct continuing, or some accidental cause, irritation is excited, and the second stage produced.

b. *Inflammation and Suppuration of the Lachrymal Sac.*—This affection is attended by puffiness of the inner corner of the eye, redness of the surrounding skin, which becomes swollen and hard from the effusion of lymph. Suppuration having commenced in the sac, ulceration comes on, and the matter effects an external opening, by which it is discharged. Obstruction, inflammation, and suppuration, do not always take place in the *ductus ad nasum*, from ordinary causes; but the progress of the complaint when arising from ordinary and from specific causes, will be different. An opening being thus made in the sac, it will be rendered permanent, or kept open, by the flow of pus and tears out of the wound over the cheek; the disease then arrives at the third stage.

c. *Fistulous opening from the Sac to the Cheek.*—In this stage of the complaint the patient is a good deal distressed by frequent returns of inflammation and suppuration of the sac.

TREATMENT.—Various means have been attempted in the cure of this complaint; still no plan has hitherto been laid down that has proved successful; at least, the benefit derived from the means and treatment recommended, is in most cases very slight. In many cases little need be done but to evacuate the sac, for the purpose of preventing irritation in those cases where there is simple distension. One cause of this complaint is a vitiated state of the follicles of the meibomius, when matter is secreted, and the eyelids are closed together, and irritation is thus produced in the lachrymal sac; in these cases, the eyelids should be washed with tepid water, and besmeared every night at bed-time with a little of the unguentum hydrargyri nitratis: by these means, and attending to the constitution, and removing irritation as it arises, the patient may remain in that state for years.

When the obstruction is complete, the distension considerable, the attacks of inflammation frequent, and suppuration is commenced, another kind of treatment must be adopted. In this case, the object of treatment will be to effect a natural passage for the flow of the tears, that is, through the nasal duct, instead of their flowing over the face. Anel is the first who attempted to procure a passage for the matter and tears into the sac, when the natural one was obstructed; and this he did by introducing a very fine probe through one of the puncta and the lachrymal sac to the *foramen ad nasum*, and thus dilated the structure; but the instrument was so flexible and thin, that it was but indifferently calculated to overcome the obstruction. Mr. Travers, who has had extensive opportunities of watching the progress and trying the effects of different treatments in this disease, recommends the use of an instrument of this kind, which, however, is somewhat different, being more nail-headed, and not of the same exceeding fineness, but more effectual for removing the obstruction. And likewise he constructed a small syringe, the mouth of which was to be introduced into one of the puncta; tepid water was then to be injected through the punctum and sac to the nasal duct:—but the injection

of fluid was found inadequate to overcome the obstruction. Sir Astley Cooper remarks, that "it is a useful instrument in gleet discharges from the sac or duct, but beyond this it is quite inefficient."—*MS. Lect.*

Mr. Wathen recommended that a hollow metallic tube should be introduced into the *ductus ad nasum*. The object of its being hollow was to allow the tears to pass through it: but it was found inadequate to the purpose. M. Dupuytren uses a gold tube in this manner, and it is reported that most of his cases are cured. Pott also advised the use of bougies for removing the obstruction. Mr. Ware's plan, the one now generally adopted, consists of the introduction of a nail-headed style into the *ductus ad nasum*, and letting it remain there. The style should be just large enough to allow of the flow of tears by the side of it. If no opening has been made from the repeated inflammation, the mode to be adopted is as follows:—direct the patient to be seated; then, standing behind him, pass your hand round the patient's head, open the lachrymal sac, and then carry a blunt-pointed bistoury inward and downwards, and divide the obstruction; the instrument with which the external excision is made, is what is termed a phymotome knife. This being done, the surgeon should ascertain whether the passage be free, and then introduce a nail-headed style about an inch and three-eighths long. The head of the style is to lay obliquely on the front of the cheek, and a piece of adhesive plaster spread on black silk is to be put over it, which will prevent persons from suspecting that there is any thing wrong with the eye. The style requires to be removed once a-day, for the first week, and to be washed. There is sometimes but little irritation occasioned by the introduction of the style—but generally there is none; and the comfort the patient experiences is very great; the water ceases to flow over the cheek—the sight becomes stronger—the tendency to inflammation is obviated; and, in fine, so much comfort is experienced, that the patient is loth to dispense with its use.

Although the relief obtained from this plan is great, this mode nevertheless, must be considered more in the light of a palliative than a curative remedy, since the obstruction frequently returns.

When the style is removed. It sometimes happens that from disease about the bones of the nose, a fistulous opening from the sac to the nose is formed. If an operation in this case should be performed, a sharp-pointed instrument must be introduced (either a probe or a trocar) through the fore-part of the os unguis into the nose; and the only point of consideration which remains is to keep open the perforation by means of a sponge tent, or nail-headed style. It rarely, however, becomes necessary to resort to this operation.

FISTULOUS ULCERS. *See* ULCERS.

FORCEPS.

An instrument of common use in surgery for various purposes, and as differently constructed. The principal intention of the surgical forceps is to lay hold of substances which cannot conveniently be seized with the fingers; consequently, the instrument is invariably formed on the principle of a pair of pincers with two blades, either furnished with two handles or without such a purchase, as circumstances may require. The smallest forceps is that used in the operation for cataract, and which is solely made subservient to the removal of any particular opaque matter from the pupil, after the principal part of the chrystalline lens has been taken away. A larger sized forceps is that used for the securing of the mouths of arteries where such vessels require a ligature. A similar instrument is also constructed for the purpose of removing dressings, pieces of dead bones, and other extraneous substances from wounds, and particularly for raising the fibres which it is intended to cut, in every operation where careful dissection is requisite. This latter kind of forceps resembles that contained in every case of dissecting instruments, and is, in consequence, often designated by the appellation of the *artery*, or *dissecting*, forceps, from the more important uses to which it is applied. None of those already mentioned are made with handles; each opening by its own elasticity, the ends of the blades coming only into contact when pressed together.

The following description of forceps are those constructed with handles:—

The common forceps, so called, that is, with handles, contained

in every case of pocket instruments, for the removal of dressing from sores, extracting foreign bodies, dead pieces of bone, &c.

A larger forceps for the extraction of polypi; and those of different sizes and constructions, used in the operation of lithotomy and lithotrity. The cutting forceps, e. g. the common bone-nippers, and the sharp forceps, constructed with the edges in the same line with the handles, as used by Mr. Liston for the division of bones.

FRACTURE.

DEFIN.—A solution of continuity of one or more bones, generally the consequence of external force, but occasionally by powerful muscular action, as is often manifested in fracture of the knee-pan.

Although the bones are not liable to those kinds of injury which are so common to soft parts, namely, incised, punctured, and other wounds, they are frequently subject to a species of injury peculiar to themselves; that is, they are liable, under the application of external force, like any other hard and brittle substance, to be broken. They give way under the application of certain external violence, that is, they break; and this kind of injury is termed *fracture* of the bone. The bones, like other organic parts, possess in themselves the power of repairing injuries, though the process is somewhat slower in its course. When the soft parts are divided, they become reunited either by adhesion, called *union by the first intention*, or by the process of granulation and cicatrization, which is called *union by the second intention*. (See CICATRIZATION and GRANULATION.) But the union of a broken bone is not at all like that of the soft parts, taking place by adhesion. The two occurrences cannot be assimilated; the union of a broken bone is more like that of the soft parts by granulation and cicatrization, though not precisely similar even to that. It is observed that when the ends of bone are brought into contact and maintained in that position, they slowly grow together; that is, the bone becomes united at the part at which it had been broken. It has been said that this arises in consequence of the effusion of blood in the interval of the broken ends of the bone, and the subsequent organization of the blood thus effused. This explanation, however, does not suffice, because bone will unite

even when no blood is effused; and if blood be effused, (and it probably is in most cases,) it is absorbed before the process of union commences.

UNION OF BONES.—In the progress of the union of broken bones, we find that a considerable swelling occurs in the situation of the fracture—a swelling that is rather firm to the feel, and this is technically called *callus*. The word *callus* signifies, originally, merely a hard lump. The term simply denotes the circumstance of the swelling that occurs about a fracture. After the fracture is united, there is generally more or less of irregularity, or swelling, remaining, and that also is designated by the term *callus*. Hence this has become quite a technical word, to denote that effusion of substance by which the fracture of a bone is consolidated. Thus, in technical language, we speak of the substance of bones being united by *callus*; and they who have investigated the process by which this is effected, have been said to have investigated the formation of *callus*.—See **CALLUS**.

Formerly it was supposed that the broken ends of bone became united by effusion into the interstices of a kind of viscid fluid, which gradually hardened, and became converted into the nature of bone. It was supposed that particular articles of food or medicine favoured the formation of this substance; and some worthy matters have been given, under the notion of promoting it; hence the term *osteocolla* was applied to a substance of that kind formerly in use. When experiments, however, came to be made on living animals, it was soon found that this notion of the effusion of a fluid, which gradually hardened, between the broken parts of a bone, and thus caused the consolidation, could not be maintained. Duhamel supposed the consolidation of bone arose from certain changes that took place in the periosteum. Others considered, that granulations were produced from the broken ends of the bone, and thus the union was accomplished. It seems to have been the opinion of Mr. Hunter, that union was effected by the effusion of blood into the intervals of the broken bone, and then by its subsequent organization, according to the view entertained of the process of adhesion of the soft parts. More accurate investigations, however, have shown that the process is

not effected in any of these ways. Recently, the attention of some of the French surgeons has been directed to this point; and the account which they have given of the mode of union of broken bones is the most correct. Dupuytren has directed particular attention to the subject, and he has discovered, that when the two ends of a broken bone are brought together, and maintained in accurate apposition, they become, in the first instance, united by a swelling, and subsequent ossification of the soft parts immediately surrounding the ends of the broken bone. This forms a kind of case for the fracture, by which the broken ends of the bone are held together for a time; then the broken ends are brought and held together unite, and become consolidated. Thus he distinguishes between the first or *provisional* union produced by the swelling and subsequent ossification of the surrounding soft parts; and the ultimate or *definite* union by the agglutination of the two broken ends. The former he calls the *cal provisional* (the provisional callus); the latter, the *cal definiti* (the definite callus). According to his account, it appears that, in the first instance, taking the period from the occurrence of the fracture to the end of about the eighth day, the periosteum, the cellular substance, the muscles, and other soft parts immediately surrounding the broken bone, become swelled, and form a considerable tumour, which can be felt externally. All these parts enter into the composition of that swelling. The thickest part is opposite to the situation of the fracture, and it is gradually lost on the natural surface of the bone in both directions from the fracture.

In the commencement, the tumour is somewhat red, that is, there is some determination of blood to it; but towards the latter part of the period mentioned, namely, towards the end of the tenth day, this red appearance is lost; and the swelling, when examined internally, has a whitish appearance. In the early part of the time there is, in fact, a mixture of coagulated and fluid blood; blood is effused from the vessels which are at the situation of the fracture, and it subsequently coagulates. Such is the state of the parts from the commencement of the fracture to the end of the tenth day; and at this time there is either a kind of viscid fluid found between the ends of the bone

there is something like a reddish granular substance between them—a sort of spongy substance—nothing osseous.

In the second period, from the tenth to the twentieth or twenty-fifth day, the swelling becomes less in size; it is more limited to the neighbourhood of the broken ends of the bone, but is considerably firmer in its structure. It begins to assume a fibrous, or cartilaginous, or something of an osseous structure; and during the same time the medullary cavity goes through the same process, it likewise begins to assume an osseous or cartilaginous structure. During this period (the second period) the parts admit of motion; that is, the broken ends can be moved on each other, but no *crepitus*, no grating, is perceived upon such motion. The *third* period extends from the twentieth or twenty-fifth to the fortieth, fiftieth, or sixtieth day, and in that third period the external swelling becomes ossified—assumes a pretty firm ossific character. The internal swelling of the medullary membrane becomes ossified in like manner; and, in fact, this ossification of the external and internal swellings becomes firm enough to allow the patient to employ the broken bone. In the case of fracture of the thigh or of the bones of the leg, the patient can now support the weight of his body on the limb that was broken; but yet the external extremities of the fracture are not united. They still remain connected by the viscid fluid, or the red spongy substance mentioned. Although the fracture at this time is sufficiently consolidated to enable the patient at all events carefully to use the limb, yet it is weak enough frequently to allow of the fracture giving way again, in consequence of some external force or violence, or in consequence of too much weight being placed upon the limb.

The *fourth* period extends from the fortieth, fiftieth, or sixtieth day to the end of the fifth or sixth month, and in that time the external swelling becomes completely and firmly ossified; and when you then examine it externally, it seems as if the periosteum were continued over the swelling to the sound parts of the bone. As it has assumed a strong ossific character, the medullary membrane is ossified also, and the ends of the bone, which have not been

closely united, are found to be connected by bone, so that you can see the situation in which they have been previously separated by a faint line, when the fracture is sawn through.

In the *fifth* period, which extends from the fifth or sixth month to the twelfth month, the external provisional callus is entirely absorbed, and the union of the bone becomes so firm that subsequently the bone will, perhaps, break more easily in other places than at the seat of fracture. The provisional callus having served its purpose of keeping the broken ends together for a given period is entirely removed; and that portion of callus produced by the medullary membrane is equally completely removed, so that the medullary membrane is restored to its natural state. This, then, is the course taken by nature in repairing the fractures of long bones when the two ends are kept in proper apposition.

It sometimes happens that the ends of broken bones are not brought exactly into contact; they do not nicely meet as they ought, and yet the bone will be united under these circumstances. What Dupuytren calls the *definite callus* never takes place in such a case. The broken ends are perhaps only in contact by their sides; then the bones are united by what he calls the *provisional callus*, and that provisional callus permanently remains. A very firm union will take place in this way. The ends of the broken bone ride upon and overlap each other, but there is a substance which holds them together. The medullary cavity, of course, cannot be restored in such a case. The resources of nature are very extensive. In many instances, where the ends of a broken bone do not come near together, the bone will become consolidated, so that the patient can bear upon it.

It has been known also that a portion of bone has been broken off; a part of the whole thickness of a long bone, extending into the medullary cavity, has been broken off and turned completely round, so that the exterior of the bone has been turned towards the medullary cavity, and still union has taken place. There is a specimen of that kind in the Hunterian Museum. This shows that there are very extensive powers in bone for repairing injuries, and, therefore, it must not hastily be concluded, that, because

ensive injury has been received, it will be necessary to remove the limb, or that nature is not sufficient to repair injuries that really may be very considerable.

PRACTICAL RULES OF TREATMENT.—From the general view of the process by which a fracture is united, you will immediately deduce the practical rules that are to be observed in the management of such cases. You must bring the broken ends of the bone together—approximate them—bring them as nearly as possible to their natural position, retain them in that position, and keep the limb quiet, that there may be no danger of their becoming separated. These are the general purposes that are to be fulfilled in the treatment of fractures; but the circumstances attending fractures are so various, that it is not sufficient to mention these general observations, it is necessary to enter somewhat more into detail respecting the peculiarities attendant on these accidents.

Fractures differ, in the first place, in consequence of the description of bone affected. There may be a fracture of a long bone, of a broad bone, or of a short bone.

The observations already made respecting the surgical treatment of fractures, apply almost entirely to those of long bones. Short bones, such as the carpal or tarsal, are hardly ever the objects of fracture; sometimes, indeed, the *os calcis* is broken, but that is a very rare accident. The broad bones are more frequently broken, yet these fractures admit of very little help surgically; and they generally are more important, in consequence of the mode in which they affect the parts contained in the cavities (cavities formed by the broad bones), than in consequence of a fracture of the bone itself. This is more particularly the case with respect to fractures of the cranium; we cannot do much with respect to those, so far as the bone itself is concerned. Fractures of the pelvis—the same; so that our observations respecting fractures relate almost exclusively to fractures of the long bones.”—*Lawrence, Op. citat.*

When there are considerable differences in respect to the nature of the injury, and the extent of the parts involved. The fracture may affect the middle, compact, or solid part of the bone, or its

spongy articular extremities. The direction of the fracture is various. The bone may be broken across—transversely; it may be broken in a slanting direction—obliquely; or it may be broken lengthways—longitudinally; but the latter kind of fracture is uncommon—longitudinal fracture; it perhaps hardly ever takes place, except in gun-shot injuries, where the fracture of a bone is accompanied with fissures or cracks for considerable distance. Under such circumstances, nearly the whole length of bone may be cracked longitudinally. There is, however, a kind of partial longitudinal fracture, which is more common; and that is when the fracture takes place of the inferior articular portion either of the femur or of the os brachii—the condyles; that part which constitutes the condyles of both these bones is occasionally broken in a direction which approaches to the longitudinal, the fracture in such cases frequently extending also into the joint, which, in its course, is rather a serious complication of mischiefs: and, instead of the simple division of the bone, you may have, under certain kinds of violence, the complication of a fissure, or crack, extending for a considerable distance.

DISTINCTIONS OF FRACTURES.—A bone may be broken in one place, or in two places, or a certain portion may be broken into several fragments; hence arise the distinctions of *fracture*, *double fracture*, *comminuted fracture*. The injury to the bone may occur alone, or it may be accompanied with more or less injury to the surrounding parts. A fracture may be accompanied with more or less extensive laceration or contusion of the muscles, or other soft parts. There are few fractures in which there is this kind of injury, and, in a great number of cases, it forms an important part of the mischief. Fracture is not uncommonly attended with ecchymosis; that is, laceration of blood-vessels, effusion of blood; this blood may be diffused generally into the cellular texture, or a considerable quantity of it poured out in one spot. Or, lastly (which is a more important injury), a large artery may be wounded; the latter circumstance more particularly occurs in fractures of the leg, where there are large vessels lying close to the bones. Fracture is not unfrequently accompanied

division of the integuments, and a protrusion of the broken bone, a wound of the integuments communicating with the fracture; this is called a *compound* fracture. We use the terms simple and compound as opposed to each other; a simple fracture being one in which there is no external wound communicating with the broken bone, whether it be broken in one or more places; and a compound fracture being a fracture in which there is a wound in the integuments communicating with the broken bone. These terms are not employed exactly in the same kind of way by the French writers; there they use the term for a simple fracture to denote, simply, a case in which the bone is broken in one place—*fracture simple*—a simple fracture. What we call a compound fracture is, with them, *fracture compliquée*—a complicated fracture, though that does not correspond with what it should mean by such an expression; because a complicated fracture admits of various kinds of other injuries with the fracture of the bone. The occurrence of fracture may be complicated with injury of a joint; that is, the fracture may be so situated as to extend into a joint; and there are some rare instances in which fractures have been accompanied by dislocation, though these are uncommon injuries, because the violence which produces them never causes one or other of these accidents alone. If it thrusts the head of a bone out of its socket, it does not produce fracture; and, *vice versa*, if it breaks the bone, it does not force it out of its socket. Therefore, in general, the existence of fracture excludes the idea of luxation; and the occurrence of luxation makes one think there is no fracture. But there are some instances in which fracture and luxation are joined.

CAUSES.—With respect to the causes of fracture, a bone may be broken by any violence directly and severely applied; such as a severe blow, the wheel of a carriage going over a limb, or any other violence of that sort will fracture a limb. But, more commonly, bones are broken by force indirectly applied to the part at which the fracture takes place. A person falls, and the end of a bone comes to the ground; well, the weight of the body rests upon the opposite extremity of that bone, and the bone being included between these two forces, gives way at its middle, or at its weakest

part—gives way at a point where there is no direct force applied to it. That is the way in which bones are broken in cases of falls. There are certain causes of fractures which may be considered *predisposing* or *remote* circumstances, which favour the occurrence of fracture, when the bones are placed in such a situation as to become the subject of the kinds of violence mentioned. In the middle period of life, when the bones have attained their greatest strength, *cæteris paribus*, they are least disposed to fracture. Fractures take place less frequently in young persons than in others. In elderly persons, the bones become considerably more brittle than in the active and robust period of life, so that in the event of falls, or any material violence, fractures very readily take place. Sometimes there are states of the constitution which we cannot very well define, in which we find bones broken, without our being able to account for the occurrence.

There are certain morbid states of constitution, in which fractures take place, usually under the application of very slight degrees of force, such as, in a healthy individual, would be totally inadequate to produce such an effect. It is in this way that the bones of cancerous patients have frequently been fractured, merely from moving in bed, or from some similar slight exertion. In these cases, however, we can conceive how that takes place, because we find the bones, under such circumstances, considerably softened, and a great part of the earthy matter removed, and perhaps, a cancerous substance deposited in its place.

OBS.—When a limb has experienced considerable bruises, in conjunction with a fracture of the bone, when consequently blood may have been extensively effused into the cellular texture, and the limb greatly swollen, you may anticipate the occurrence of inflammation, just as you would do from a similar injury of the soft parts unconnected with fracture. In the latter case, you would not think of binding the limb firmly with bandages, and of applying wooden or iron machinery tightly embracing it; you would think that course of proceeding likely to aggravate the inflammation. In the first place, then, you must put out of consideration the circumstance of the fracture, and treat the case as you would do a similar injury of the soft parts without fracture; and having

duced the ecchymosis and swelling, you might proceed to the application of an apparatus proper for a fracture. In such a case, then, in the first instance, lay the limb in a position most agreeable to the patient's feelings; and generally that is in the half-bent state, such as people throw the limbs into ordinarily when they go to sleep. Apply leeches to the part and cold washes. It may be necessary to pursue this treatment some days before it is right to apply the apparatus suitable to a case of fracture. The same reasoning applies, if the limb should swell after the application of the fracture apparatus. The patient sometimes feels the apparatus unpleasant, and occasionally it is necessary to undo it in the day-time; to leave the limb quietly on the splint, use cold applications, and then apply the apparatus again at night, in order to prevent the spasmodic twitchings which are likely to occur. With respect to that particular circumstance, which is often productive of considerable inconvenience—spasmodic twitchings, involuntary motions, by which the ends of the broken bone are made to grate against each other, we find it very difficult sometimes to overcome them. The more completely, however, we can get off the inflammation, the less likely is it that the patient will be troubled in this way; when the inflammation is removed, the more exactly we adapt the fractured ends of the bone—the more moveably the fragments are kept, the less likelihood is there of spasm.

Little advantage, it is believed, will be found from the means supposed to have the direct power of allaying spasm—opium, or other things of that kind;—frequently the skin is very seriously injured in cases of fracture. *Ecchymosis* takes place, and the external surface is of a deep livid colour; and the injury to the skin is often so considerable, that the minute vessels, on the surface, pour out a serous fluid, and vesications of the cuticle occur. These vesications often contain a turbid or darkish fluid—sometimes a livid or reddish fluid; and the occurrence of such vesications, combined with the deep-red or livid appearance of the ecchymosed or bruised skin, often lead persons to apprehend that gangrenation has commenced, or is about to take place. The appearances, indeed, are sometimes deceptive; but you will find

that, however extensive this livid and dark state of the skin may be, and however numerous the vesications, yet they are simply the consequence of bruises of the skin, and that they do not portend mortification. All that is necessary is to prick the vesications, let out the fluid, and lay over the part simple dressing—spermaceti spread on lint.

UNUNITED FRACTURE.—After a fractured limb has been kept in a suitable apparatus the length of time ordinarily found sufficient for the union of the bone, it is sometimes discovered, on removing the apparatus, that the bone has not united. Occasionally we find the fracture quite loose—the limb quite moveable in the situation where the fracture has taken place; and sometimes such a want of union continues for weeks, and even for months, and often, at the expiration of a year or more, a fracture will not be consolidated—it is then called a case of *ununited fracture*. This, of course, is a very unpleasant occurrence, both to the surgeon and to the patient. The limb is rendered useless, or nearly so. It bends at the seat of fracture, just as if there was a joint at that part. Indeed, on examining these cases occasionally a kind of smooth surface on the bone is found to exist; and there is a condensed substance surrounding the ununited ends of the bone, something like an imperfect joint. More commonly, however, the bones are found connected by a condensed cellular membrane, or a species of ligamentous membrane, and there is no joint produced*.

It is important to ascertain in these cases, whether the want of union arises from any thing peculiar in the nature of the accident, or to the peculiarity of constitution, or to some want of care or attention—something inefficient in the treatment of the case. It is apprehended, if all the cases of want of union be taken, no reason will be found for concluding that the circumstance arises

* The cause of the *non-union of fractures* is the want of approximation; if the fractured ends are not brought into contact, the periosteum is not raised, the cartilage that is formed does not cover the extremities of the bone, and the protruding portions are removed by the absorbents, so that the process of union only goes on in those surfaces of bone which are lying in contact.—*Sir A. Cooper's Lect.*

am the latter, than from either of the two former causes. Mr. Amesbury, who has paid particular attention to fractures, and who has published some observations very well worthy of mention, has related the result of his experience upon the subject of ununited fractures; and from experience, he expresses himself very decidedly, that it is owing to the inefficient apposition, and failure of retaining in contact the broken ends of the bone; consequently, the treatment that we should follow, to avoid the possibility of this occurrence, consists rather in the careful management of fractures in the first instance, than in any other course of proceeding. Mr. Amesbury says, that in a great proportion of the cases which have come under his care, when a properly adjusted apparatus was applied, when the broken ends of the bone were brought into accurate contact, and kept in apposition, the fracture has generally united within a moderate length of time. In cases where somewhat of increased action would seem to be necessary for the consolidation of the fracture, in consequence of the time that has elapsed, he recommends not merely the application of a proper apparatus for keeping the broken ends of the bone in contact, but to combine with it the use of *pressure*. This may be accomplished, by putting particular sorts of splints or pads on the part, the object being simply to produce such a degree of pressure as will excite some degree of pain—a pain which will last for a certain time. When the cases have been treated in this way, Mr. Amesbury has found that the ununited fractures have united readily. Indeed, he observes, (which accords with our own experience on the subject), that the individuals in whom the defect of union is found, are generally persons of healthy constitution, in whom we cannot perceive any indications of a defect in the natural powers.

It is important to ascertain the point now mentioned, because if union can be accomplished by the simple means just mentioned, we shall save patients from the necessity of undergoing treatments which are both painful and dangerous. For in the instances of these ununited fractures, proceedings have been pursued which, at all events, have generally required a long

course of confinement, and, in some instances, have caused such disturbance as ultimately to prove fatal to the patient. Sometimes an incision has been made through the soft parts, the fractured ends of the bone have been exposed, and the surgeon actually sawn off a part of the ends. This, if it is in the fleshy part of the thigh, must be a very difficult thing to accomplish; and to have to inflict a very extensive wound, a wound very likely to be followed by considerable inflammation, and that with a still more serious effect. In many instances in which this has been done, the patient has at least been left in a worse situation than he was in before.

Another mode of proceeding in these ununited fractures, has been the passing of a seton between the broken ends of the bone, and leaving it there in order to excite a certain degree of inflammation, which having been accomplished, the seton has been withdrawn, and the part left to its natural powers. I believe it may be said, there are two or three instances in which, after some weeks or months' treatment of this kind, with considerable danger, union has been effected, but in other instances union has failed. Sometimes blisters have been applied; again, it has been conceived that rubbing the broken ends of the bone together may excite the necessary degree of action requisite for the consolidation; but still where that has been done, consolidation has not been found to take place; at all events, however, that is not a dangerous proceeding.—See *Lawrence's Surg. Lect.*

TREATMENT OF COMPOUND FRACTURES.—In compound fracture the soft parts may be divided by the same violence which breaks the bone, as in the case of a carriage wheel passing over a limb: a contused and lacerated wound of the soft parts is made by the wheel at the same time that it occasions the fracture. In such a case you have a large external opening—a very extensive wound. More commonly the bone is broken first, and then a fractured end (more particularly if the fracture be oblique, so that a part of the bone has a sharp extremity) is forced through the soft parts in consequence of the exertion the patient uses when the injury has occurred. The patient rises perhaps, or attempts

rise and to stand on the leg, and thus the occurrence may take place. When a fracture happens to a person who is intoxicated, being aware of what has occurred he makes use of violent efforts, and thus the broken end of the bone is not only often forced through the skin but through the stocking; it has been forced even through a boot. In these cases, where the division of the soft parts is secondary, the external wound is generally small—sometimes a mere puncture, while the internal wound is perhaps just as extensive as in the former instance.

What is a proper case for amputation?—The degree of injury is extremely various in cases of compound fractures. In the most serious cases it becomes a question whether the loss of the limb cannot be necessary, in order to prevent the risk which would otherwise accrue to life. It is difficult to lay down precise rules at this point. Each case presents something peculiar to itself; it will be necessary for the judgment of the practitioner to be exercised after a careful consideration of the particular circumstances in each individual instance. We can only speak here in a very general way upon what is necessary to guide us in determining upon this important question. We must attend to the degree of injury which the parts have received, and also to the greater or less importance of the parts involved: for instance, it should be seen whether joints are at all injured; whether it is probable that considerable blood-vessels or any large artery be injured. The age and the constitution of the patient must be taken into consideration. Also it is sometimes a question of importance to ascertain whether the patient will have such professional care and such comforts as his situation requires.

A comminuted fracture of a bone, with the soft parts extensively lacerated and mangled, by a limb being engaged in machinery, for instance, is a case, respecting which we can be under no doubt. Amputation is necessary in such a case. We sometimes find a limb half torn off, and the fracture of the bone by no means the most important part of the case. Here it is absolutely necessary to amputate. The case of a comminuted fracture with extensive bruising and laceration of the soft parts, where the bone is extensively exposed, more especially if fracture occur in the

neighbourhood of a joint with a great probability of extending into it, and with the probability also of an artery or arteries being injured, that case is one in which amputation must be performed. If it occur in an old person, in a person of enfeebled constitution, or to a person in an hospital or in a crowded situation, where the powers of recovery generally take place less favourably than under other circumstances. But, the same kind of injury may not be thought a case requiring amputation, if it happens to a young subject, one of vigorous constitution, and to an individual situated in a pure and wholesome air. We should be on our guard against hastily condemning a limb in cases of this kind, for the resources of nature are so great that sometimes wounds are parts restored, when we had anticipated that the loss of the limb would be the inevitable consequence.—*Surg. Lect. citat.*

The surgeon is not to consider the size of the external wound as all as a measure of the degree and seriousness of the injury; but the violence which the bone has experienced, the contusion or laceration of the surrounding soft parts, the injury to joint, or some large artery—such are the circumstances which constitute the state of danger. *Cæteris paribus*, it is an advantage to have a large external aperture in these cases, because such an external wound affords, as the matter forms about the wound, an easy escape to it: so that, in many instances, the case will be better than when there has been merely a minute external opening of the skin.

The reason for amputating, in a case of compound fracture, is the danger that would accrue to the life of the patient, in consequence of the injury, if the limb were not removed. In the most serious injuries of this kind which sometimes occur, traumatic gangrene, mortification of the limb, generally may be expected to come on, and violent inflammation, with a corresponding febrile disturbance of the system, which runs to such a height as to endanger life. Then there is a more remote degree of danger from repeated suppurations, from the drains on the system which take place when these wounds get into the chronic stage, and when there is a thin discharge, accompanied with hectic fever. Another consideration which influences us in our determination

the very imperfect, and sometimes useless, state of the limb the patient may be said to have recovered from the injury. The injury which the soft parts, in the neighbourhood of the fractured bone, have sustained is so considerable, and the repeated inflammations and suppurations have produced such a degree of stiffness, that the patient, perhaps, recovers with a limb in a condition not to be at all useful to him, but, in point of fact, to be rather burdensome than otherwise, and that, too, after many months, and even sometimes years of suffering. These are the considerations which, under certain circumstances, induce us to think it expedient to amputate a limb rather than to attempt to preserve it.

The same question occurs in this case as in the instance of gun-shot injuries to limbs from gun-shot wounds,—the time at which an amputation may be most advantageously performed. For the case of compound fracture, amputation may be performed immediately after the occurrence of the accident; or it may be deferred till some time afterwards. There is no doubt whatever being by far the safest and most eligible practice to amputate immediately—to perform the operation within twelve or twenty hours after the receipt of the injury; and all the considerations which led to that inference, in instances of gun-shot wounds, (*see* WOUNDS, GUN-SHOT) are equally applicable to cases of compound fracture that require amputation.”—*Constance*.

When a compound fracture is treated with the view of repairing the injury, and of restoring the limb to an useful state, the object is generally to produce an union of the external wound; the edges of the wound are approximated and retained in contact in the hope that they may become united, and thus that the compound fracture may be converted into the state of a simple fracture. In this we do not very often succeed, because the wound of the soft parts is not favourable to the occurrence of adhesion; it is lacerated and a contused wound, and a wound of that kind does not regularly unite by adhesion. The attempt, however, may be made; the edges of the wound may either be drawn together

by short portions of sticking-plaster, or covered with lint di in the blood which flows from it; this forms a crust over wound. If we succeed in producing union of the external wo the case will go on as well as if it were an instance mere simple fracture. It is necessary in compound, as well as in ple fracture, to bring the displaced ends of the bone into proper apposition, to place them in contact, and to maintain so; but the injury which the soft parts have experience one of the circumstances that requires particular and earl tention.

It may naturally be expected, in consequence of such inju inflammation, suppuration, fever, renewed inflammation and su ration, repeated formations of matter should take place. It sh be recollected, that the inflammation here occurs in the cellular ture, in the very centre of the limb; and also how easily inflar tion, when it takes place in the cellular substance, runs along texture, so as within a very short time to extend through the v of the limb, as in the case of phlegmonous erysipelas.—When t fore, in suppuration, the progress of the matter to the surface i peded by muscles, tendons, and fascia external to it, the e sion of suppuration throughout the limb in the intervals bet the muscles is a very common occurrence. These are the e which are to be prevented or overcome; and what is the c most likely to accomplish that purpose? It will be found necessary here, as mentioned in the case of simple fracture contusion and bruises, to put out of consideration, for a time fracture of the bone, and to adopt the means that are necessa prevent the occurrence of inflammation in the soft parts. you certainly would not attempt to prevent that by the app tion of bandages, or of hard splints to the limb. Very a antiphlogistic treatment must be adopted. In a young patie full habit with such an injury, you must bleed from the arm, follow up that by active abstractions of blood, locally, by lee apply cold, and adopt the other parts of the antiphlogistic t ment necessary on such an occasion. During the time yo doing this, the limb must be laid easily upon a soft pillow.

on a broad splint, well padded and soft, so as to prevent the fractured ends of the bone from moving on each other.

Propriety of bleeding generally.—There has been a dispute (in fact almost all points in the medical profession have been disputed), whether it be proper to bleed in compound fracture, or injuries of this kind; and one of the principal reasons brought forward against it is, that in the progress of the case, in order to repair the injury—in order to unite the bone—in order to remedy the consequences of the inflammation, suppuration, and so forth—the patient will require the exertion of considerable strength of constitution, and therefore you ought not to take from him blood—you ought not to run the risk of lessening those powers, the exertion of which will be so much needed. It seems to me, that the reason for bleeding is in order to prevent the inflammation, and that suppuration, which, in the further progress, are said to require this constitutional power. If you adopt suitable antiphlogistic treatment in the first instance, much inflammation and suppuration will not occur, so that the demand is not made upon the constitutional powers. The reasoning which objects to taking blood as a consequence of the extensive suppuration which will take place in the progress of the restorative processes, seems to be this,—If you do not bleed, inflammation and suppuration will ensue, and you want power in order to repair the effects of those processes: you are not to bleed, because you will want that power afterwards. This is a mode of reasoning, (says Mr. Lawrence,) that I should not be disposed to entertain. The occurrence of suppuration and inflammation, which is to be charged, in point of fact, to the neglect of proper antiphlogistic means, is made a reason why those antiphlogistic means should not be adopted!

It is by no means, however, absolutely necessary to bleed generally in cases of compound fracture; general bleeding, probably, only required in some few instances, where the patient is robust, and where he is of that kind of constitution in which considerable inflammation may be expected. In the majority of instances it will be sufficient to bleed freely from the part by the application of leeches, until the probability of inflammation shall have passed.

If, a few days after the occurrence of the injury, pain and

swelling should come on, and if the patient should begin to feel hot and thirsty, you would immediately adopt the same kind of antiphlogistic treatment here mentioned; for you have the same kind of object in view. Until all increased action—until all probability of inflammation is at an end, you will not find it expedient, in cases of compound fracture, to bandage up the limb, and to confine it tightly in splints. In fact, closely bandaging it, and the firm application of hard splints, are more likely to produce inflammatory action than to be of any service to the bone. "I think, therefore," observes Mr. Lawrence, "that after all risk of inflammation has gone by, you ought to adopt very gentle means for retaining the broken ends of the bone in contact; and in common fractures of the leg, nothing answers the purpose better than what is called a wooden *fracture box*; the sides and ends of which admit of being altogether or separately opened, where the limb rests on a soft pillow at the bottom of the box, and where it rests against each side upon two pads—where also the foot is similarly supported by a pad at the end. Then the different parts which open can be fastened again by buckles and straps to any degree of firmness that may be required. To prevent such movement as would be painful to the patient, by altering the thickness of the pads, or by putting an additional pad into a particular situation, you can produce a pressure where you want to straighten the bone, or prevent it deviating in any particular direction. By letting down one side, you can expose a wound if it is on that side, and apply poultices or leeches or dressings, as required. If you have the pads covered with a piece of oil silk, you keep them clean. You find the patient made very comfortable by this apparatus, and in many instances the fracture goes on so well under their use, that one prefers continuing to use them to removing it, and putting the limb on the ordinary splints. However, after inflammation has gone by, and when there is no risk of its return, the limb may be taken out of the box, laid in the ordinary splints, and treated in the usual way."—*Surg. Lect.*

OBS.—The progress of compound fractures is often retarded by the separation of portions of bone. The ends of the bone being occasionally completely denuded sometimes perish, so that a portion

on must be completely separated, before the process of union of the fractured ends can commence. When a portion of the whole thickness of the tibia, for instance, or of any essential solid part, is to be removed by the absorbents, considerable time is required. However, after this is accomplished, you will find that the union of the bone will take place very perfectly. Although considerable pieces may come off from each end of the broken tibia, the processes of nature are adequate to supply what is lost, or, at all events, to ossify the soft matter which intervenes between the ends of the bone, so as to render the union sufficiently strong for the support of the body.

‘It may happen that the bone is comminuted in the situation of the fracture; that some portions are completely detached, quite loose, or, if not, that they are merely connected together by a slender portion of soft parts. When pieces of bone are thus loose, and near the surface of the wound, it is better to remove them at once; they are only sources of irritation and inconvenience if they are left behind. You are not, however, to make any extensive incision in order to remove them, because we speak of fragments merely that are either entirely or nearly detached, and which can be removed without much pain to the patient.’—*Lawrence.*

You may have a compound fracture, in which the bone is very much smashed—broken into a great many pieces, which might cause you some perplexity. It has been said, that you should pick away the loose and detached portions, but I do not see what advantage can be derived from picking away the smaller pieces of bone. The only mode in which the fracture can unite is by the separate pieces of bone becoming vascular, and the probability appears to me, that they will become more so when the pieces are small than when they are very large. If there should be any protruding, detached pieces of bone, which appear very much to disfigure the proper position of the fracture, you should take them away; but it is impossible to lay down any such precise rules in surgery that will direct one in all cases, unaided by the conviction of man's own judgment. You must therefore be very much guided by circumstances; if you could replace the different pieces

of bone, and by giving the part a moderate degree of support to retain them there, I think you had better not take any away. It is of no use to strap and bandage a fracture to make it unite by main force—that will never do. The support you should give a fracture should be gentle and equable, just such as it would derive from the healthy state of the parts.”—*Abernethy*.

Sometimes too, when the sharp end of the bone has been forced through the skin, we find a difficulty in restoring the bone to its situation. It is so completely held just through by the surrounding integuments, that, in some instances, we cannot replace it. Under such circumstances, there are two courses of proceeding. It may be necessary to enlarge the wound of the skin a little, and then to replace the protruding fragment; or, in some instances, it may be advantageous to saw off the projecting point of bone.

On this subject Mr. Abernethy observes, “A fracture may not only be compound, but there may be considerable projection of bone through the external wound. In a very oblique fracture the bone may protrude very much through a small opening in the integuments. A person may, in jumping from a carriage, or from a height, fracture his leg, and fracture it so obliquely as even to push it through his boot. What are you to do in that case? The bone is protruding considerably through a small opening in the integuments, from the obliquity of the fracture. I remember the time,” says Mr. Abernethy, “when this used to be a frequent question put to those who presented themselves at Surgeons’ Hall, by the leading men there, and especially by Mr. Pott, who was one of the first men of his time as a surgeon. What would you do in such a case? Would you enlarge the wound or saw off the bone?—I know that the answer expected was, I would rather enlarge the wound than saw off the bone! Mr. Pott had a great objection, and this objection was general at that time, to the removal of any part of the bone if it could possibly be avoided. If any spiculæ of bone should make the surface of the fracture appear ragged, then it is a different thing, they may be removed, because in attempting to return them you might irritate very much the neighbouring soft parts. They objected very much to the removal of any considerable portion of the fractured bone, and so do I object to

Whatever portions of bone you may remove, leave of necessity a mass to be filled up, which must be greater or less in proportion to the size of the pieces of bone which you may remove. The only way in which it can be filled up is by granulation; and the demands made upon the constitution, under the suppurative process, are very great, producing that degree of irritability called hectic fever. I say then, that I would rather enlarge the wound than saw off any considerable portion of bone."—*Surg. Lect.*

TREATMENT UNDER COMMON CIRCUMSTANCES.—Reduce the bones as speedily as possible, which may be very easily done by relaxing the muscles acting upon the limb. Bring them as nearly into apposition as possible; and if there is slight hemorrhage, do not be searching for a small vessel, but place a little lint over the wound, and by making a gentle pressure upon it, it may be suppressed. Next, bring the integument as neatly over the parts as you can, and dip a dosil of lint in the blood, and put it on the surface of the wound, which irritates the least of any application, and appears to approach the nearest of any other to the natural covering of the parts. In this way the wound unites by the adhesive process, and the union of the bone goes on as in simple fracture, and is cured in one-fourth of the time which would be required if the wound were allowed to be filled up by granulations. This is the principal object to be aimed at, unless the fracture be accompanied with severe contusion of the soft parts, when a diltice should be applied in order to facilitate the discharge from the wound, and promote the separation of the parts to be removed. For instance, a wound caused by a heavy body passing over the limb, the parts must slough, and therefore it would be useless to attempt to procure an union by adhesion.

If the wound communicating with the fracture be caused by the ends of the bone or any sharp instrument, adhesion may generally be procured. Adhesive plaster, however, is not to be applied, as it frequently produces erysipelas on the edge of the wound, and on this account," observes Sir Astley Cooper, "I have latterly put a bit of lint on the edges of the wound, after extirpating the adhesive plaster over it." Then apply the gummy-tailed bandage loosely, so that it may give way to the tension

that follows. Some evaporating lotion should also be applied, and the material of which the bandage is made is a very good thing for retaining the fluid for the purpose.

Splints should afterwards be put on. Those made of wood are the best; one of which should be applied to each side of the limb. The splints are not to be applied tightly at first, so as to cause pain, but they should be well padded, and the bones nicely adjusted. It often happens, that in a few days inflammation sets in, and a discharge of pus follows, when the lint that was first applied should be partly removed, and the matter allowed to escape; and if it should be small in quantity, after it is discharged, replace the lint carefully, and do not apply a poultice, but continue the use of the cold wash. If, on the other hand, the discharge of matter be considerable, or if it be a contused wound, with a tendency to slough, then fomentations and poultices should be applied, and the wound healed by a granulating process.

POSITION OF THE LIMB.—The position of the limb may be just the same as in simple fracture, with the exception, that if the suppurative process be set up, the wound will require dressing; and therefore, it will be necessary to have the limb in a convenient position for that purpose. If the leg be fractured, it should be bent and laid on its outer side; for if it rest on the heel, then the fractured part is without support, and it requires very great attention to prevent deformity of the limb. If, while the leg is lying on its side, you allow the toe to fall, the foot becomes everted, and the patient seldom recovers a useful limb. If the thigh be fractured, it should be placed over a double-inclined plane, with a splint on each side; that on the outside should reach from the trochanter beyond the knee; and, both in this and the former fracture, the ball of the great toe should be kept in a line with the inner side of the patella. On this subject, Sir Astley Cooper observes—"I do not like the extended position of the limb, because the muscles are put on the stretch, and there is danger of shortening of the limb ensuing: this was the practice about fifty years ago. The lateral position of the limb, as recommended by Mr. Pott, I also object to, for two reasons;—the first is, that it is almost impossible to keep the toes from falling; the consequence

that the foot is turned out; and I have seen several patients, treated by Mr. Pott for this accident, who had this deformity. The second objection to the practice is, that the limb, from being kept in the extended position, causes the motion of the knee joint to be very much diminished, and there is great difficulty in subsequently restoring it."—*Surg. Lect. St. Thomas's Hospital.*

In a compound fracture of the *humerus*, let the arm hang by the side, with the fore arm and hand very slightly supported in a sling, so that its weight may not be entirely taken off the humerus, but it will tend materially to preserve the apposition of the ends of the bone. Do not keep the patient in bed; for in the recumbent posture the arm is generally placed across the chest, the arm is out on the twist, and the fracture unites badly. A compound fracture of the *femur* generally does better than a compound fracture of the leg, because the bone is so much surrounded by muscle that the wound made is much more easily closed, and is not therefore followed by the same degree of suppuration.

The *humerus* generally does well when fractured, on the same account. The worst cases are those of the fore-arm and leg, from inflammation and sloughing of the tendons in the one, and the superficial nature of the covering of the bone in the other.

CONSTITUTIONAL TREATMENT.—The *constitutional treatment* required in these accidents will be regulated by the force of the symptoms; but there are a few circumstances which are considered important for the young surgeon to become acquainted with. If the patient is young and plethoric, take blood from the arm sufficient to allay the constitutional suffering; but do not give purgatives, as they very much disturb the patient, and add to the irritation by the necessity which there is of his being frequently moved. Nothing is so important in the treatment of compound fracture as the frequent changing of the positions and dressings of the patient; it is a state of things which is necessary for the recovery of the parts, and therefore the less they are disturbed the better. Give opium to quiet the patient, and give also, at the same time, the saline mixture, or the liquor antim. tartarizat. to keep up the secretion of the

difficulties sometimes met with in the Treatment of these Acci-

dents.—And, first, of the difficulty which now and then exists in the *reduction* of the bone, which occasionally arises from a portion of skin being nipped under the projecting extremity of the bone. When you try to extend the limb, you find you cannot bring the skin into its place. If this projecting portion of bone be large, make an incision through the integuments, and turn them on one side sufficiently to reduce the bone, and afterwards try to unite the parts by the adhesive process.

When any difficulty is experienced in the reduction of a *fracture* which is very *oblique*, do not divide the integuments, as the probabilities are that the periosteum has been injured on the exposed bone, and that it would afterwards separate by a tedious process of exfoliation; the vitality of the part is very low, and a wound necessary to be made to replace the bone would be a large one. Sir A. Cooper advises to saw off the sharp projection of bone at the extremities of the fractured portions, and then carefully replace the bone in its proper situation. The muscles draw the ends of the bone together, even if it be shortened. Do not adopt this practice, however, where there are two bones, one is not fractured; for if the broken or the sawn surfaces be brought into contact, no ossific union can take place. Several cases, however, have been published by a very ingenious surgeon in which it was supposed that ossific union had taken place between the separated portions of the tibia; but this union, probably, was effected by a tough ligamento-cartilaginous matter and not by bone.

If the *bone be very much shattered*, and several pieces be detached and loose, remove them, but with the greatest degree of care, so as to avoid irritating the wound more than is absolutely necessary. If these portions of bone be not removed, they produce excessive irritation, and will very much retard the healing of the wound by frequent exfoliations. But if the pieces be large, do not detach them; for if they be connected by periosteum they will again unite; or if there be one large piece, and the periosteum on it is entire, let it remain.

Compound fractures are often attended with *hemorrhage* from large arteries, which have been wounded by the broken extre-

of the bone. It was formerly the practice to amputate in the accidents whenever any vessel of importance was wounded, under the supposition that the injury could not be repaired, and gangrene would in all probability happen. But so many have been saved, even when the principal artery going to the limb has been torn, that we are induced by such experience to adopt a different plan. Sometimes the anterior tibial artery is cut through. "In a case," says Sir A. Cooper, "which I perfectly recollect, the vessel was taken up by a tenaculum and tied, and the patient did very well. In one case, where the anterior tibial artery was wounded, it was secured by a ligature, and the patient also did well. But in another case of the same kind, the man died; but the hemorrhage was stopped by pressing a piece of lint into the wound, and the artery was not tied."

The introduction of extraneous bodies into the wound to stop a hemorrhage is wrong in compound fracture, as they produce much irritation, and do not effectually answer the proposed object. It is better in some cases, in which you have great difficulty to secure the vessel at the wound, not to be twitching and pulling, and continually irritating the wound, and frequently to no purpose; but to cut down at once on the artery in its course to the part. If, for example, the posterior tibial artery should be wounded just below the middle of the leg, where it is deeply covered by muscle, it should be cut down upon higher up, and tied. Mr. Hey sawed through the fibula to get at the posterior tibial from the outer part of the leg; but I should recommend it to be secured from the inner side of the leg by making an incision between the gastrocnemii and the tibia, and then cutting through the fascia covering the deep muscles.

"I have only known," says Sir A. Cooper, "one instance of the femoral artery being divided in compound fracture, and I thought it right to amputate immediately. The hemorrhage was slight; but as the artery and vein were both torn through, I considered there was very little chance of saving the limb. In cases of division of the brachial artery by fracture, amputation became necessary. In one of these cases I amputated even before the gangrene, which had taken place in the lower part of

the arm, was extending; but as this arose only from local inflammation the patient did perfectly well."—*Lect. citat.*

"It sometimes happens that there is considerable bleeding from a compound fracture: the sharp end of the bone has pierced a vessel, and hemorrhage follows. It has been recommended immediately to enlarge the wound, if you cannot get the vessel without, and by a tenaculum to pull it forth and secure it. I cannot say that I should approve of such a practice; the wound is bad enough. And as to stuffing foreign bodies into the wound, to stop hemorrhage—oh! that is very bad practice. I can only tell you, that I have known large arteries—aye, even the principal arteries of a limb, wounded, and yet the hemorrhage was stopped by a different method."—*Abernethy.*

The authority last quoted, cites two cases of compound fracture of the leg, in each of which there was reason to believe that the anterior tibial artery was wounded. There was a considerable flow of blood from the wound; the cellular membrane was extended with effused blood, even down to the foot. He directed the limb to be put in a proper position, so as to replace as far as could be done the ends of the bone, and directed a cold lotion to be applied by means of rags to the part, so as to arrest the flow of evaporation; the consequence was, the temperature of the part became reduced, and the hemorrhage ceased. Mr. Abernethy, from this, and similar experience, states, that the hemorrhage from bleeding arteries, even of some importance, in compound fractures, may generally be commanded by the use of cold applications.

FRACTURES EXTENDING INTO THE JOINTS.—If a compound fracture should extend into the *ankle joint*, that, of itself, would form no reason why amputation should be performed; but it should be guided principally by the nature of the injury, by the age, and also by the constitution of the patient. If the compound fracture, extending into this joint, be oblique, it will generally do well, provided care be taken to procure adhesion of the wound; which is best effected by applying lint dipped in blood to the lacerated integuments, as already mentioned, and allowing it to remain there until it separates spontaneously. The more

A bandage should be applied, and kept wet with a spirituous
i, composed of sp. vini. ℥j. aquæ ℥v. A splint should be
ed on each side, padded with cushions so as to preserve the
toe in a line with the patella, as I before mentioned to you,
is a point you must attend to on these occasions. Place the
n its side, in the semiflexed position, so as to relax the
es, and render the patient's position as easy as possible.
osition, however, will require to be varied, according to the
ion of the wound. But if the bone be comminuted, as well
ken into the joint, and if there be bleeding from any large
it will be proper to amputate immediately; more especially
patient be obliged to work hard for his support; for after
ry from comminution, the limb will bear but a slight degree
ction. But still, if the constitution be good, and the person
ut the middle age, it is right to take away the small pieces
e, heal the wound by adhesion, and produce ankylosis. In
ese suppuration even followed, and the patient did perfectly

A compound fracture extend into the *knee joint*, and the open-
large, it will be necessary to amputate, as the constitutional
ance will be exceedingly great, and run the risk of de-
g the patient. But if the opening be small, try to procure
on, and thus make it a simple wound. When the condyles
femur are broken into the joint, the limb is to be placed on
w in the straight position, and evaporating lotions and
are to be used to subdue the inflammation and swelling
necessarily attend this accident. Supposing the external
to have closed, you then apply pieces of pasteboard, moist-
being soaked in warm water, about sixteen inches long,
ad enough to reach under the joint, and have them con-
a roller. When these dry, you will find them exactly
to the shape of the joint, and afterwards retain their form,
st to confine the bones. Sir A. Cooper prefers the straight
in these cases, because the tibia presses the extremity of
ten condyle into a line with that which is not injured.
ound fractures of the elbow joint generally happen

through the internal condyles of the os humeri, and the fracture takes an oblique direction into the joint. In the most severe accidents of this kind, the constitution is generally able to support them, if they be judiciously managed. Several cases may be mentioned which would prove the success of the practice of effecting union by adhesion. If a contrary practice be adopted, if poultices, for example, be applied, the adhesive process is prevented, and suppuration produced, which puts life in danger and renders amputation necessary.

In all cases of this accident the arm should be kept in the position; for an anchylosis, in a greater or less degree, will be the consequence; and it is attended with much less inconvenience in this position than in any other. If the bones be very much comminuted, and the wound large, all the detached portions of bone should be removed; but in old people, when much injury is done, there is often not sufficient strength to support the suppuration process, and amputation should be recommended. The edges of the wound should be kept together by placing a piece of lint dipped in blood over them, and a bandage lightly applied, washed with spirits of wine and water. Even if it should suppurate, it will not be necessary to amputate, unless any thing particular should afterwards happen.

In the Wrist.—A compound fracture extending into the joint is a very serious accident when the radius is much comminuted; but it is an injury which does very well when the bone is broken without being much shattered. A case is related of an injury in a patient in the country, where the man met with the accident by falling upon the back of his hand, and the ulna protruded an inch and a half through the integuments. The fracture was immediately reduced and bandaged tightly; the wound healed by the adhesive process, and the man recovered the use of the limb. Another case of the same kind, came under the care of Mr. Chandler, in Guy's Hospital, where the ulna was projected through the integuments at the back of the carpus, and a compound fracture of the radius, with great comminution of the bone, was produced. The ulna was first replaced, but

ely resumed its dislocated position on the back of the wrist, though it did not again protrude through the skin. The hand and fore-arm were placed in a poultice, and were ordered to be changed twice in the day. A copious suppuration ensued, attended with violent constitutional irritation; and Mr. Chandler, in order to save the patient's life, after a lapse of several weeks, amputated the limb.

In a similar case, it would be proper, when torn pieces of bone were felt at the extremities of the radius, that the wound should be enlarged for their removal; and instead of fomentations and poultices being used, that the wrist should be surrounded by lint soaked in the blood, and a roller loosely applied. The arm should be supported on a splint, so as to keep it perfectly free from motion; evaporating lotions are to be applied; and the limb is not to be disturbed unless the patient has symptoms of a suppurative process, when a small opening should be made in the bandage to allow of the escape of pus; but still the bandages should be ordered to remain. The patient should be bled from the arm if inflammation and constitutional irritation be considerable, and leeches ought to be occasionally applied under these circumstances. The bowels should be kept gently open, but all active purgatives avoided. If the suppurative process have extended up the tendons of the fore-arm, it will be necessary to amputate. The amputation should not be performed where the tendons are loose in the arm, but further up, in the muscular part of it; you would otherwise have a sloughy irritable stump.

Another untoward circumstance is *high degree of inflammation* arising in the neighbouring parts. If the patient's general health be good, the inflammation will not extend beyond a few inches from the accident; but if the patient be irritable, and the inflammation, for example, be in the leg, the inflammation will extend in the course of the absorbents to the groin; and if there be fever at the same time accompanying this, it must be considered as an indication of great danger. Such appearances must be treated very actively by depletion: apply leeches, fomentations, also, and poultices to the neighbourhood of the wound.

Lotions also, of the liquor ammoniæ acetatis, with rectified spirit of wine, should be applied to the inflammation on the limb, while the poultice is applied to the neighbourhood of the wound. At the same time opium should be given to allay the constitutional irritability, and a gentle diaphoresis promoted on the skin, by giving some saline medicines, as the liq. ammon. acet. These symptoms generally make their appearance in persons who have lived irregularly, either as regards their diet or their habits. Be very cautious about the administration of purgatives, as they disturb the patient very much ; but, if absolutely necessary, give an enema.

Another obstacle met with in the treatment of compound fracture is an excessive *spasmodic action* of the muscles. This action is sometimes so violent as to render all our attempts to overcome it absolutely nugatory. In one case it disturbed the limb so much as to render amputation necessary; and on dissection it was found that there was a piece of bone separated from the other parts, and locked between the extremities of the bone. It is sometimes necessary to amputate from a *want of union* between the fractured ends of the bone. Sir A. Cooper amputated a short time since, the leg of a young woman in Dorcas' Ward, from a great deformity of the limb: it unfitted her for any of the duties of life, and she, therefore, became desirous of having it removed. By some mismanagement or other the bone was fractured in the process of parturition, and although she was then nine years of age, there has not been the least attempt made towards ossific union. The part where the fracture took place was as flexible as a joint.—*Surg. Lect.*

The ordinary treatment of these cases is, to bandage the limb firmly, buckle on a case of firm leather over the limb, and apply carefully a splint on each side of it, so that no lateral motion be allowed. If it should happen in the leg, let the patient walk as much as she can on crutches; and thus, by making pressure on the ends of the bone, bring on a sufficient degree of inflammation to throw out adhesive, and, afterwards, ossific matter. Non-union is sometimes thought to be the result of continuing cold applications for too long a period to the part, thus checking that degree of

inflammatory action which is absolutely necessary to bring about a restoration of the parts. But, if properly managed, it is generally unnecessary to amputate in this state of the accident. Mr. Amesbury's splints will be found very useful in the treatment of such cases; they have been successful in many instances in accomplishing the desired object.

It has been recommended to amputate parts which have been injured by compound fracture, when *tetanus* makes its appearance.

Mr. A. Cooper advises this not to be done, the result of his practice not having confirmed its success. He advises, rather, to put a little of the extract of opium, liquefied by the addition of a little water, into the wound, which he has known to succeed when large doses of musk and opium had been taken without producing the effect.

When is the most proper time to amputate in compound fractures, supposing the operation to be necessary?

All the circumstances before mentioned being taken into account, if it will be necessary to amputate in a few days after the accident, then the sooner it is done the better.

If you amputate at one hour after the accident, the patient will do better than if you leave it twelve hours; for this reason,—if you amputate immediately, the constitution has but one shock to sustain, and in general rallies much better than when the amputation is delayed. But if you leave it eight or twelve hours, there is a great degree of irritation previously set up. The loss of blood is rather a favourable circumstance than otherwise, to prepare for the operation.—(See AMPUTATION, *Rule for*, by Mr. Abernethy, p. 42.) The persons in whom these operations succeed the most are such as are loaded with adipose matter. If you leave a limb, the constitutional irritation runs so high that it generally destroys life; and if you amputate, they frequently die in twenty-four hours after the operation from the constitution being unable to bear the shock which that operation produces. The mortality of compound fracture admitted into these hospitals generally does well in the proportion of about three to four; which circumstance, I think, alone, would furnish an incontrovertible proof

of the superiority of the treatment by adhesion to that which was formerly employed."—*Sir A. Cooper's Lect.*

"Fractures may not only be compound and comminuted, they may be produced in such a way as to cause extensive injury of the neighbouring soft parts; for instance,—the wheel of a heavy carriage passing over the limb, or gun-shot wounds, may do so much violence as to render it probable that the parts will slough. Under such circumstances, it has been a question of some consideration, whether an operation for the removal of the part should be immediately performed or not. Mr. Guthrie, who has written on this subject, recommends the immediate operation; but you must take this into account, that his conclusions are drawn from peculiar circumstances. Mr. Guthrie, as a military surgeon, has perhaps seen the necessity of operating *sur-le-champ*; because the wounded can only be taken away in heavy, rough-going carriages, which would, to a certainty, injure the parts materially, and very much preclude the chance of success that might otherwise be gained by delay."—*Abernethy.*

"Other persons (continues Mr. Abernethy) have advocated the same opinion; but I should rather defer operating until the next day if I could, or the next evening. The constitution has sustained a very serious shock by the injury; and the addition of the shock of the operation, before the first was recovered from, would in many cases, extinguish life. I know that the practice for the immediate operation would not succeed among Londoners; for there are very few of them capable of sustaining such a twofold injury. I should say, wait: tell the patient, that you will leave him until the next day: let him recover a little, and prepare his mind for it. If you find that the circumstances of the case are not so urgent on the second day, say you will put it off a little longer. It is astonishing to see what little impression a large wound, such as that formed in amputation, will make upon the system, when it has been for some time previously suffering from considerable irritation. Amputation of a limb from a man in full health is known by experience, to be a very dangerous thing; and, therefore, I should recommend you to wait a little, after the receipt of a violent injury, before you perform it."—*See p. 42.*

Q. What is the difference between a simple and a compound fracture?

A. The only difference is, that the one heals by adhesion, and the other by granulation.—*Abernethy*.

In respect to the inflammation which frequently comes on in compound fracture, when matter forms in consequence of such inflammation, it is expedient, as early as we can, to make an elective opening for its discharge. The matter in these cases often forms deep in the limb; and if an external opening be not made for the exit of that matter, it is apt to extend in the limb, run in the intervals of the muscles, to produce extensive sinuses or excavations which are afterwards very troublesome, and the source of long-continued suppurations. Free and early openings are particularly applicable in cases of suppurations occurring in compound fractures.

It may be a question, whether it would be proper to proceed to amputation, if we are certain that the fracture extends into a joint. Such a circumstance does not render amputation necessary. If the fracture extend into a joint, without having any immediate internal communication, the processes of restoration necessary for consolidating the fracture will go on very well. It may happen that the joint is swelled, that inflammation of the synovial membrane may ensue; and, indeed, that may ensue, whether it be the case of simple, or of compound fracture; this may be combated by proper treatment. Such an occurrence, therefore, is certainly no ground for amputation. Would it be expedient, or is it necessary, to propose amputation in the case of fracture extending into the joint with an external communication to the fracture? If there were an extensive opening into a large joint, it might be necessary; but the mere circumstance of such a condition of fracture (and a joint not of the largest size) is not a circumstance in any means requiring amputation. Mr. Lawrence gives a case in St. Bartholomew's Hospital, of a compound fracture of the lower part of the tibia, which was, in fact, comminuted, in consequence of a very heavy stone (a grind-stone) falling upon it. In a little time, a portion of the bone came away, consisting

of a part of the internal malleolus, visible from without, from which this portion had separated. That patient recovered very well. There was no particular circumstance occurring from the extension of the fracture into the joint, nor from the separation of a portion of the fractured bone, involving even the articular surface of the malleolus.—*Surg. Lect.*

Now when it is considered how extensive the mischief is in these cases, it will be easily understood that the consolidation of the bones requires a longer period of time than is found necessary for reparation in cases of simple fracture. Eight, ten, twelve, or a greater number of weeks often elapse before the fracture is consolidated. And again, from the long confinement, from the inflammatory swellings which the parts undergo, and from the depositions into their textures consequent on inflammation, so much stiffness will often ensue, both immediately round the fracture, and in the neighbourhood of the joint, that the limb, after the accident may be said to be cured, often remains in a state of very little use to the patient for a considerable length of time. In this condition, friction, bandaging—common bandaging—surrounding the limb with strips of soap-plaster, warm bathing and subsequent friction, with powerful stimulating liniments, are means by which, with natural attention, the use of the limb may ultimately be restored.—*Lawrence.*

I. FRACTURES WHICH HAPPEN AT THE UPPER PART OF THE THIGH BONE.

It is not only necessary accurately to distinguish these accidents from dislocations, with which they might be confounded, but also from each other. Three distinct species of fracture, very different in their nature and result, have been described under the indiscriminate name of fracture through the neck of the thigh bone. These accidents are much more frequent than dislocations; for whilst, on an average, we have only two dislocations in the year, the wards of our hospitals are seldom without an example of fracture of the upper part of the thigh bone. These fractures are three in number:—First, where it happens through the neck

the bone entirely within the capsular ligament. 2. Through the neck, at its junction with the trochanter major, by which the trochanter is split, and the upper piece is driven into it. 3. A fracture through the trochanter major, beyond its junction with the neck.

4. SYMPTOMS OF FRACTURE WITHIN THE LIGAMENT—The limb becomes from one to two inches shorter than the other, for the connexion between the cervix and trochanter being destroyed, the trochanter is drawn up by the muscles, as far as the ligament permit, and it rests on the edge of the acetabulum, and on the ilium. You can detect the difference in length best, by desiring the patient to lie down on his back, when, by observing the distance between the malleoli, it will readily be discovered. The heel generally rests in the hollow between the malleolus internus and tendo achillis of the opposite leg, although there is some variety in this respect. The retraction is at first easily removed by drawing down the limb, and you may make it appear of the same length as the other, but immediately on removing your extension, the muscles will draw it into its former position, and this will be the case as often as you like to repeat the experiment. This may be done until the muscles acquire a fixed contraction, which enables them to resist extension that is not of a powerful kind. The next circumstance which marks this injury is the eversion of the foot and knee; this is caused by the power of the external rotatory muscles which are inserted into the thigh-bone, and which are opposed only by feeble antagonists.

On the first sight of a patient, then, with this accident, there are several things that will particularly strike your attention—the shortness of the injured limb, with an eversion of the foot and knee. In this dislocation upwards, the head and neck of the bone prevent the trochanter from being drawn backwards, whilst the neck of the bone, being shortened by the fracture, readily admits of it, and this is the reason why the limb is inverted in the one, and everted in the other. The limb has been found inverted, but it is a very rare occurrence. Some hours must elapse before this eversion becomes permanent in its character, as the muscles require some time to contract firmly, and this is the reason why it has been mistaken for a

dislocation upwards. In this fracture the patient suffers but little pain when at rest in the recumbent posture. But on rotation pain is felt, from the rough end of the bone grating against the synovial membranes lining the capsular ligament. The thigh may be perfectly extended, but flexion is more difficult, and attended with pain; this is increased if the thigh be directed towards the pubes, and lessened if carried outwards. If there should be any doubt now remaining as to the nature of the accident, let the patient stand by the side of his bed, supported by an assistant, and you will have all the appearances before named present, and if he attempt to bear on the injured limb, it will produce much pain, which is occasioned by the *psoas magnus* and *iliacus internus* being put on the stretch, as well as by the pressure of the roughened surface of the bone on the inner part of the capsular ligament. A crepitus is also discoverable, when the limb is drawn down, so as to be of the same length as the opposite one, and then rotated, but not so when the patient is lying on his back, with the limb shortened. It occurs more frequently in women than in men. This probably may be accounted for by the more horizontal position of the neck of the bone, and the comparative feebleness of constitution in the former. It occurs in persons of advanced age, and it is a mistake to talk of its happening in young persons. "Although," observes Sir Astley Cooper, "I have been now thirty-nine years at Guy's and St. Thomas's Hospitals, and have had more than my share of the practice of the metropolis during that time, I have seen more than two hundred and twenty-five cases of fracture of the neck of the thigh bone within the capsular ligament, yet I have only known two persons in whom this accident occurred under fifty years of age. This fracture, then, rarely happens under fifty years of age, and dislocation seldom at a more advanced period. But the most common period at which fracture occurs is between fifty and eighty."—*MS. Lect.*

The reason why the bone breaks so much more readily in old age, is, that there is a peculiar process taking place in age, which produces an entire alteration in the structure of the head and neck of the bone. The natural changes which thus take place in the bones, in different periods of life, are remarkable; they incre-

bulk and weight in youth, they remain stationary during the adult period, and become lighter and softer in the more advanced years of life. You may cut the bones of old persons with a pen-knife, which you could not do at the adult period. The neck of the femur undergoes an interstitial absorption, by which it becomes shortened and altered in its relation with the shaft of the bone; so that the head of the bone, instead of being above the level of the greater trochanter, sinks almost to its root. Indeed, the bones of an old person may be readily distinguished in the skeleton, from those of a person at the middle period of life.

The slightest causes often produce fractures in this state of the bone. The way in which they usually happen in London, is from an old person slipping off the foot pavement, and, though it is only a descent of a few inches, the unexpected shock acting perpendicularly on the cervix, with the advantage of a lever, produces a fracture. The patient immediately falls, and the accident is very frequently improperly attributed to this circumstance. Even turning suddenly round has produced it.

"The union of this fracture," says Sir Astley Cooper, "has been the cause of much difference of opinion. It has been said that these fractures will unite like fractures in other parts of the bone, by bone; but I have taught for the last thirty years, in my lectures, that, as a general principle, fractures of the neck of the thigh bone, of the patella, olecranon, coronoid process of the ulna, and condyles of the os humeri, unite by ligament, and not by bone. In all the examinations which I have made of transverse fractures of the cervix femoris within the capsule, I have found my opinions confirmed, as I have not met with a single instance in which bony union had taken place. I would not maintain its impossibility, but what I wish to be understood to say is, that if it ever does happen, it is an extremely rare occurrence, and I have never yet met with a single example of it. Whilst, to support a contrary opinion, only a single instance has been produced, having the shadow of plausibility; and in this case the appearances were found in both the thigh bones, and even resembled what I have often observed in the dead body, arising from a softened state of the bones.

“ There are several reasons which may be assigned for the want of ossific union in the transverse fracture of the cervix within the ligament. The *first* is a want of the proper *apposition* of the fractured ends of the bone. It is scarcely possible to preserve the parts in apposition even for a few hours, and the slightest change of position produces an instant contraction of the large and powerful muscles passing from the pelvis to the thigh, so that the ends of the bone become immediately displaced. This is also the case in fractures of the patella, where, notwithstanding all our efforts to prevent the retraction of the muscles, it very seldom happens that we can succeed in supporting a complete approximation of the bones. The *second* reason for a want of bony union is, a *want of pressure* of one bone on the other. Even if the limb were preserved at its proper length, and admitting the capsular ligament not to be torn, this circumstance would operate to prevent an ossific union. There is a large quantity of synovial fluid secreted into the joint; this distends the ligament, and entirely prevents the contact of the bones. After a time this fluid becomes absorbed, but not until the inflammatory process has ceased, and ligamentous matter has been effused into the joint from the surface of the synovial membrane. That cause which so powerfully conduces to the union of other fractures is wanting here, viz. the pressure which the *muscles* produce on the broken extremities of bones; for, if two broken bones overlap each other on the side on which they are pressed together, there will be an abundance of ossific matter deposited; but on the opposite side, in which there is no pressure exerted, scarcely any change will be observed. But the *third* and principal reason is, the almost entire absence of ossific union in the head of the bone when detached from its cervix. The principal supply of blood to the head of the bone being derived from the ligamentum teres, which has only a few minute vessels ramifying from it on the bone, the natural supply of blood for the neck and head of the bone is derived from the periosteum; and when the neck is fractured, and the periosteum torn through, the means of ossific action are necessarily cut off. No deposit of cartilage or bone, as in other fractures, is produced, but there is a deposition of ligamentous matter.

ring the surface of the cancellated structure. On dissection these accidents you find that the cancelli are rendered firm and both by friction, as in other bones which rub on each other in their articular cartilages are absorbed. Portions of bone are attached by ligament, or are loose and floating in the joint covered by ligamentous matter; but these do not excite inflammation more than similar portions which are found in the knee and the elbow joints. The capsular ligament and the synovial membrane are very much thickened from the inflammation which they have undergone, and are therefore very much strengthened. The membrane is sometimes separated from the fractured portions so as to form a thick band, passing from the fractured edges of the cervix to the head of the bone. Ligamentous matter passes from the cancellated structure of the head to the neck, uniting, by a flexible material, the one broken portion of bone to another. It appears then, as a general principle, that *ossific union is not produced*. I have seen the two preparations of Mr. Stanley, at Bartholomew's, which were supposed to be specimens of that union, but these have the same appearance on each side: now it is very probable that age or disease may produce similar effects in both bones, but it would be very difficult to suppose that accidents would do so. In experiments which I have made on animals in perfect health, the union is always by ligament. One of the best proofs, however, is a narration of Mr. Langstaff's, in which the bone is fractured both with and without the capsular ligament; that without is united by bone, and that within the capsule is united by ligament. It is often seen that appearance in the necks of the thigh bones of old people, supposed to represent the union of a fracture through the cervix by bone. But the truth is, that it is occasioned by the motion of the neck of the bone, in the way I have before described, allowing of the descent of the head of the bone just to the root of the trochanter major."—*Lectures*.

TREATMENT OF FRACTURES OF THE NECK OF THE THIGH (within the capsular ligament).—Numerous measures have been adopted for the purpose of producing an ossific union of this

fracture, but all to no purpose. Disappointed in the attempt, finding the patient's health suffer from the necessary confinement, Sir Astley Cooper directs a pillow to be placed under the limb throughout the whole length, and another to be put under the knee and the limb in this way extended for ten days or a fortnight, until the inflammation has subsided. He then orders the patient to get out of bed, and seated on a high chair, to prevent the limb being too much bent, afterwards to walk with crutches, bearing gently at first on the foot, then to increase the pressure more and more, until the ligament becomes thickened, and the power of the muscles increased. Next, to use a shoe with a high heel, which would very much diminish his lameness. The patients treated in this way, walk after a few days with crutches, then with a stick, and in a few months require no additional support. But in cases in which the slightest doubt may be entertained, whether the fracture be within or without the capsule, it is much better to treat them as if they were external to the capsule, and where fractures will unite by bone.

b. Of Fractures external to the Capsule, and when the neck of the bone is driven into the cancellated structure of the trochanter major. This accident is marked by the leg being from half to three quarters of an inch shorter than the other. The foot and toes are everted, much pain is felt at the hip, and on the inner and upper part of the thigh, and the usual rotundity of the joint is lost.

SYMPTOMS—The first diagnostic mark of this fracture is, that it happens in the young, and in persons under fifty years of age, although it has been known later. But, if the symptoms before described are seen at any age under fifty, it will generally be found to be a fracture external to the ligament, and is capable of union by ossific matter. Yet it must also be remembered, that this fracture may occur in more advanced age, and therefore requires care in the discrimination of the two. The second mark of this accident is, that it is usually the result of some very severe injury, as blows received on the part, from falling upon some projecting body, or from heavy carriages passing over the limb, whilst the fracture within the capsule occurs from any slight

It may be known, in the third place, by the crepitus, which is produced by a slight motion of the limb; and it is not necessary, in this accident, to draw the leg down to feel the crepitus, as the retraction is not so great as in the former accident. There is also usually great extravasation into the surrounding parts, and this swelling is quickly followed by great tenderness to touch. There is also violent pain produced upon slight motion of the joint, followed by a high degree of constitutional irritation; many months elapse before the patient recovers the proper use of the limb.

TREATMENT.—The principle to be attended to in the treatment of this fracture is, the approximation of the bones by pressing the upper end towards the acetabulum; at the same time preserving the length of the limb, by applying a roller around the foot of the leg, and binding it firmly to the sound one; thus making the sound limb afford support, and act as a splint to the fractured one. A broad leather strap should be buckled around the pelvis, to include the trochanter major, so as to press the fractured ends of the bone firmly together; and the best position in which you can place the limb is in a straight line with the body. I have done very well where the patient has been laid on his back on a mattress, and the thigh brought over the double inclined plane, which may be very easily made by three boards; one passing from the tuberosity of the ischium to the foot, and the two others leaving a joint in the middle, by which you can increase or diminish the angle as may be required; over these a pillow may be thrown. A long splint should be then placed on the outer side of the thigh, fastened above with a strong strap around the pelvis, and secured below by another strap round the knee, so as to prevent the knee being moved from its position. This must be continued in for several weeks, and the patient may then be allowed to rise from his bed, if the attempt do not give much pain. He must still, however, wear the strap around the pelvis; and he recovers, with a useful but shortened limb.

FRACTURES THROUGH THE TROCHANTER MAJOR.

Fractures through the trochanter major are in general oblique,

and they may happen without any injury being at the same time done to the neck of the bone.

SYMPTOMS.—They happen at any period of life, and are marked by the following symptoms; the limb is very little, sometimes not at all shortened; there is a numbness in the thigh, the patient cannot turn in bed without assistance, and the attitude is productive of great pain. The trochanter is sometimes drawn forwards towards the ilium, sometimes it falls towards the tuberosity of the ischium, but is generally widely separated from the portion of the bone remaining in connexion with the neck. The foot is greatly everted, and the patient cannot sit, as any attempt to do so produces very great pain. You can feel a crepitus with great difficulty, if the detached portion of the trochanter be not much fallen, or much drawn forwards. This fracture unites very firmly, and the patient recovers a good use of the limb. The accident, then, may be easily known by the separation of the bone at the fractured part, so that the finger may be placed between the fractured portions; by the crepitus, felt by putting the finger on the trochanter when the knee is advanced; by the upward motion of the trochanter not following the motions of the lower part of the shaft of the bone; and when at the lower part of the trochanter, by the great over-lapping and distension; it is followed by an excessive deposit of callus.

TREATMENT.—The treatment of this accident is much the same as that of the former: you should pass a wide bandage round the pelvis, and keep the limb extended, and the patient in the horizontal position, in the way before pointed out. Sometimes the bone is fractured just beneath the trochanter, and the deformity produced by this accident is very great, which is caused by the upper end of the bone being drawn upwards by the action of the *psoas magnus* and *iliacus internus*. The proper way to treat it is by raising the thigh over an inclined plane, and elevating the trunk to about an angle of forty-five degrees. In this manner you bring the ends of the bone in apposition, but you should not attempt to depress the upper end of the bone, as it only increases the patient's sufferings to no purpose.

III. FRACTURES OF THE KNEE JOINT.

And first of Fractures of the Patella.—The patella is generally broken transversely, but sometimes longitudinally. In the first case the upper part is drawn from the lower by the action of the muscles inserted into it, whilst the lower part remains fixed to its ligament. The degree of separation depends on the laceration of the ligament.

CAUSES.—It happens either from blows on the patella, or from the action of the muscles.

SYMPTOMS.—The accident is at once known by the depression between the two portions of bone, into which you may put your fingers, and by the upper part of the bone moving readily on the inner and fore part of the thigh. The power of extending the knee is also lost; and the knee bends forwards from a loss of action of the extensor muscles. Soon after the accident, extravasation takes place on the fore part of the joint, and produces a livid appearance, but this is removed by absorption in a few days. There is afterwards considerable effusion from inflammation into the surrounding parts.

ISSUES.—The union of this fracture is generally by ligament, whether the separation of the bones be great or little. But still the principle which should guide us in the treatment is, to make the ligament as short as possible. If the upper end of the bone is retracted by the muscles, the ligament connecting the bones is shortened, so that the patient walks very lame, and is liable to fall and break the other patella.

TREATMENT.—When called to this accident, the patient should be placed on a mattress, the limb extended on a well-padded cushion, which is placed behind the thigh and leg. He should be raised as much as he can to the sitting posture, to relax the *rectus femoris*; an evaporating lotion or the *white wash* should then be used, and the heel should also be raised towards the trunk, to support the lower portion of the patella. If there should be inflammation existing for a day or two, leeches must be used, and an evaporating lotion continued; and, when the inflammation has subsided, the bandages may be applied. The mode generally adopted is, to pass a roller from the foot to the knee, to

prevent the swelling of the leg; then rollers are applied above and below the joint, under which a piece of broad tape is passed on each side, which crosses the rollers at right angles, and, by tightening these, the upper portion is brought down towards the lower. Sir A. Cooper's plan, namely—"Buckle a leather strap around the thigh, above the fractured portion, and from this another strap should be passed beneath the foot, the leg being kept extended and the foot raised; this strap is brought up on the other side of the knee, and buckled to the circular strap above the knee. A roller should also be applied on the leg. After keeping the limb in this position five weeks, you may begin to use slight passive motion, taking great care, however, not to do too much, as this would separate the ligamentous union which had been formed. You may increase this from day to day, until the limb can be bent perfectly. The smallest distance at which I have known the bone to unite is half an inch, and the greatest distance seven inches. At a moderate distance is one or two inches. It sometimes happens that, from the degree of separation, the patient loses the command over the motions of the leg; and, in such cases, you may exercise the extensor muscles by letting the patient swing his legs over a table, in order to accommodate the muscles to their new line of action. Unless this be done, or passive motion be used, the patient can never recover the use of the limb."—*Sir A. Cooper's Lect. MS.*

b. In the *longitudinal fracture*, the bone also unites by ligament. "I have seen it unite by bone, but it was rather a fissure than a fracture. The treatment will be to apply leeches and evaporating lotions; in a few days a roller should be applied, then a laced cap, with a strap to buckle above and below the knee, with a pad on each side of the patella, to bring the parts as near as possible into contact."—*Ibid.*

c. *Compound Fractures of the Patella* are very dangerous accidents, frequently proving fatal to life, from the violent degree of constitutional irritation which they occasion. They are generally recovered from by the following treatment:—Bring the internal fragments together by a small suture, apply adhesive straps round the knee, evaporating lotions on the fore-part, and the limb

ended by a splint passed beneath. Whenever a joint is laid open, except by a valvular opening, that wound is difficult to heal on account of the flowing of the synovia, and is, therefore, very difficult to cure; but, if the integuments be brought together by a suture, the parts beneath often heal by the adhesive process. The suture should not be kept in more than a week.

Fractures of the Condyles of the Femur, extending into the joint, which are known by the great swelling that takes place in the joint, by the crepitus and the deformity, you should place the limb on a pillow in the extended position, for then the head of the femur keeps the extremities of the bone in their places. Apply evaporating lotions, and leeches, if necessary, to subvert the inflammation, and then mould a piece of stout pasteboard, moistened, round the knee, and bind it on with a bandage. This, when dry, adapts itself equally to the different surfaces, and forms a most excellent splint to retain the fractured extremities of the bones. After five weeks you should commence gentle motion, or otherwise ankylosis will take place. The same observations apply to *fractures of the head of the tibia*.

IV. FRACTURE, SIMPLE, OF THE LOWER JAW.

The form and position of the lower jaw, and the circumstance of its being covered by little except integuments in the greater part of its extent, render it very liable to fracture. It may be broken either at its interior arched position, its ascending branches, or at the processes by which those branches, or rami, (as they are technically called,) are terminated. The rami of the lower jaw are less strong, and considerably thinner than the arched portion, but as they are covered by powerful muscles, fractures of the rami are comparatively rare. The bone is most frequently broken in its strongest (i. e. in its anterior arched) portion. Fractures of this part may be either *perpendicular* or *oblique*, but they are said sometimes to be *longitudinal*, but that may be considered a very rare occurrence. The bone may be broken at one or more—there may be a simple fracture, or the fracture may be complicated with an external wound. The fracture, too,

is often attended by a good deal of contusion—ecchymosis and swelling of the neighbouring soft parts.

SYMPTOMS.—The symptoms of this accident, in consequence of the superficial situation of the bone, are very obvious. In the first place, if there be any displacement of the fractured part, there is an alteration in the appearance of the lower part of the face; the mouth is a little deformed; it appears to be turned aside. When you come to feel the row of teeth, you immediately perceive the irregularity produced by the fracture; and in the same way, by feeling along the bone externally, detect the injury. Then, further, if you take the two portions of the fracture, one in one hand and one in the other, you can move them, and hear very distinctly the crepitus, or grating, caused by the broken ends rubbing against each other. These circumstances are so very palpable in the case of fracture of the jaw, that it is hardly possible to make any mistake in judging of the accident.

TREATMENT.—The replacement of a broken lower jaw is very easy. By introducing one or both thumbs into the mouth, and by depressing or keeping stationary the posterior part of the bone at the same time that we elevate or bring forwards the anterior part with the fingers, we can in general replace a fractured lower jaw with great facility. The *retaining* it in its situation, and preventing it from moving, are points not quite so easily accomplished as the replacement; for we can only apply the means of retention to the external surface of the lower margin of the bone, the whole of the inside of the bone not being within our reach. However, this inconvenience is overcome by the advantage we have in the complete and firm support which the lower jaw receives from the upper jaw. When the mouth is shut and the lower jaw is firmly bound in apposition to the upper jaw, it may be said to supply, in some degree, the place of a splint.

The best and easiest mode of keeping the lower jaw in its situation is by means of a *four-tailed* bandage, consisting merely of a long piece of linen split at each end. The middle and undivided portion is applied to the chin, and embraces the anterior part of the bone, whilst two ends of the bandage are carried below

ards and fastened behind the head, and the opposite ends or s are brought up by the sides of the ears, and fastened over the of the head. In this way force is applied in a circular man- to the anterior arched portion of the bone, at the same time t force is applied in a perpendicular direction to the basis of bone below; and by the combination of these two forces the es are steadily fixed in apposition. The bone, of course, re- ns steadily fixed only so long as the person keeps the mouth t; and in order to avoid the displacement which the natural ions of the jaw in mastication, deglutition, and articulation, ld produce, persons must abstain from talking, and they t take merely soft food—*spoon victuals*, until the union of the e is effected.

; has sometimes been found advantageous to apply a sort of nt to the surface of the jaw; you take a piece of pasteboard oed in water and made quite soft, and cut out a piece that adapt itself to the inferior edge of the bone; just make a few ss in it, so that it will fit itself to the jaw. In this moistened e the pasteboard will accommodate itself to the form of the e and when dry you will find it to be a pasteboard *case* exactly oted to the part. You use this as a splint, confining it by the t-tailed bandage, which I have just described. But you will llect that pasteboard is a roughish substance, and that if it is d firmly on the skin of the face the parts will sometimes be e excoriated. It is necessary, therefore, to protect the face pplying soap plaster to the surface, or by lining the paste- d with soft rag. By neglecting this precaution, considerable ation has frequently been produced—even inflammation and ormination of matter have ensued in consequence.

V. FRACTURE, COMPOUND, OF THE LOWER JAW.

is happens from the violence applied to the bone, and probably t the fracture extending on the inside of the mouth, to the where it is covered by the gum, it becomes a compound ure, although there is no external opening into the wound. e frequently happens, in such a case, that there is much inflam-

mation, and indeed the formation of matter is by no means uncommon occurrence.

SYMPTOMS.—If the bone be broken in the rami or branch these parts are covered by the thick masseter muscle, and it is no means so easy here to be satisfied of the existence of fracture. Little can be done, however, under such circumstances, for purpose of keeping the parts together; you can merely, as in other case, bind up the one jaw against the other, and enjoy quietude until the fracture shall be consolidated. Little is to be done by any particular apparatus, more particularly where fracture is so completely out of your reach as any portion of ramus of the jaw.

TREATMENT.—Mind, under such circumstances, an opening must be made early for the exit of the matter. It has been commended, by way of assisting to maintain the fragments of jaw together, to tie the teeth on each side of the fissure with silk or by a piece of thin wire. It will not often happen that there be occasion to adopt these means.

VI. FRACTURE OF THE SPINE.

The body of one vertebra, and the articulating or transverse processes either of the vertebra above or of the vertebra below are involved in the case of what is properly called a *fracture of the spine*. It is true that both spinous processes, particularly, may be broken; or there may be a fracture of one of the spinous processes only; this, however, does not take place commonly, as these processes are so covered and inclosed by strong muscles that it is difficult to break one process and no more.

CAUSES.—Fractures of the vertebral column generally happen in consequence of the application of some very great degree of force to the body. A person falls from a great height to the ground—falls upon the trunk; or some very considerable weight falls from a great height upon the trunk; it is some violent force of that kind which produces fracture of the spine.

SYMPTOMS.—When the vertebral column is thus broken, the accident may be attended either by displacement of the fracture

or not. If the fractured parts have undergone displacement, irregularity may be produced in the line of the spinous processes, and therefore when, on passing the finger along it, an interruption is found in the series of those processes, one or more seem to be depressed, or pushed in, or the spine may form somewhat of an angle at a particular point. Frequently, however, although there may have been displacement, yet when the no longer acts upon the spine, it recovers its straight position so that you have not any external visible circumstance that actually point out the precise spot where the injury has been done. You can only judge of it by the sensation which the patient describes, and the accident is usually attended with so much pain, that he generally points out pretty accurately the injured part. When the vertebral column is displaced, the accident is attended with pressure upon the spinal chord which runs along the canal, and this pressure produces insensibility and complete paralysis of all the parts situated below the injury. It is this circumstance that renders fractures of the spine so very serious; and renders them, in fact, in general, extremely dangerous, and at times necessarily, sooner or later, fatal.

A fracture of one or more of the vertebræ would unite just as much as a fracture in any other part of the body, if there were nothing to be considered but the broken bones, and it would not be a matter of more consequence than a fracture in either of the limbs. The great importance of a fracture of the spine arises from its effects upon the spinal chord; and the situation of the spinal chord in the vertebral column is such, that it cannot possibly escape the effects of an injury such as the one we are now describing. If the spinal chord be not actually pressed upon, the accident most likely produce so much disturbance from bruises and contusions, that effects almost equally serious with those occurring from pressure will ensue. The symptoms in the former sometimes come on more gradually; but the spinal chord immediately receives at the moment so much injury as to produce the complete paralysis of all the parts below the seat of injury. The patient is so completely deprived of sensation, that if you pinch the skin, or apply heat, the patient is not sensible of it:

the loss of sensibility is complete; and there is also a complete loss of voluntary motion. The patient is not able to move any part receiving its nerves from below where the accident has occurred. Complete insensibility, then, and complete paralysis, are the consequences of the injury.

At the same time, the natural organic functions of the parts which are necessary for maintaining vitality, the circulation, and the secretions all go on. The internal or organic life goes on, although the external life, that which constitutes voluntary motion and sensation, is put a stop to. The heat of the parts is kept up to a certain extent, but not the same as under ordinary circumstances; the want of power extends itself to the muscles of the large intestines, and to the bladder, so that the patient has not the power of expelling his feces or urine; the sphincter muscle of the rectum loses its power, so that the feces may pass off involuntarily. The distention of the bladder, and the necessity for using the catheter, exist at an early period after the accident, but after a certain length of time the water runs off involuntarily.

There is a general symptom (observes Sir A. Cooper) attending on fracture of the spine, the exact reason of which, I believe, has not been explained, or at least if it has I am not aware of it, that is, a permanent erection of the penis—a state of *priapism*; and this I have seen occur, when fractures of the spine have happened in very different situations.—*Surg. Lect.*

VII. FRACTURE OF INDIVIDUAL VERTEBRÆ.

The *vertebræ* are not much exposed to fracture, considered individually. Their form, situation in the body, and the way in which they are surrounded by muscles and other soft parts, render it very difficult to have a force applied in such manner as to act powerfully on one vertebra without affecting the contiguous bone. Fracture, therefore, of a single bone is rare, but the vertebral column, taken collectively, is liable to fracture, that is, an injury may pass through a part of the column; in which case more than one vertebra becomes involved in the mischief.

PROGNOSIS OF SPINAL FRACTURE.—Now, the prognosis

ance which the patient has of surviving the accident, and the length of time he may live after the occurrence of the accident, circumstances which depend much on the situation in which the accident has been received.

When an accident of this kind happens to the first, second, or third vertebra of the neck, if it be attended by displacement of any of the broken parts, so as to cause pressure upon the *medulla spinalis*, the case is immediately fatal, because the pressure then being above the origin of the phrenic nerve, respiration cannot be continued. When a fracture takes place below the third cervical vertebra, although the occurrence of the fracture in that situation paralyses the entire costal muscles, though it paralyses the abdominal muscles, that is, although it paralyses the great mass of muscles engaged in the act of respiration, still the phrenic nerve is not involved, and in that case, for a certain length of time, respiration is carried on by the diaphragm.

A fracture of the first or second vertebra is not, however, necessarily fatal; it is only under circumstances in which the fracture is attended with such displacement as to produce the pressure just alluded to, that death is the immediate consequence. There is a preparation belonging to the museum of St. Thomas's Hospital in which there appears to have been a fracture of the first vertebra—the atlas, because there is a distinct fissure in it. Now, the individual in whom this took place recovered completely, because the atlas and dentata are completely anchylosed—completely soldered together by bony union. There the fracture was not attended with pressure upon the spinal chord. A case is mentioned by Sir Astley Cooper, in which a boy, three years old, received a serious injury about the upper part of the neck; and at the occurrence, was observed to be unable to move his head, except in a very limited way. He never moved it without holding it with both hands. He seemed to be afraid that some mischief would occur by the least shake or motion of the head. He died at the end of twelve months; it does not appear from what cause; but it was found on examination, that the atlas was broken in such a way as to loosen the attachment of the ligament which holds the vertebra dentata in its place.

If a fracture take place in the fourth cervical vertebra, or an inferior one, down to the beginning of the dorsal vertebræ, the patient generally lives from three or four to seven, eight, or ten days, according as the fracture is situated higher up or lower down. In such a case the patient performs respiration simply by means of the diaphragm. The power of contraction of the diaphragm is retained; when the diaphragm is put into action, therefore, the abdominal viscera are protruded, and the chest is enlarged on each respiration, and the reaction of the parts seems to occasion the inspiration; but respiration is performed very imperfectly in this way, so that the patient can hardly speak, except in a low tone. He is incapable of sneezing; he cannot make any effort for the expulsion of the fæces; he cannot put the muscles of the abdomen into action, they are completely paralysed, and in this state life is not long supported. "I had a case under my care some time ago, where the fourth was partly dislocated upon the fifth cervical vertebra. In this case, dislocation could not be distinguished from fracture. That patient lived four days, and not long after that period I had another case in the hospital where the injury had been received quite in the lower part of the neck; in fact, the body of the sixth cervical vertebra, with the articulating transverse processes of the vertebra above it, had been fractured, and the body of the sixth was displaced forward so as to overlap the seventh, and press on the spinal chord. In this case the patient lived ten days."—*Surg. Lect. by Sir A. Cooper*.

When the *dorsal* region of the spine is broken, the patient will perhaps live a fortnight or three weeks. In case of fracture occurring in the lumbar region, the patient may live three, four, five, or six weeks, and, in some instances, life has been prolonged to a much later period. If we do not mistake, Astley Cooper states a case, where a patient survived a similar accident nine months. There is a curious instance (a specimen in the Museum of the College of Surgeons, which was sent there by Mr. Harrold, a surgeon at Cheshunt, where a fracture of the spine had taken place; it was either of the last dorsal or the first lumbar vertebra. This patient was kept perfectly at rest; the urine was drawn off by the catheter, and after the accident he

ered a kind of power of expelling the urine, which appeared to be effected rather by the action of the abdominal muscles, than by the contraction of the muscular coat of the bladder. However, about six months he had considerably recovered; he could sit and dress himself, and though there was a total want of voluntary power in the inferior parts, he had a power of moving himself down stairs from step to step. He died at the end of twelve months. There was a complete bony union of the fracture—a complete bony callus soldering the parts together; and the singularity in this case was, that a part of the body of the vertebra had been driven off by the accident, and was driven across the vertebral canal, so that it had completely divided the medulla spinalis, and the ends are about an inch separate, according to a preparation which is now in the museum. This case, then, very clearly shows that fracture of the spine may be recovered from, so far as the fracture itself is concerned. It shows that the vertebrae possess in themselves the same powers of restoration that are possessed by any other part. A gentleman showed Mr. Lawrence a specimen of a piece of bone, and asked him what he thought of it. It was a piece of the spine; and he said, "If I were to give my opinion, I should say that the spine must have been broken, and that the fragments had become united by bony union." It had the appearance of having been broken, and of there having been thrown out on the anterior part of the column a sort of bony excrescence, forming a kind of *rough plastering*. He said it had been a fracture. In this case, also, there was a mass of bone that had grown up the vertebral canal, and I could hardly see any space in which the medulla spinalis could have remained. He said it was a circumstance in which the spinal chord had been completely and very much divided; and, indeed, from the state in which the vertebral canal appeared to be, that must have been the case; there was not room to pass, perhaps, more than a blow. This patient had recovered so far as to be able to walk about. There is a case minutely described by Soemmering where the patient died in six months from the occurrence of the accident, of mortification of the lower extremities. The fracture was done to the body of the first lumbar vertebra, and the

articulating transverse processes of the last dorsal. There has been the same kind of rough substance thrown out, and the bone in the fractured parts was firmly consolidated.

TREATMENT.—What *treatment* should be adopted in these cases? In fracture, without any displacement, and where there is not actual pressure on the spinal chord, but where, soon after the injury, serious pains come on in the course of the nerves below the seat of injury; when convulsions and painful spasms attack the limbs, and which occur in consequence of inflammation of the spinal chord, we can only have recourse to the ordinary antiphlogistic treatment; take blood locally, and adopt the ordinary antiphlogistic means, strictly enjoining rest. With respect, however, to the ordinary run of cases, which are instances where paralysis and insensibility immediately attend the accident, must place the patient in a state of perfect quiet, and make him keep absolutely at rest; for this purpose the fracture-beds employed by Mr. Earle, Mr. Amesbury, and others, are particularly well calculated, because they afford the patient the opportunity of relieving himself without movements of the body; so that there can be no motion of the broken ends of the bones against each other; *none* of those motions which would be likely to increase pressure upon the spinal chord, or that would be likely to produce or aggravate inflammation. Absolute quiet is the essential point in the treatment of these cases. It may be necessary to adopt antiphlogistic means of a local character; and in these cases do not, in general, require any other measures. You may employ the catheter so as to draw off the water at proper times, and then, under favourable circumstances, we see that nature is capable of repairing an injury of this sort, so far as the injury to the bones themselves is concerned, although the power in the limbs is not likely to return, when the spinal chord has received a very serious injury.

OBS.—The proposal has been suggested of relieving the spinal chord from pressure, by denuding the vertebral column on its posterior aspect, and by cutting away with a saw or trephining the spinous process, corresponding to the situation in which the spinal chord may be supposed to suffer, under the idea of elevating

pressed bone, or of taking away that part which causes the pressure, in the same way that you would relieve the brain from pressure occasioned by fracture of the bones of the skull. The great objection to this proceeding is, the uncertainty respecting the precise seat of the injury, and the precise mode in which the spinal chord has been injured, or continues to suffer pressure. Sometimes an irregularity, apparently a prominence of a spinous process or two, may point out the situation in which you may suppose the injury to have been received, and in which you might suppose it probable that incisions should be carried, in order to accomplish this purpose. But in a great number of instances there is no direction of that kind, and you would proceed under great uncertainty, whether it ought to be one or other, or a whole spinous process, that ought to be removed. Then, again, it is not known whether the paralysis is the after-consequence of an injury, or whether it is merely the effect of that injury which the spinal chord had received at the time of the accident, although it may no longer continue to suffer pressure. In some cases, there is a portion of bone driven from the body of the vertebra, standing across the vertebral canal, and filling it up. Removing the spinous process in such a case would be of no benefit to the patient.

VIII. FRACTURE OF THE STERNUM.

The *sternum* is not frequently broken. Although it presents a very broad surface, and although very often considerable violence is offered to it in the shape of blows, although it is not covered by other parts, it eludes fracture, in consequence, probably, of the elasticity of the cartilages of the ribs by which it is supported. The parts of the chest with which it is connected bend, and, consequently, the bone escapes fracture under circumstances which we would suppose capable of producing it. The sternum is occasionally broken, and it may be a very serious occurrence, or it may be by no means important. A very violent injury, such as the passing of a wheel over the body, will destroy it. The injury is then of a very serious nature, not so much from the injury which the sternum itself has received, but from the mischief done to the parts within the chest. A fracture of the

sternum, not attended with injury to the internal parts, is very important.

TREATMENT.—The following case will illustrate the treatment to be employed in fracture of the sternum:—"A young man, twenty-six years of age, was brought into the hospital (St. Bartholomew) in January 1826, under my care (*Mr. Lawrence*). I believe he had been engaged with some companions, perhaps in drinking; and after an entertainment of that kind, they had resorted to sports. He was rather a rough nature, and, in the course of his exertions, his chest had been struck with great violence against the edge of a table. He was very soon found that the sternum was broken across the middle; there was not any displacement, but there was a little irregularity just at one edge. When it occurred, he felt much pain across the part, and also on coughing. At the time he came to the hospital his pulse was feeble, and he seemed to be labouring under considerable depression, just like a person who had met with an accident of considerable importance. When he drew his breath, or when he coughed, or when he bent the head forward, crepitus could be distinctly perceived. The pulse soon rallied, and he lost two ounces of blood from the arm; aperients were administered, and he had a broad bandage buckled on his chest, similar to that which is applied in the case of fractured ribs. In the course of the night he suffered a good deal from coughing, which produced pain in the chest and much uneasiness. For this he had a liniment which he was to take often. The cough disappeared, and the case went on well. He came in on the 16th of January, and went out, I think, on the 1st of February, quite well. I have seen other instances of fracture of the sternum, which have gone on in a similarly favourable way to this."—*Surg. Lect.*

OBS.—It is possible that some fractured end or portion of the sternum may be depressed, but this does not ordinarily occur. The way in which it is fixed to the cartilages prevents depression. If, however, the inferior fragment of the sternum should be depressed under the superior fragment, inasmuch as the anterior mediastinum is directly behind, and contains only loose cellular membrane parts, of no consequence, that simple displacement would not be of importance.

IX. FRACTURE OF THE RIBS.

Fractures of the *ribs* are much more common than those of the *sternum*. When these take place at the anterior part, or sides of the chest, the accident is generally easily recognisable by putting the hand where the violence has been received, or where the patient says there is considerable pain.

SYMPTOMS.—The movements of the chest produce a sensible grating, or crepitus, and the patient experiences great pain from the motions of the broken ends of the bone in the chest. When, however, the fracture is situated in the lower ribs, and further back where the ribs are covered by thick muscles, we often do not succeed in detecting grating or crepitus, although all the other circumstances are present which lead us to believe the existence of fracture. In a doubtful case like that, it is better to adopt the treatment suitable to fracture of the ribs. The function of respiration is of course much affected when fracture of the ribs has taken place, for this continued action being attended with the more or less motion of the ribs, a constant source of pain arises, which, however, in some measure, can be avoided by the diaphragm and the abdominal muscles being employed in the respiratory action, to the exclusion of the intercostal muscles and the motion of the ribs.

TREATMENT.—If the chest could be kept perfectly at rest—if the patient did not employ the intercostal muscles at all, there would be no movement of the fractured ends of the bones, and no local pain probably would be experienced. We endeavour to accomplish this as well as we can, by covering the part, either by a broad bandage of calico or flannel, or by including it in a broad piece of girth, fastened with buckles and straps, called a *fractured-rib bandage*. Patients very often experience great comfort from the application of that bandage; they find they can move, and cough freely, when it is on. In some instances, however, the pressure of this bandage, and the swelling that takes place, tend to act unfavourably on the broken ends of the bone, and to aggravate the sufferings of the patient; and this is particularly the case where several ribs are broken; so that it is often found

necessary to leave the chest without external pressure. In these cases, therefore, the treatment must be regulated according to the circumstances, and allow the patient to have, or not to have, a bandage, according to his own feelings. If the patient be strong, if he has much cough in consequence of the accident, and if he be of a full habit, it is expedient to bleed him once, or oftener to purge him, put him on low diet, keep him quiet, and in the course of a fortnight or three weeks he will get perfectly well.

The fracture of a single rib is by no means an important occurrence; the patient recovers easily, but when you have several ribs broken, the case may be a very serious one. And there is one thing connected with fractures of the ribs, which, in many cases, is a source of great danger, and that is, the circumstance of the broken end of the bone projecting into the cavity of the chest, wounding the pleura and the lung. Under such occurrences, air escapes through the wound from the lung into the cavity of the chest, and very often also passes through the opening, which the broken rib has made, into the cellular membrane around the situation of the fracture. From the general communications of the cellular membrane over the body, the air, when once admitted, readily extends over the chest, generally over the side of the body, and may, indeed, occupy the whole of the body, constituting what is termed *Emphysema*, in which the cellular membrane generally is distended with air, as the cells of it are with water, in the case of anasarca or general dropsy. The mere distension of the external cellular membrane, although it may produce great swelling, although it may even go to the extent of swelling up the eyelids and closing the eyes; although it may distort the features, so as to render the person hardly recognizable, and although it may swell other parts still more considerably, yet this mere distension of the cellular membrane by air is not a thing of any great importance.

TREATMENT.—If the swelling proceed to any considerable extent, we can at once get rid of it by making a puncture with the lancet into some part of the body, and the swelling quickly disappears. But the great mischief arises, in the case of emphysema, from the air which passes into the cavity of the chest, more than

larly if it does not meet with a ready exit. The cases, therefore, of emphysema, in which there is the largest swelling externally, are by no means cases of the most importance.

When air escape from the lung into the cavity of the chest, and remain there; in the first place, the lung that has been wounded collapses, becomes very much diminished in size, and the place which it formerly occupied in the chest is now occupied by air. If air still continue to pass through the wound into the chest, it not only occupies the space formerly occupied by the inflated lung, but it pushes the mediastinum, which is a sort of partition, towards the other lung, and prevents that lung from becoming distended; so that respiration is very much impeded from this cause. The mediastinum, you of course are well aware, is a moveable partition in the chest; and it is so moveable, that when you are on the right side, the heart, which is seated, in fact, on the mediastinum, falls over upon it towards the right side; so that you cannot feel it pulsating on the left side, as you would do under the circumstances. You know, also, that the heart ascends and descends freely, in proportion to the extent of the motions of the diaphragm. So that the mediastinum is capable of passing from one to another position, according to the force applied to it. If any matter, or any fluid, contained in one side of the chest, will exercise a considerable pressure on the parts contained in the opposite side through the mediastinum.

Remarks.—If, under any circumstances, respiration should become extremely embarrassed, the only course of relief is that which you must take if one side of the chest was swollen or distended with air or pus; that is, you must make an external opening, and allow the air to escape, which it will do with, at all events, temporary relief. If it should accumulate again, you must repeat the operation. In performing this operation, you make an opening between the fifth and sixth ribs towards the anterior part of the chest, if on the right side; but you had better make the opening lower down, and more towards the side of the chest, if you are to operate on the left side for the purpose of avoiding the pericardium and heart.

X. FRACTURES OF THE PELVIS.

Fractures of the *pelvis* can hardly take place, unless in con-

sequence of some very great violence; such as tremendous falls which literally shatter to pieces the parts of the body that come to the ground, or from the passage of a carriage-wheel over the lower part of the body. And when that accident does take place, it is so generally attended by wounded vessels, internal hemorrhage, or violent injury of some important organ, that a mere fracture is of minor consequence.

TREATMENT.—Indeed, in those cases of fractures of the pelvis we can do but little towards relieving the very precarious state in which the patient is placed. If the os pubis be fractured, there may be injury to the urethra, and this may require a particular mode of treatment. We are not capable of doing much in these cases for the purpose of retaining the fractured parts in apposition. All we can do here, as in fracture of the spine, is to put the patient into an easy situation, let him be kept perfectly at rest, and administer to any particular symptoms that may present themselves.

If the *sacrum* be fractured, you have, in addition to the ordinary symptoms, a paralysis of the parts which are supplied by the sacral nerves below the seat of injury. Fractures merely of the *spine of the ilium* are not of a serious character.

Treatment.—In such cases we can do little more than keep the patients quietly in bed; but a *compress* might be applied to promote the apposition of the fractured bone.

XI. FRACTURE OF THE CLAVICLE.

“When you consider the form, the position, the connexion, and the office of the *clavicle*, you will not be surprised to find that it is very frequently broken. The clavicle is a bone of rather slender substance, and elongated in its form. It is situated at the upper and anterior part of the chest, where it is covered simply by the integuments; so that, in its outline is distinctly visible through the skin. It is placed between the sternum and the scapula, to both of which it is articulated; and it serves to keep the scapula, and through it the whole of the upper extremity, at a proper distance from the sternum, so as to give to the arm a free range of lateral motion. If not for this bone, the scapula and upper extremity would come forward over the chest; and, indeed, were it not for the clavicle

er extremity would come forward, and correspond in man to situation of the anterior extremity in quadrupeds. The clavicle is a kind of *pivot* upon the trunk on which the upper extremity turns. Under these circumstances, the clavicle is frequently broken by direct violence, that is, by blows inflicted immediately upon the bone itself. It is also liable to be broken in consequence of violence communicated to it through the medium of the upper extremity. Thus, when a person falls to the ground, and stretches out one arm to save himself—if he fall on the shoulder, on the elbow, or on the palm of the hand—in either of these cases, the clavicle is included between two forces, and the bone gives way at its weakest point, which is generally toward the middle.”—*Boyer*.

Generally speaking, the fracture of the clavicle is *single*, that is, it consists of one fracture only; but in the case of a violent blow the bone may be broken at more than one place; and there is often great ecchymosis of the surrounding parts. By such a blow, the comminuted portion of the clavicle may be depressed upon the axillary vessels and nerves, and produce symptoms referable to pressure upon those parts. Fractures of the clavicle, also, may be either simple or compound—the latter very rare.

When the clavicle is broken, it depends on the situation, where there will be any considerable displacement. If the fracture takes place at the scapular end, that is, within about an inch or an inch and a half of the articulation, there will not be any displacement because the under surface of the clavicle is there closely connected to the root of the coracoid process by a ligament. Like-
 wise, if the bone be broken near to its thick part—near to its sternal end, it is generally not displaced. But these are the unusual situations in which a fracture of the clavicle is likely to take place; it more commonly gives way towards its middle, where there is usually considerable displacement.

Symptoms.—When the clavicle is broken, the shoulder being no longer retained by the bone in its proper lateral situation, it moves towards the sternum; the shoulder moves onwards, or towards the middle line of the body; and this carries the scapular

end of the fragment under the sternal end. The shoulder sinks; for the clavicle forms a support to the upper extremity the weight of which the scapular end of the clavicle is dragged downwards. The principal displacement, then, is inwards towards the sternum, and that necessarily occasions a riding of the bones; which as necessarily causes the sternal end to overlap or ride the scapular end. When the reduction is effected which it easily is, there is a manifest grating or crepitus. A deformity that is produced by the displacement of the fragment is visible externally; and, in fact, if the clavicle unite with two fragments displaced, this disfigurement is more or less visible afterwards, a circumstance which, of course, it is very desirable to avoid, supposing it to occur in females, with whom that part of the body is usually exposed. The motions of the upper extremity that is, those motions which the upper extremity performs upon the trunk of the body, are effected with pain, and they are limited more especially the movements upwards. A person, when a clavicle is broken, cannot, without much pain, raise the arm. Under motions, those that are performed with the arm hanging down, may take place without much inconvenience. In consequence of the sinking of the shoulder, the patient generally turns his head and neck to that side; and he will be inclined to support the elbow with his other hand, in order to ease the pain; such is the kind of attitude in which he will place himself.

TREATMENT.—It is very easy to reduce or replace a broken clavicle, but it is by no means easy to retain the fractured ends in exact apposition, so as to produce an union in which there shall be no deformity. If you lift up the elbow, carrying the shoulder a little backwards and outwards, you can bring the broken clavicle into its proper place; and if you can keep the upper extremity in this situation, you, of course, can maintain the position of the fragments; but this is the difficulty; you cannot apply the means of retention so as to bear exactly upon the broken bone; you can only act upon the broken ends of the clavicle through the muscles of the shoulder. Although moving the arm outwards, to elevate it so as to get the clavicle into its proper position, does not occasion much inconvenience, yet *retaining* the limb in this position

becomes exceedingly troublesome to the patient, for many of apparatuses that are used for this purpose *gall* the patient, causing excoriations. Several modes of bandaging that have been invented for fractured clavicle act pretty well while the patient is in the erect posture, but when he lies down, the shoulder is pushed forwards, the bearing of those applications is considerably altered, so that they no longer produce the proper effect, especially if the patient lie on the side on which the accident has occurred.

Two modes of retaining a fractured clavicle in its situation have been generally practised, act by drawing back the shoulder altogether. The figure of 8 bandage is one which has been most commonly used; this consists in applying a bandage to the two shoulders alternately, and crossing it over the back, so that the turns round the shoulders represent pretty accurately the figure of 8. In that way the two shoulders are usually equally drawn forwards and inwards. There is a bandage which was invented by Desault, and it is very similar to the figure of 8 bandage. It consists of a square piece of leather, adapted to the part, and two straps which go round the shoulders, and are buckled to two pass-buckles round in the opposite direction. This piece of leather is divided into two in the middle, so that the force is applied as in the figure of 8 bandage. Both of these modes of proceeding are attended by a very considerable degree of pressure on the under part of the axilla. The skin is rubbed, fretted, and excoriated, and great inconvenience is thereby experienced. The shoulders are not only drawn together posteriorly, but the scapular end of the broken clavicle is pushed somewhat under the sternal end, as may once be perceived. Now, you want some force that will keep the shoulder connected with the broken clavicle outwards, and not inwards or towards the middle line of the body. Desault, observing the defects of these ordinary bandages, very properly observed that the principal object in a broken clavicle was to keep the scapular end of the broken bone outwards, to remedy the inclination which exists in the shoulder to fall towards the sternal end. He said the principal indication was to pull the shoulder outwards in the lateral direction, and the scapular extremity of the

clavicle connected with it; and he thought that the best mode of accomplishing this was to employ the humerus as a lever, placing a cushion in the axilla as a fulcrum. This cushion is thick at the upper part—of between three and four inches in thickness, and gradually tapers off, becoming thinner below, where you do not require any cushion. When the cushion is placed into the axilla, the arm is brought down to the side; thus the upper extremity of the humerus is drawn out, in doing which you likewise bring out the part of the clavicle which is connected with it. Desault used a peculiar apparatus for the purpose of meeting his views, but it was so complicated that it soon got, in a great measure, out of use, and is not now employed at all. However, the principle of placing the cushion in the axilla, and of carrying the upper end of the arm over it, is, undoubtedly, perfectly correct, and constitutes one of the important points of treatment. In order to get rid of this complicated bandaging of Desault, Boerhaave employed the cushion, at the same time used a body-belt fixed with straps and buckles, something like a fractured-rib bandage. Around the lower part of the arm was a portion of web, with straps corresponding to buckles on the body-belt, and thus keeping the arm close to the side.

The best mode of treating a fractured clavicle will consist in applying a cushion in this way, confining the arm to the side by means of a broad bandage encircling the trunk and arm generally, supporting the elbow and the rest of the extremity by means of a sling carried over the opposite shoulder. By having the sling of a requisite length, the shoulder is maintained at a proper degree of elevation, and that sinking is remedied, which is the natural consequence of the accident.

There is a great multiplicity of bandages and apparatuses for fractured clavicle; and from this circumstance it may be inferred, that not one of them is recognised as answering the purpose very properly.

Obs.—It should be observed, that the difficulty of maintaining the two ends of this slender bone in direct apposition is so considerable, that it is doubtful whether any one of the processes hitherto recommended can be confided in for accomplishing

ose very satisfactorily. It will usually happen, that more or deformity will attend fracture of the clavicle; but there is this blication in the case, that the deformity does not at all injure subsequent motions of the part. We may see instances, indeed, which the fractured ends are considerably displaced, where the external extremity rides considerably over the scapular, and the movements of the limb are quite perfect.

XII. FRACTURE OF THE SCAPULA.

The *scapula* is so much covered by muscles, and its connexions with the trunk are of such a kind, as to allow of its yielding under application of external force, so that fractures here are uncommon. Some parts, however, which are placed nearest the side of the body, and which project particularly, may be broken—the *acromion* especially, the inferior angle of the scapula, and rarely the coracoid process, and the neck of the bone.

TREATMENT.—Now as regards the inferior angle of the bone, the *acromion* and *coracoid processes*, all that we can do in cases of fracture of those parts is to keep the upper extremity at rest; when that moves, the scapula will move also; and we may, in some measure, assist the maintenance in apposition of the broken fragments, and the consolidation of a fracture, by relaxation (through the peculiar position of the upper extremity) of a particular muscle connected with the broken part of the bone, or by the application of some local compress. We can, however, do much by any kind of apparatus.

Fracture of the *neck* of the scapula is spoken of as if it were a common occurrence. “I have seen many cases,” observes Mr. Lawrence, “said to have been fractures of the neck of the scapula. Now the heart is so completely internal, it is so protected by the *acromion*, the *clavicle*, the *coracoid process*, and the head of the humerus, that we cannot well expect that it would be frequently broken; add to this, the force applied to any of those parts loses its influence in some measure by the yielding of the scapula. I should rather think, therefore, that fracture of the neck of the scapula is a very uncommon occurrence; and I am the more inclined to this opinion, from never having seen, in any anatomical museum, a

specimen of such a thing. I believe that those cases so frequently supposed to be fractures of the neck of the scapula, are fractures of the head of the humerus high up. It must at all events be extremely difficult to establish a diagnosis in these cases; indeed, the detection of a fracture, when situated under considerable thickness of parts, which surrounds a joint, is attended with great difficulty; and, of course, it is still more difficult to arrive at knowledge of the exact parts of the bone that may have been broken.—*Surg. Lect.*

“In reference to treatment, however, there may be no material difference between that which we should pursue, if the neck of the scapula, or if the head of the humerus, were broken. In both cases, the weight of the upper extremity must be sustained by means of a sling; we press it upwards, and the humerus must be firmly bound to the side. That is the course of proceeding we should adopt, whether the neck of the scapula, or the head of the humerus, were broken.”—*Ibid.*

XIII. FRACTURE OF THE HUMERUS.

The *humerus* may be broken in any part, from the head down to the inferior articular extremity.

XIV. FRACTURE OF THE NECK OF THE HUMERUS.

Fractures of the *neck* of the humerus are very often spoken of. This is hardly to be understood in a strict sense, because the neck of the humerus is the portion immediately surrounding the hemispherical prominence, articulated to the glenoid cavity, and this is a part particularly thick and strong, and therefore not likely to be broken. But when we speak of fracture of the neck of the humerus, we must include, probably, almost the whole of the space above the insertion of the deltoid muscle.

TREATMENT.—It has been already mentioned that in these cases, to support the weight of the limb and keep it firmly fixed to the side, are the readiest means of maintaining the apposition of the broken ends. It may happen, if the situation of the fracture is low, so that we can feel the exact situation, that we may assist the apposition of the fragment by placing a compress in the axilla, and drawing the upper part of the extremity downwards, inward,

forwards; or even by applying a compress externally. There are minute points which must be judged of in every particular case; but, as before observed, the general mode of proceeding is to be by supporting the weight of the extremity, and maintaining the apposition of the fragments by confining the arm to the

XV. FRACTURE OF THE SHAFT OF THE HUMERUS.

When we have the whole of the shaft of the bone immediately under observation, the existence of fracture is easily ascertained, and no difficulty is experienced in maintaining the broken parts in apposition.

TREATMENT.—Relax the muscles attached to the humerus. In putting such a fracture up, we may apply a circular bandage to the upper extremity, commencing at the wrist, and carrying it upwards, continuing it over the elbow and over the fractured bone; then we may include the fractured bone in two, three, or four splints, according to circumstances. Occasionally, after using a certain portion of the bandage to accomplish the circular rolling of the limb, some surgeons employ the rest in carrying it round the splints, so as to confine them properly to the humerus.

When the humerus is broken at its lower part, and the fracture extends longitudinally into the elbow joint. Sometimes one of the epicondyles is broken off, the internal or the external; and, indeed, in the majority of such cases, the fracture embraces rather more than that part to which the anatomical term *condyle* is applied; it embraces a portion of the inferior extremity of the bone. In such a case there may be a longitudinal fracture, extending above the elbow-joint, and a transverse fracture, forming the termination. A complication of injury generally gives rise to swelling of the joint, effusion of fluid into its cavity, pain in the part, requiring the application of leeches, or other antiphlogistic treatment, before we proceed to confine the bone, with a view to its consolidation.

TREATMENT.—When the inflammation has been subdued, we may confine the fractured parts by means of the same kind of splints that are commonly used for a fractured humerus. These, however, in some instances, do not completely retain the fragments of bone in apposition, and under such circumstances it is

expedient to employ a bent splint, that embraces the fore-arm as well as the upper arm. Mr. Amesbury, whose observations have already referred to, recommends a bent angular splint, which the upper part is adapted to the humerus, and the lower part to the fore-arm. Another mode recommended is, to take a wetted piece of pasteboard, so as to form a case for the arm, to take it off when it is dry, and line it with leather, or some other soft substance, and then it is found to be a machine well adapted for retaining the elbow, fore-arm, and arm, in proper situation.

After a certain time has elapsed, say at the end of a fortnight or three weeks, in the case of fracture extending into the elbow joint, or indeed in the instance of fracture extending into the other joint, it is expedient for the surgeon gently to move the parts—to give what we call *passive motion*.

XVI. FRACTURE OF THE FORE-ARM.

The bones of the fore-arm may be both broken together, or may be broken separately. In the former case there is a deformity of the limb, and angle; and a crepitus is felt on moving the bone.

TREATMENT.—When both bones are broken, the object is to retain them in a position parallel to each other, and to maintain them in a perfectly quiet state until consolidation is effected. The attitude of the limb, therefore, is the palm of the hand towards the chest, the thumb upwards, and the little finger downwards, so that the direction of the hand, the radius and the ulna, is the same. If you allow any degree of pronation and supination, the bones will no longer be parallel, and then the fragments, especially of the radius, will not be in apposition. It is not likely the hand will fall into the supine state, but if not supported it has a natural tendency to fall into the prone state, and then that fragment which is carried forward with the hand projects, and of course the bone unites in an improper position. Flexion then of the elbow at a right angle with the humerus, the parallel position, whether one or both bones be broken, are the points to be attended to. Then you place a splint on the outer and on the inner side of the limb. Those splints ought to be lined with a thick compress, com-

holding with the interval between the bones, and the whole to be then confined by a roller. The splints should be long enough to extend to the hand; at all events the inner splint should reach upward to the hand, so as to support the thumb, and prevent it from dropping.

A circular bandage is not well calculated for fractures of the forearm, because, in surrounding the fractured portions, you would draw the fractured ends inwards, and if great care was not taken, you might have the fracture united in such a way as to impede the motions of supination and pronation; such has been known to occur; indeed the necessity of preventing the inward displacement of the fragments of the fore-arm has appeared to some so important, as to induce them to recommend splints which are fixed on the sides turned towards the bones, so that the convexity shall press inwards towards the interosseous ligament. Common straight splints will, however, answer every purpose that is required.

The radius is much more frequently broken singly than the ulna, for the radius constitutes almost entirely the articular surface which supports the hand; and fractures occur, in consequence of force applied to the hand, as in cases of falling, when a person stretches out his hand to prevent himself from being hurt. If you have not any great displacement of the fragments, or comminution. The treatment of the fracture, so far as bandages and splints go, is the same as if both bones were broken.

The radius is sometimes broken very near the wrist; and here the action of the pronator radii teres, and quadratus, will sometimes displace the fragments, by drawing the lower fragment upwards. It was proposed by Mr. Cline to let the hand fall down in this case, so as to have the short fragment of the radius drawn upwards. There is not, however, any great room for displacement in such a case.—*See Lawrence's Lect. Sup. citat.*

Perhaps the most frequent fracture singly, is that of the olecranon, and the mode in which this part projects, renders it much exposed to blows, or other violence, more especially in cases of falls; so that you cannot be at all surprised that fractures of the olecranon should be so frequent. In these occur-

rences you may either have a small bit of bone broken off a part which is immediately connected with the attachment of the tendon of the triceps, or the fracture may extend across the middle of that part of the bone which forms the great semilunar cavity. This fracture is sometimes attended with considerable displacement, arising from a retraction of that portion of bone connected with the tendon of the triceps; however, in many instances, that portion of the bone is not materially displaced, and, indeed, whether it be or not, we usually find, that if the elbow be brought into the extended position, the fragments are nearly, if not completely, in apposition. The pulley of the humerus on which the sigmoid cavity of the ulna plays in its motions of extension and flexion, and the excavation in the humerus just above the olecranon, contribute to fix the end of the ulna in its position, and to prevent any external displacement. The only displacement that can take place, is in consequence of the extremity being drawn up by the triceps. You will find, by observing the motions in a skeleton, that there is an inch, or an inch and a half of difference with respect to the position of the head of the ulna arising from the limb being in the bent, or in the straight position; if you bend the fore-arm, you have a displacement in consequence of the action of any muscles, but in consequence of the movement of the end of the ulna, from and upon the head of the humerus. It has been generally stated, that in fracture of the olecranon, you must keep the arm in a state of complete extension; that you must place a splint on the palmar aspect of the elbow-joint, covering the inferior half of the humerus and the upper half of the fore-arm. It must be observed, that this is a very unpleasant position for the arm to remain in. Patients will not bear to be kept in this condition for the required period, and a great stiffness is produced in consequence of the stretching of the ligaments and muscles, which this position requires. In the majority of instances, this extension is unnecessary. In the instances where the fragments are not much displaced, the elbow may be kept in the half-bent position. You may apply a circular roller to the upper arm, commencing above and carrying it downwards, so as to prevent the contraction of the triceps. You

employ lateral compresses, so as to fix the broken ends of the radius in their proper position; then maintain this by pasted splints, accommodated to the form of the limb, one before and one behind, so as to encase the arm. This practice is recommended by Mr. Earle, "and from some cases that I have seen, I think that he has properly enforced the advantages introduced by Desault and others, of the practice which relieves the patient of the inconvenience of keeping the arm in the forced extended position. Fracture of the ulna, at any part below the elbow-joint, is to be treated by the same applications and bandages which would be used in other fractures of the fore-arm."—*Lawrence*.

XVII. FRACTURE OF THE CARPUS.

Fracture of the *carpus* cannot take place, except by extensive injury, which comminutes and extensively injures a great variety of bones. We do not find fracture of any one particular bone; the bones are too much surrounded by soft parts to admit of that.

XVIII. FRACTURE OF THE METACARPUS.

Fracture of the metacarpal bones of the fingers or thumbs, must be treated by keeping the hand in a state of rest. So far as the metacarpus is concerned, the ends of the fractured bone are generally displaced, so that if the hand be kept at rest, that will be found sufficient.

XIX. FRACTURE OF THE PHALANGES OF THE FINGER.

In the case of fracture of the *phalanges* of the *fingers* or *thumb*, splints and rest are sufficient to answer all the necessary purposes.

FRACTURE OF THE SUPERIOR THIRD OF THE FEMUR.

Fractures of the upper extremity of the thigh-bone, below the trochanters, that may be in consequence of the displacement of the superior end of the fracture, occasions a very serious subsequent deformity.

TREATMENT.—In fracture of the upper third of the thigh-bone, in such a case as you cannot effectually depress the upper end of the fractured bone, which is drawn upwards and forwards, the lower

extremity must be raised to a level with it: and this is best accomplished by the fracture-bed, which presents a double-inclined plane, giving the power of bringing that plane to different degrees of elevation, which will enable you to raise the lower portion to a proper level with the displaced upper portion. In addition to the condition into which the limb is brought by the double inclined plane, it must be confined by three splints, one external and internal, and an anterior one, applying at the same time soap plaster, and a many-tailed bandage.

XX. FRACTURES OF THE SHAFT OF THE THIGH BONE.

Fractures of the *shaft* of the thigh-bone more commonly place below the middle or in the lower third.

TREATMENT.—In respect to this, as well indeed as regard fractures of the thigh-bone generally, a great difference of opinion has prevailed respecting the proper position of the limb. Mr. Pott inculcated the advantage and propriety of the bent position of the knee, with the limb resting upon its outer surface; that the patient might lie on his side; that the fracture should rest on its external surface on the bed, that the external condyle of the knee should rest on the bed, and the knee should be at half bent; that is the position which Mr. Pott strongly recommended, and which, from his recommendation and his writings, has very commonly been adopted in England since his time—the half-bent position of the knee with the fractured part of the thigh resting on its external surface. In France, more particularly from the time of Desault, it has been customary to lay the limb in a straight position; “and,” observes Mr. Lawrence, “I have no hesitation in saying, that if the question is merely between the bent and straight position, the French plan is the best. The truth is, that patients cannot and will not support the bent position with the limb resting on the side, the foot on its external surface, and the knee on its external condyle. You might put a patient into that position immediately after the accident, but he cannot continue to remain in it for a long time. The pelvis sinks down, the patient gets on his back, the limb remains on the side and the consequence is that the thigh-bone unites in an improper way, and the knee is

are permanently turned outwards or everted. The straight position avoids this inconvenience, for when you have done up a fracture, and placed the limb in the straight position, you at all events calculate on the patient remaining on his back, though he cannot long continue in the awkward position of being on his side. I believe general experience has offered proof decidedly in favour of the straight position. There is, however, another kind of posture, which has lately been very much adopted in this country, and that is the bent position, with the patient lying on his back, employing the double-inclined plane, and the extremity placed in a position similar to that which has been explained as proper in the case of fracture of the neck of the thigh-bone. This double-inclined plane is often employed in distant parts of England, by using two boards, one for the thigh and another for the leg, to which it is always advisable to add a foot-board. With this double-inclined plane, the employment of splints, lateral and anterior, must of course be adopted."

FRACTURES OF THE INFERIOR EXTREMITY.—In fractures of the lower extremity of the thigh-bone, the circumstances attending them are various.

TREATMENT.—When the fracture extends through the lower end of the bone, when it is a comminuted fracture into the joint, if the fragments are not displaced, it is probably not very material, whether the limb be placed in a straight or in a half-bent position on the inclined plane. It is said, that by putting the limb in the straight posture, the pressure of the lower extremity, of the pelvis more particularly, fixes and keeps in a proper situation the broken fragments of the femur. In this case, when the two ends of the femur are split through the middle, you might expect displacement of one of them, and the proper position of the limb might certainly keep them more apposed to each other. However, when fractures happen of the condyles, they are not attended with much displacement. At all events, we have several cases of fractures passing through the knee-joint, in which patients have done very well, when they have been placed on the half-inclined plane. "In these instances," says Mr. Keene, "you may expect that there will be inflammation

of the synovial membrane of the knee-joint, increased secretion from that membrane, and more or less of swelling and redness of the joint. You must, of course, adopt proper antiphlogistic means to combat those symptoms, and when they are properly removed, then you adopt the means necessary for confining the fragments of the broken bone in a right position. Although in such cases very often present rather formidable appearances during the active disturbance produced in the joint from mechanical injury, you will find that, under judicious antiphlogistic treatment necessary for removing those symptoms, the case goes very well. You will, of course, be aware of the necessity in these instances, of what I have had occasion to mention with respect to fractures of the olecranon—to give passive motion to the joint three or four weeks after the occurrence of the accident, for the purpose of preventing anything like stiffness or partial ankylosis.—*Surg. Lect.*

XXI. FRACTURE OF THE PATELLA.

In the great majority of instances, the fracture of the patella is *transverse* and *simple*: the bone is broken straight across, and, generally, in one place. It may, however, be broken *longitudinally*; it may be broken *obliquely*; and it is also susceptible of *comminuted* and *compound* fractures. Of the latter, that is, the oblique, the longitudinal, the comminuted, and the compound, are rare fractures; while the simple transverse fracture is of frequent occurrence. The oblique, the longitudinal, the comminuted, and compound fractures of the patella are effected by direct violence, immediately acting on the bone; such as a severe blow on the front of the knee joint, or a heavy fall, when a person comes to the ground upon the patella. But the common kind, that is, the simple transverse fracture of the patella, is produced by the action of the muscles which are affixed to the basis of the bone, the extensor muscles of the knee. A person, in walking, being in danger of falling, by his heels slipping from under him, makes a violent effort to throw himself just as the heels are slipping forward, and when the body is somewhat in the half-bent position; he exerts the exten-

cles of the thigh to the utmost of their power to bring high, the whole of the trunk, forward over the feet to himself. Under these circumstances, the patella is forcibly drawn by the extensor muscles against the interval between condyles of the thigh bone; in this position the patella will project a little above the edge of the trochlea of the femur; therefore it snaps off as a piece of stick would, by the sudden convulsive action of the muscles of the thigh. It is a great muscular effort, and explained with reference to the situation of the patella and the femur. The bone being held firmly at the lower part, and the extensor muscles suddenly drawing it upon the edge of the trochlea, the bone is snapped, just as a piece of wood would snap when forcibly struck against the edge of a table. You will see, that when the extensor muscles of the knee joint are brought into action, in order to draw the thigh forward for the prevention of a fall, the whole weight of the body is carried forward, and it is this violent action that causes the fracture. When the patella gives way thus, the patient falls to the ground, so that the fall on this occasion is the consequence of the fracture; the fracture does not take place in consequence of the fall.

Symptoms.—The symptoms of this fracture of the patella are inability on the part of the patient to move the joint; the want of power over the motion of the knee joint is felt as we feel with regard to the motions of a limb when the main bone of that limb is broken. The patient falls; he has no longer the power of moving the part; more or less of pain is usually experienced in the knee; and, on examination, in consequence of the position of the patella being covered merely by the skin and thin pericarditis, we immediately recognise the division of the bone; to discover the fissure, or separation, which has occurred; we can feel with the fingers the interval between the two pieces of bone, which is sometimes so considerable as to admit of a finger being introduced into it. The separation that takes place under these circumstances is considerable, from the superior fragment of the patella being drawn upwards by the contraction of the extensor muscles. The extent of this displacement, however, varies very much, from the circumstance that the fibres covering the patella, and the la-

teral attachments of fascia, are, in some instances, completely broken through, while in others they are not divided at all; these be not divided, there may be a mere fissure between the fragments; there may be no retraction of the superior fragment, but if they be extensively detached, you may have the superior fragment drawn up from the inferior, half an inch, an inch, two, three, or four inches, or even more: you may have a very great interval indeed between them.

TREATMENT.—This interval you find you can diminish considerably by the position in which you place the limb. If you place the knee in the extended position, and if you also bend the hip on the pelvis, you thereby relax all the muscles attached to the patella, and consequently you diminish the interval between the inferior and superior fragments; the former of which, so far as regards the tibia, remains always at the same distance. Of the muscles that are attached to the basis of the patella, the principal are the two vasti and cruralis, which cover the sides of the thigh, and are completely relaxed by the extension of the leg; but the former, the rectus femoris, is only relaxed when you bend the thigh on the pelvis. Then, when you have all the muscles relaxed as much as possible, (which is to be obtained by the extension of the leg and the bending of the hip joint,) that is the position in which the limb is to be placed, in order to favour the approximation of the broken ends of the bone; and the patient is to remain with the limb so placed, until the process of union is complete.

In a great number of instances, you will find that the broken portions of the patella are so nearly approximated by this position of the extremity, that you gain no further advantages by the application of bandages, or apparatus of any kind. You may, therefore, in many cases, treat the fracture of the patella by simple attention to position. When the knee is in the extended position, you certainly can obtain no advantage, so far as the approximation of the broken portions of the bone is concerned, by any thing you can do to the lower half of the patella. The latter is connected to the tuberosity of the tibia by a ligament which does not admit of extension or contraction, and therefore remains permanently the same; the upper end, connected with the mus-

indeed be drawn downwards towards the lower, as it is more elevated, according to the action of the muscles connected with it. The application of bandages, and pressure from above, therefore, may contribute to depress the superior fragment; and the interval between the two fragments may certainly be increased by motion of the inferior limb: that is, if you were to bend the knee joint, you would increase the interval by removing the inferior to a distance from the superior half of the patella. In the skeleton, an interval of more than two inches is made in this situation by simply bending the knee. You may, therefore, increase the interval by bending the knee joint; but no person would think of bending the knee in a case of fractured patella. When, therefore, the knee joint is straight, you can do nothing more, so far as regards the inferior fragment, than your attention is directed to the superior one. In a great many instances, then, you will find that position, without any bandages or apparatus, will bring the broken ends of the bone as nearly in contact as you can have them. Frequently, a broken patella is bound up by a *figure-of-8* bandage, crossed above and below the patella in front, and going behind the ham, so that the two portions of the figure of 8 encircle respectively the inferior and upper parts of the patella, the decussation taking place in the middle. Boyer recommended concave splints, adapted to the superior surface of the lower half of the thigh, the knee, and upper part of the leg; occupying, therefore, about two-thirds of the limb; with knobs on each side, and two straps coming from the one to the other, one above and the other below the fragments, circumferencing the parts in an elliptical form. The limb, then, must be kept for five or six weeks in this attitude, with or without the assistance of apparatus, as we find necessary; and in that time you should find the union of the patella to have taken place, though it has not become strong enough to enable the patient to use the limb, to lean upon the joint, and to put in action the muscles which are inserted into the patella. The patient ought not to exert those muscles, particularly if he be an elderly person, less than a couple of months. We find, that before the end

of that time the parts are not united by bone, but that the broken portions are joined together by ligament; and if the patient begin to use the limb earlier, the ligamentous union will become elongated, and the interval between the two fragments increased.

The strength, therefore, of the ligamentous deposition, which connects the two portions of the fractured bone, depends a great deal upon the degree of approximation obtained between the fractured portions. We may say, that if these are separated only the length of an inch, they will become united by a very firm ligamentous substance, and that the patient will recover nearly complete use of the knee joint, and the power of the external muscles connected with the articulation; but when an interval comes to be extended beyond that distance, you have so thin a ligamentous stratum uniting the bone, and the relaxation of the muscles of the thigh is of course so great, that the power over the knee joint is very much diminished, and the patient is rendered cripple for life.

“The circumstance of fracture of the patella not uniting bone seems to arise simply from the two fragments not being brought closely together. I fancy there is nothing in the situation or structure of the patella that in itself would render the bony union impossible. The only peculiarity that we can observe is, that we do not generally succeed in bringing the broken extremities of the bone into actual contact. In fact, to show that bony union may occur, it is only necessary to mention, that in some instances the patella has been united by bone: there is an instance of the sort mentioned by Boyer.”—*Lawrence*.

“Now, as the patella forms a portion of the knee joint, you will not be surprised at finding that, when broken, a considerable degree of inflammatory action is experienced in the knee joint; the joint becomes swollen and hot, and that effusion takes place from the inflamed synovial membrane. In fact, the occurrence of inflammation to a certain extent is a very common circumstance. You are not to place the joint in the position which it is permanently to occupy during the process of union until you have removed that state of inflammation. You should, therefore,

first instance, keeping the joint extended, apply leeches if necessary, lotions, and other requisite means. You may find it necessary to continue these for two, three, four, or more days, before applying such bandages or apparatus as you may deem excellent. You remove the inflammation of the joint before you commence the means that are necessary for the consolidation of fracture."—*Ibid.*

XXII. COMPLICATED FRACTURES OF THE PATELLA, AND TREATMENT.

In the case of other fractures of the patella, the inflammation which injury to the soft parts excites, and the possible or probable remote effects of that injury, are circumstances of more consequence than the state of the bone. The first point, therefore, in other fractures of the patella, is to adopt all the means that should deem necessary in the case of a serious wound of an important joint,—to use such antiphlogistic means as are required to prevent or remove inflammation. If there be a *comminuted* fracture of the patella, with an external communication rendering it a *compound* fracture, of course the case is a very serious one. A penetrating wound of the knee joint, or of any great articulation, is at all times serious, and it is, of course, not rendered so by a comminuted fracture of the bone. It has sometimes been supposed, that this is a proper case for immediate amputation; but we are not to regard it in that point of view. It is a very serious case, and amputation *may* become necessary; but there are instances in which compound fracture of the patella, in the comminuted state of the bone, has been cured, leaving the patient merely with a stiff joint. You cannot expect the patient to retain the entire use of the joint after such an accident; and if inflammation should subside, if certain portions of the fractured patella should come away, and no other injury should be the result than ankylosis of the joint, the patient comes off very well. Such a case has occurred. There was an instance in St. Bartholomew's hospital, in which a patient had compound frac-

ture of the patella, and recovered thus far; he has now such a limb as enables him to go about; he has the use of that limb pretty well.—*See Lect. supra citat.*

XXIII. FRACTURE OF THE LEG.

In fractures of the leg, we may have the two bones broken together, or we may have them broken separately. The most frequent case, perhaps, is the *fracture of the two bones together*; when, in addition to the irregularity in the bones themselves, there will, of course, be more or less change of figure—deformation of the limb in which the accident has occurred. When the two bones are both broken, it does not follow that they were broken at the same time. The tibia sustains the weight of the body; the fibula has nothing to do with it; therefore, the tibia probably breaks first, and the patient continues to move upon the limb, unaware of the extent of the accident; and the motion that takes place after the occurrence of fracture of the tibia, will perhaps cause the fibula to break. But then it will break at its weak part—it does not follow that it should break exactly in the same place where the fracture has occurred in the tibia.

XXIV. FRACTURE OF THE TIBIA.

The tibia may be broken transversely or obliquely; it may be broken in different parts, that is, it may be comminuted, and the fracture may be simple, or it may be compound,

In the case of a *transverse fracture* of the tibia, we do not find any displacement of the broken ends, and this more particularly if the fracture takes place towards the upper part, that is, in the neighbourhood of the knee joint, where the bone expands in size, and the fractured surfaces are of course larger. These fractures, however, are frequently in some measure serious, in consequence of their probable extension, as is often the case, into the knee joint. When the fracture of the tibia is oblique, it usually slants from above downwards, and, at the same time, from without or behind, inwards or forwards; that is the direction in which the ob-

is observed; so that when the fractured extremities are placed, which they often are to a considerable extent, the sharp end of the superior fragment passes against the integument covering the skin, penetrates it, and thus converts a simple into a compound fracture. Indeed there is so much tendency to displacement from the action of the muscles of the leg, particularly the powerful muscles of the calf, that when the tibia is broken obliquely, the fibula being fractured at the same time, it is difficult merely to remedy the displacement. The strong muscles of the leg acting on the os calcis, tending to draw the foot upwards and backwards, displace the lower part of the bone, and carry it behind, so as probably to occasion the two portions to form a very marked projection or deformity forwards.

TREATMENT.—The mode of treatment which is usually adopted in fractures of the leg, is that of placing it in a position in which the knee, the leg, and foot, are laid on their outside, with the knee in the half-bent position; “this is, in fact,” observes Mr. Lawrence, “an attitude that has been recommended by Mr. Pott; and the objections which I made to the half-bent position of the limb lying on its outside, in fractures of the thigh bone, do not apply to the same position in cases of fractures of the leg. This bent position of the limb relaxes the strong muscles of the calf, which come from the back of the femur, and those are, perhaps the muscles which have the greatest power in displacing the fractured ends. I think, therefore, I will find that position of the limb to be altogether the most convenient. The outer side rests on a broad splint, which is nearly straight and reaches from the upper edge of the knee down to the heel, having a foot-piece connected with it; and there is another splint to be applied, extending from the inner condyle of the femur down to the lower part of the foot. The splints are padded, so that they may sit easily on the limb. The fractured part is covered by soap plaister, and the limb is bound up with a many-layered bandage. This is a convenient, and, in many cases, beneficial mode of retaining the fractured ends of both bones of the leg in contact.”

3.—If the tibia be broken alone, the fibula remaining entire, you will easily perceive, there can be no material displacement.

ment of the fracture, and therefore the position just recommended, together with the apparatus alluded to, will answer such an accident.

XXV. FRACTURE OF THE FIBULA.

The fibula is, not uncommonly, broken alone, without the tibia participating in the accident. This may happen, either in consequence of some violence directly offered to the fibula, that is, some blow upon the bone, fracturing it at the point of contact; or it may happen, either in consequence of a twist or dislocation of the foot. In the former case, that is, if the fibula be broken by direct violence applied to it, there is in course no displacement of the foot—that remains in its natural position. Sometimes there is considerable difficulty in detecting a fracture of the fibula, for that bone is so covered with muscles, that we cannot trace it with the hand throughout its whole length, nor detect crepitus. The circumstance of the patient having met with an accident, the particular nature of the accident, the sensation in some instances of a snapping or giving way of the bone, an inability to use the limb, with a particular pain on touching or pressing it—these are the circumstances that must guide us in doubtful cases. If we are unable to decide, it is better to treat the case as if the fibula were fractured, and let the patient go through the same process as is customary in that accident.

The fibula may be fractured in consequence of the dislocation or twisting outwards or inwards of the foot. The lower extremity of the fibula constituting the external malleolus, is applied to a considerable portion of the surface of the astragalus; now, if the foot be twisted outwards, you will observe, that a great power is applied to the inferior portion of the fibula, and you will not wonder that it yields at its lower part. If the foot be twisted inwards, a similar accident may occur. The ligament connecting it to the os calcis and lower part of the astragalus, is forcibly drawn inwards, and thus it will happen that the fibula may be broken, perhaps at a distance of two or three inches above the ankle-joint, not directly in consequence of force applied to the

; but merely from the twisting of the foot inwards or outwards; so that in this case you have the fracture of the fibula and a more or less dislocation of the foot. This is a kind of fracture that happens in the lower part of the fibula, in that part where it is covered by little more than skin and integument, and where, therefore, detection by the hand is more easy. The lower end is more moveable under these circumstances, and you can with little difficulty ascertain the nature of the accident. Perhaps by passing your hand over the part where the pain is experienced, you can detect the crepitus.

TREATMENT.—When the fibula is broken by a blow, you may place the foot in the position mentioned; but if it be twisted inwards or inwards, it may be necessary that you should manage the foot as well as the leg; that there should be a foot-rest to that on which the leg lies on the outside, as well as to that which lies on the inside of it, by which means the foot may be kept in a proper position with respect to the bones of the leg; judge of this by the direction which the great-toe bears in reference to the patella. When the great-toe is in a straight line with the inner edge of the patella, then the foot is in a proper position. In all events, either by this or some other contrivance, you must attend to the situation the foot bears with respect to the fractured portions of the fibula, and to the state of the leg gene-

XXVI. COMPOUND FRACTURE OF THE LEG.

With respect to compound fracture of the leg, which is the most violent *compound* fracture you will have to treat, the general observations made respecting compound fractures, are particularly applicable. In the first place you should place the limb on a soft cushion, and adopt the means necessary for reducing inflammation, without attempting to confine the limb between those hard unyielding surfaces called splints; for possibly you will find some time after the accident, that the straight position of the limb on a soft cushion in a fracture-box will be much easier to the patient, and more likely to accomplish the object in view, than the application of any splints. The straight position of the limb, and the

use of the fracture-box, are proper at first in compound fractures, as these are attended with contusion, ecchymosis, and swelling, so that, under common circumstances, the application of splints and confinement of the limb, must be delayed for some time after the accident has occurred.

The mode of managing fractures of the leg, now mentioned, provides only for the confinement of the leg and foot; and it may be said, that in order to maintain the extremities of the broken bones in their proper position, and at the same time to keep the knee quite immovable, the knee also should be subjected to confinement. Mr. Amesbury, whose observations on fractures we have had occasion to mention, has a plan of treating fractures of the leg and also fractures of the lower third part of the thigh, in which his apparatus embraces both the leg and the thigh, and indeed the whole so that the whole lower extremity is rendered nearly immovable. He represents, that when fractures are treated in this way the patient is enabled at an early period after the accident to move the limb, to change its position, and that even at a comparatively early period he can get out of bed and walk about, not bearing the limb of course, but moving it by means of a sling suspended round the neck, by means of which the whole limb is moved together. Whether or no such a mode of treating fractures of the leg is preferable to the ordinary one must be decided by experience, the result of which is not perhaps as yet sufficient to settle the point. That it is not easy always to keep the extremities of the broken bones in absolute apposition, so as to produce an union that will be free from all deformity, is a well known fact, authenticated by a variety of specimens.

When fracture occurs in the lower part of the tibia, near the ankle-joint, it not uncommonly happens that the injury extends into the articulation; and it is by no means uncommon to find either the internal or the external malleolus broken, in which case the fracture must, of course, extend into the joint. These occurrences, if not complicated with an external wound, are by means of any particular consequence. They may occasion a degree of swelling and inflammation of the joint, and may render necessary to use leeches, and other means for checking infla-

on; but the cases will go on nearly as well (except as far as employment of those means are requisite) as any ordinary fracture would do.

XXVII. FRACTURE OF THE BONES OF THE FOOT.

The bones of the foot are very little susceptible of fracture. I should, however, have mentioned one point not yet decided, respecting fractures of the leg, and it is a point of consequence. The three large arteries which run along the tibia—the anterior tibial, the posterior tibial, and the peroneal arteries—run all three of them very closely in contact with the bones of the leg; they run so near to them, that they are certainly very liable to injury in the case of fractures of those bones; and the laceration of a wound of one of these vessels adds very much to the difficulty and seriousness of a case of fracture of the leg. Perhaps, the surgeon may not be aware of the occurrence of injury to the vessel immediately after the accident, but hæmorrhage may come on at some distance of time.

Remarks.—In the *foot*, the bones are so little liable to fracture that there is not much to remark on the subject. The *os calcis*, however, projects so much from the rest of the foot, and is so much exposed to external violence, that it may be broken. The other bones of the tarsus cannot be broken except in consequence of an accident of a very serious kind, attended with considerable crushing of the bones of the foot, and if those of the *metatarsus*, or toes, are broken, the nature of the accident will be sufficiently obvious, and the mode of treatment very simple.

What is the length of time within which fractures may be consolidated? It has been very generally stated that this requires ten days or about six weeks. This, however, as might be expected, *à priori*, depends on circumstances, and will, therefore, be different in different instances. It may be stated that the consolidation of a fracture may require from a fortnight to seven or eight weeks. It will take place in less than a fortnight in children in whom the processes of growth are extremely rapid. It therefore, becomes consolidated very quickly, and fractures are readily united in them; indeed, much sooner than one would

expect. In elderly persons you often find, even at the end of six or seven weeks, that the ends of the bone are not united, and that they are quite moveable, and that you are obliged to continue to subject them for a long time to the means necessary for the consolidation of the fracture. In general, it should be observed that with respect to children, we might fear that deformity would result from our inability, in many instances, to restrain them as we could wish. The movements of young subjects at first occasion them considerable pain, and from this cause, probably, we generally find that they do very well. We cannot, however, keep the splints or bandages on as we should like, and after a few days the little patients will begin to move about. It is supposed that they do not do so until they feel that it can be accomplished without much inconvenience; and when that is the case, they move about without producing much injury to the parts.

Under the granulations arising from the cancellated structure, cartilage is also found; and, about the twelfth day in simple, and from the seventeenth to about the twentieth day in compound fracture, there are bony patches deposited in the cartilage. It is by the accumulation of those patches that ossific union gradually takes place. A compound fracture is necessarily slower in its progress towards recovery, from the causes just explained, than a simple fracture; and the union is frequently retarded by excoriations of bone, which will often take up a tedious time to separate, and keep up considerable constitutional irritation. *Three months* may be considered a short time for the union of a compound fracture to take place; sometimes the accident is recovered from in nine months, and, occasionally not even in twelve.—*Sir A. Cooper. Vide Lect.*

XXVIII. FRACTURES OF THE SKULL.

Fractures of the skull are not of themselves dangerous, nor are they injurious to the brain; these fractures, therefore, do not give rise to any alarm, if care be taken to prevent inflammation. The danger in these cases is to be apprehended from disturbances arising from some distant part, irritation of the system, or extravasation; it is not then, from the fracture itself that the danger is to be apprehended.

ed, but from compression of the brain, extravasation of blood, irritation in some distant part; therefore, when called to a case of fracture of the skull, you do not operate, but consider the symptoms that are present, endeavour to ascertain from what they arise, and then regulate the treatment accordingly. If the symptoms are those of concussion, the treatment must be directed to (CONCUSSION); if those of extravasation of blood, and there is much excitement, it will be necessary to remove a portion of the bone; but if there be fracture only, without any of the symptoms above mentioned, there will be no occasion to operate.*

PROGNOSIS, CAUSES, AND SYMPTOMS.—When a fracture occurs at the base of the skull, it is much more dangerous than at any other part, because extravasation is much more likely to take place, or if not, inflammation of the brain, from the violence of the injury received, very often supervenes. The mode in which fractures are produced, is by falling from a great height on the summit of the head: when all the weight of the body rests on the foramen magnum, and cuneiform process of the os occipitis, the injury is in this way done; as in very many cases a transverse fracture through the foramen magnum, cuneiform process, and part of the temporal bone is the consequence; a discharge of air from each meatus auditorius takes place, and where there is any other mischief, deafness often remains for life. A curious

the members of the French Royal Academy of Surgery, (a body of men in which Surgery is greatly indebted) hold and defend the doctrine, that all fractures of the skull ought to be trepanned; from them this opinion was first promulgated, and supported by the late Mr. Pott. It is not a little extraordinary indeed, that men who have shown so much discernment and judgment in the remarks they have made in other parts of surgery, should have adopted so very strange a notion as this, and retained it, apparently, for a length of time. Desault, however, a surgeon of the greatest experience, never would trephine, whatever accident befel the skull; for, said he, "I have seen some very badly fractured skulls do well without having been trepanned, but I never saw one recover who had the operation performed upon it." Now, it is not to be wondered at," observes Mr. Abernethy, "and it is your attention, that a man in the country may be trephined, and recover again, and do well. They can do things in the country that cannot be done in the London Hospitals."—*Lect.*

fracture within the orbit sometimes occurs ; and the following history of a case of this description is thus related by Sir A. Cooper " A child was playing with a pair of scissors, when a point entered the upper part of the orbit, between the ball of the eye and the superior eye-lid ; the scissors was with difficulty extracted ; the child's eye did not become inflamed ; after the accident the child walked from Walworth to Mr. W., of Hatton Garden, who attended it ; on the 10th day from the time of the mischief, symptoms of compression of the brain came on, rigors, inflammation of the brain supervened, and the child died. On examining the child after death, it was found that the scissors had penetrated through the orbital process of the os frontis, and lacerated the dura mater ; a considerable quantity of extravasated blood was found, and the anterior lobe of the cerebrum was punctured by the point of the scissors, from which it had received the injury." It is to be observed, and then happens that a blow received upon the summit of the head will produce a circular fracture of the entire cranium, commencing at the top of the head, passing down on each side through the temporal bone, and meeting at the basis. There is a circular fracture of the skull which occasionally takes place over the frontal sinuses. When the fracture is simple, if the nose be broken, the air escapes through the opening in the bone, and getting under the cellular membrane under the skin, renders the forehead emphysematous. If, on the other hand, the fracture is compound, upon blowing the nose, the air rushes through the wound, so that, in either case, the nature of the accident may be easily ascertained.

Fractures of the skull, if unaccompanied with concussion or compression, as readily unite as fractures of the bones in any other part of the body. " All fractures of the skull are to be divided into simple and compound fractures, as are fractures of other bones, into simple and compound fractures," says *Abernethy*. Where, however, large holes are made through the skull, the apertures do not again become filled by ossific matter, but by a tendinous structure formed from the bone and dura mater. The holes made in trephining are supplied in this manner, and not by bone. Also, when in fractures of the skull, where

es are separated to any distance, the interspace will not be filled by bony matter, but remain open.

TREATMENT OF FRACTURES OF THE SKULL.—When there is a simple fracture, unaccompanied with symptoms of injured brain, the trephine must not be used, neither in compound fracture; but, the application of adhesive plaster, endeavour to heal the wound in the scalp as quickly as possible. The constitutional treatment consists in depletion, by means of blood-letting and purgatives. This plan often removes symptoms of concussion, even extravasation, which accompany these fractures; and a number of cases will frequently show that the application of the trephine, which at first might have been thought indispensable, is wholly unnecessary. Irreparable mischief, in fine, might arise from converting a fracture, which was simple into one that is compound. In operating in such cases, some time should be suffered to elapse for the purpose of seeing what effects may be produced by bleeding and purgatives. It not unfrequently happens in the hospitals, upon persons being brought in who have received injury to the head, that the dresser in attendance will bleed them immediately after their admission, and at the same time send off the surgeon; before whose arrival, however, the good effects of the loss of blood are apparent, and the symptoms of concussion, even of extravasation, have often disappeared. This shows how necessary it is that you should not be too precipitate. The proper plan, therefore, in these accidents, is to try bleeding and purgatives before the operation is attempted; and whether or not, depletion will prove of the greatest possible advantage in preventing inflammation, and from which, if not kept within bounds, is the principal danger.

XXIX. FRACTURE OF THE SKULL WITH DEPRESSION.

In order to ascertain whether the symptoms arising from a fracture of the skull would come on immediately after the accident, Sir John Cooper tried the following experiment:—"A gentleman brought me a large dog, I applied the trephine to his head, and took out a portion of the bone. I then, with the

handle of a knife, separated the dura mater from the bone ; I found that I could make no impression on the brain until I had done so, and then pressed upon it with my finger. At first the animal did not seem to feel it ; but upon pressing more deeply produced pain and irritation, and he endeavoured to avoid it. Upon still increasing the pressure, he became comatose, and I kept him in that state for five or six minutes, when, removing my finger, he got up, turned round two or three times from giddiness, and walked away apparently little worse for the operation. A gentleman, who felt the animal's pulse during the continuance of the experiment, stated that it became slower as the pressure became increased. In man it is the same—slowly labouring."

After blows have been received on the head, it often happens that upon an examination of the scalp, there appears to be a depression of bone to a great extent, when, in reality, there is none. Some caution is necessary here. A person, for instance, receiving a blow on the scalp : the parts immediately surrounding the point where the blow was received will rise, from the extravasation of blood, two or three lines higher than the part itself ; for the cellular membrane having been condensed by the injury, the parts likewise tend to increase the deception : thus the surrounding parts are considerably higher than the middle ; and the external character of the contusion is certainly calculated to deceive those who are unacquainted with the nature of these accidents.—It very often happens in fractures of the cranium that considerable depression of bone will take place from the external table of the skull being driven into the diploe, and without producing the slightest injury to the internal table ; these fractures, however, can only occur in those of a middle age, for in the very young, and in very old age, the skull is thin and without diploe.

Suppose the surgeon is called to a patient who has had a severe blow on the head, and that, on examining the skull, he finds a portion of bone considerably depressed. It might occur that the man may still be capable of giving a history of the accident, and that his mind is not at all affected. On the other hand, you

called to a person who has the fracture of the skull with depression, and who has lost the powers of mind. In such a case, if the fracture is simple, and there is no wound in the scalp, and no symptom of injury to the brain, it would be the worst practice in the world to make an incision into the part, and perform the operation of trephining; for by making such an incision you add greatly to the danger of the patient, as you make what was once a simple, a compound fracture, and consequently greatly increase the danger of inflammation. Inflammation rarely follows a fracture with depression, where the fracture is simple, but very often follows a compound fracture, which is produced by making an incision in the scalp. It is recommended therefore never to make an incision when it can be avoided, or merely because there is a fracture with depression, if there be no symptom of injury to the brain. Even if there be symptoms of injury to the brain, and the fracture be simple, do not immediately trepan. Take away blood, and purge your patient freely, and see how far the symptoms may be the result of concussion of the brain, and not of depression. If the symptoms do not yield to depletion, then, and only then, perform the operation of trephining.

Remarks.—The old practice used to be, the moment an injury to the skull was suspected, and the least depression of the bone appeared, to make an incision into the scalp.

In a simple fracture, then, when it is attended with symptoms of injury to the brain, deplete before you trephine; and when it is attended with such symptoms, though there may be depression, deplete merely, and never divide the scalp. If the fracture be compound, the treatment must be very different, because a compound fracture is followed very generally by inflammation of the scalp, and it will be of no use to trephine, when inflammation is formed. It might be thought that it would be time enough to perform this operation when inflammation had appeared; but it is not the case, for if inflammation comes on, the patient will die whether you trephine or not, and you will be so far from diminishing its fatal progress by trephining, that the operation will only increase the danger of the inflammation. When inflammation of

the dura mater* and membranes of the brain has been excited by the depression of the bone, you cannot retard the progress of death by performing the operation.

It has been stated that a depressed piece of bone, if not elevated, may become a source of irritation to the membranes of the brain, or to the brain itself, at some future period, or at least may retard the recovery of the patient, although from the symptoms added immediately after the accident, no such symptoms occur at the time. There are some solitary instances which seem to favour this supposition, which, however, ought not to be regarded as sufficient reasons to warrant a departure from the general rule, that we are not to trephine unless the fracture be attended with symptoms of pressure on the brain. Mr. Lawrence of St. Bartholomew's Hospital, on the subject observes, "In the instances I have seen in this hospital where the skull has been trepanned and the patient has survived the operation, it has happened almost invariably, that hernia cerebri has taken place afterwards, an event which generally terminates fatally, and is, in such instances, to be ascribed entirely to the operation. The question of trepanning or not trepanning, therefore, is unlike one which involves the infliction of some trivial or unimportant wound—it is whether we will do or abstain from doing, that which is in itself a very serious affair, and which, independently of other circumstances, exposes the patient to considerable risk."

* *Dura meninx. Dermatodes.* A thick and somewhat opaque and insensible membrane (formed of two layers) which surrounds and defends the brain, and adheres strongly to the internal surface of the cranium. It has several considerable processes; the *falciform*, the *tentorium*, and the *septum cerebri*. It also has several sinuses, of which the longitudinal, lateral, and inferior longitudinal, are the principal. Upon the external surface of the dura mater, there are several little holes, from which emerge fleshy-coloured papillæ, and which, on examining the skull-cap, will be found to have corresponding foveæ. These are the external glandulæ pacchioni, and are in number from ten to fifteen on each side, being chiefly lateral to the longitudinal sinus. The principal artery of the dura mater is named, by way of distinction, the great artery of the dura mater, and is derived from the internal maxillary, a branch of the external carotid.

portions of the skull are actually detached, driven in and completely separated from the surrounding parts, and more particularly if they press on the membranes of the brain, or on the brain itself, these portions are to be removed in the same manner as fragments of other bones are removed in compound fractures; but if a fracture, although comminuted, be not attended with complete looseness and separation of the bone, and they cannot be got out without cutting through some of the soft parts, and through parts than have been injured by the accident, it would then be better to leave them alone altogether; for the bones of the skull, like those of other parts of the body; and it is found that the portions of bones there, although loosened, retain their vitality, reunite to the neighbouring parts, and afterwards become fully consolidated, when, of course their presence tends to diminish the size of the chasm that would otherwise be left.

Injury to the dura mater and brain. From and in cases of fracture of the skull, the dura mater must frequently not only be injured but actually penetrated by the fractured bone, and the surface of the brain more or less extensively wounded. The substance of the brain sometimes experiences very considerable injury in cases of accidents to the head, as in gun-shot wounds, where a bullet penetrates the skull, or where other large bodies penetrate the cranium. There are occasionally not only wounds of the surface of the brain, but actual detachment and considerable loss of its substance. This is particularly the case in comminuted fracture, and especially so in young subjects; part of the brain passes through the wound, and occasionally considerable portions come out altogether.—*See FUNGUS CEREBRI.*

SYMPTOMS.—The symptoms in these cases are not always so serious as might be expected. In this respect, there is indeed a variety of result. Sometimes a comparatively slight wound of the brain is attended with very serious symptoms, and even fatal consequences—at others, the symptoms are by no means so important. Instances are recorded in which instruments have been pushed into the brain through the orbital plate of the frontal bone, or up through the nose, and the patients have died suddenly. Baron Larrey relates in his work on Military Surgery, the case of

a Russian soldier, who was wounded in one of the battles during the Russian campaign, and from the anterior part of whose head he extracted a bullet that weighed seven French ounces, and had been there a good many days. The patient recovered, and all symptoms, both those immediately after the accident and those subsequent to it, were far less serious than might have been expected.

TREATMENT.—The treatment of a case in which either the dura mater or the surface of the brain is exposed or wounded, consists in carefully cleansing the wound, removing all extraneous matters, approximating the edges, gently closing it, and then instituting very rigidly the antiphlogistic plan of treatment.—Take blood from the arm, and locally by means of leeches, exhibit active aperients, following them by salines and antimonials, diet, &c.—*See* TREPHINING. HEAD, INJURIES OF, &c.

OBS.—Fractures of the skull are divided into the simple, those in which the bones are merely separated or divided; fractures with depression, or those where there is a beating in of one or of both sides; the crack, or capillary fissure of the skull; fractures of the basis of the skull, by counter-coups, or otherwise; the starred fracture, &c. Fracture of the skull may be accompanied with various injuries to the part contained within the cavity, or it may consist simply of the mechanical injury done to the bone. It is important to bear this in mind, because, if in any particular injury it is perceived that the skull is broken, it is immediately to be inferred that all the symptoms present arise from the fracture.—*See* COMPRESSION, CONCUSSION, &c.

FUNGUS.

A surgical term which means proud flesh, by which any luxuriant formation of flesh on an ulcer is expressed. It is applied also to a disease of the structure of a part which enlarges, is soft and excrescential. Granulations are frequently called fungous when they are too high, large, flabby, and unhealthy.

FUNGUS CEREBRI.—*Hernia cerebri. Encephatocèle.*—A humour which every now and then rises from the brain, through an ulcerated opening in the dura mater, and protrudes through

ration in the cranium, made by the previous application of crephine, &c. It is also congenital, occurring, however, in every different forms—in one it is covered with the scalp; in other, the corresponding integuments of the head, and sometimes even the dura mater, is deficient.

TREATMENT.—The treatment of congenital hernia cerebri, arising from the incomplete ossification of the skull, and is covered by the scalp, consists in the application of constant, yet moderate pressure; which reduces the size of the tumour, and accomplishes a perfect cure as soon as the ossification is complete. Of the good effects of this mode of treatment, a case is communicated to the Royal Academy of Surgery in France, by M. Alleneuve, who placed a piece of thin sheet lead, properly padded with soft linen, under the child's cap, to which it was adjusted in a suitable situation, and the degree of pressure was augmented or diminished as circumstances required, by tightening or loosening the cap.—*Mem. de l'Acad. de Chirurgie*, p. 103.

Edit. 12mo.

—It is confirmed by experience, that hernia cerebri, when of moderate size, may be cured by the preceding method—the aperture, through which the brain protruded, becoming gradually obliterated.

But large tumours of this description, particularly when situated about the occiput, scarcely admit of any means of relief, but require the application of some contrivance to guard them against external injury. Particular caution is also requisite in ascertaining the nature of tumours about the back of the head, before their removal is attempted. When the ossification of sutures does not take place until a late period, the cerebellum, as well as the cerebral hemispheres, are liable to protrusion.

Another kind of congenital hernia of the brain, is that in which not only large portions of the cranium, but also more or less of the integuments of the head, are deficient—and is, in fact, to be regarded as a malformation, than a disease. In most cases of this kind the infants are still-born. In these cases the brain sometimes protrudes through the inferior and posterior fontanelle, so that the child is born with the appearance of a bag, on the back of its head, hanging down over the hind

part of the neck.—See *Richerand's Nosographie Chirurgicale*, 2. p. 316. *Edit.* 4.

That species of hernia cerebri which sometimes arises after removal of a portion of the skull by the trephine, or the destruction of part of the same viscus, is the most interesting to the practitioner, various examples of which are recorded in the memoirs of the French Academy of Surgery; and although these cases have attracted considerable notice, modern surgeons are, nevertheless, far from entertaining settled notions concerning the exact nature of the tumour; some being of opinion that an organized fungus can hardly be produced so rapidly as these tumours are formed; (See *Abernethy, on Injuries of the Head, in Surgical Works, Vol. II.*) while Mr. C. Bell, (*Operative Surgery, Vol. I.*) says that the swelling is vascular and organised. Dr. J. Thompson likewise differs in opinion with Mr. Abernethy, as to the mode in which herniæ cerebri are formed. See *Report of Observations made in the Military Hospitals in Belgium* p. 57. &c.

TREATMENT.—When the bad symptoms have disappeared, the tumour being no longer confined by the dura mater, some surgeons consider it best to interfere as little as possible, and let the tumour drop off in pieces. The mildest dressings are to be employed; but whether the tumour should be opposed by pressure appears not yet to be decided. When it acquires a very large size, it may be pared off with a knife, as has been done in several instances with success. (*Cases in Surgery, 8vo. Ed. 1772.*) And Richerand affirms that when the brain is exposed by the consequence of an injury of the head, the encephalocèle should be cut down with a knife, and repressed with gentle compression. Sir A. Cooper is also an advocate for pressure made with adhesive plaister; and a compress of lint wet with lime water: the object being to reduce the swelling to a level with the bone, when the scalp will heal over it. Though Mr. Stanley, of St. Bartholomew's Hospital, judiciously observes, that when the brain protrudes through the dura mater, the idea of pressure effecting its reduction is quite untenable. (*Med. Chirurg. Trans. Vol. VIII. p. 36.*) Baron Larrey (*Mem. de Chir. Milit. T. 4. p. 206.*) regards the treatment by excisions, pressures, and spirituous applications

is and dangerous, and he merely advises a pledget of slightly chlorated oil of camomile to be applied to the swelling; to recourse to cooling aperient drinks—to remove all sources of irritation; to exclude the air; and apply the dressings with great care.

FUNGUS HÆMATODES. (*Malignant Fungus. Bleeding Cancer. Spongoid Inflammation. Soft Cancer. Carcinome Sarcinifera. Medullary Sarcoma*). A disease that soon proves fatal unless an operation be early performed, and even then the chance of success is extremely doubtful; for experience proves that it is a disease of a local nature, but almost invariably extends to a variety of organs and structures at the same time, either to the brain, the liver, testicle, mammæ, lungs, &c. No age is exempt from this complaint, but it more frequently attacks young; and a large proportion of cases occur before twelve years of age.

Late Mr. Hey, of Leeds, has given a variety of cases of this disease; and probably was the first to designate it by its present name.

Mr. J. Burns, to whom the public are indebted for the best account of it, has called it spongoid inflammation, from the spongy elastic feel which peculiarly characterises it, and which continues even after ulceration takes place. Mr. J. Wadrop, Mr. Astaff, and others, have also made the profession still better acquainted with it.

In a large proportion of the patients afflicted with Fungus hæmatodes, the general disorder of the system is indicated by a sallow unhealthy aspect; a sallow greenish yellow colour of the face which is frequently covered with clammy perspiration; constant troublesome cough; difficulty of breathing, &c.

The disease frequently affects the globe of the eye (*See EYE, Fungus HÆMATOD. of*); causing an enlargement of it, with the destruction of its internal organization. If the eye is not extirpated the sclerotes bursts at last; a bloody sanious matter is discharged, and the patient sinks under the complaint. When the disease occupies merely the adipose or cellular membrane, or upon the surface of the muscles, the tumour is not usually

painful in its beginning; nor does it impede the motion of the muscle on which it is seated. But when deeply seated in the limbs, it causes pain and weakness of the part affected. The fungus, as it increases in bulk, does not render the integument uniformly thin, as in the case of an abscess. In one part of the tumour, when pressed with the hand, will afford the sensation of a deep-seated fluid; while, in another part, it feels hard and even. In an advanced stage of the disease, the integuments and the fascia of the muscles (if the fungus be situated beneath them) are burst open; and the fungus, which rises above the aperture, sometimes appears black, like a mass of coagulated blood. At other times the appearance more resembles an excoriation. In this process the integuments do not become uniformly thin, and assume a red colour, as when purulent matter is making its way; but continue to feel as thick as usual round the fungus that has passed through them.—*See Hey's Surgery.*

“The fungus,” says Mr. Hey, “is an organized mass, and bleeds whenever it is broken. When the parts containing the fungus are divided, they are found to be in a morbid state. The adipose membrane forms a great number of pouches, filled with the fungus; upon the removal of which the pouches bleed profusely from every part of their internal surface. Whenever the fungus comes in contact with the muscles, they lose their natural redness and become brown. They also lose their fibrous appearance; and cannot in every part be distinguished from the adipose membrane, though a distinction is in general evident.—*Vide Citat.*”

OBS.—According to Mr. Hey, the growth of the fungus can always be repressed by astringent escharotics. Neither hydrargyrum nitratus ruber, the muriate of quicksilver, the muriate of antimony, nor the undiluted vitriolic acid, have been found sufficient for this purpose.—*See EYE AND TESTES, FUNGUS HÆMOTODES OF.*

SYMPTOMS.—In the extremities, fungus hæmatodes sets in with a small colourless, soft, and elastic tumour, if there be no covering over it, such as a fascia, but otherwise it is tense; at first it is free from pain, but, by degrees, a severe acute pain darts occasion-

gh it, more and more frequently, till at length it becomes incessant. It remains smooth and even for a considerable time, but it afterwards projects irregularly at one or more points; and the skin in these places assumes a livid red colour and becomes thinner. In this condition it readily yields to pressure, but immediately resumes its original form. In these projections small openings now form, through which is discharged a thin sanguineous coloured fluid. Very soon after these tumours are formed they burst, and a small fungus projects like a papilla, which increases rapidly both in height and breadth, and takes on the exact appearance of a carcinomatous tumour, which frequently bleeds to a very profuse degree. The discharge is then exceedingly foetid, and the pain is of the lancinating kind. A little way round the ulcers, the integuments become red and tender. When ulceration has once taken place, the tumour in the vicinity swells, and assumes the precise spongy quality of the original tumour. Should the patient still survive the disease in its present advanced stage, tumours of the same description form on other parts of the body, and the patient dies.

TREATMENT.—Little can be offered on this subject, since no remedy is hitherto known, or external application that has any effect over the disease. Friction with anodyne balsams sometimes afford relief in the early stages, though it does not retard the progress of the disease. The only chance, indeed, of cure, lies in early excising the whole of the diseased parts, removing not only the soft brain-like, fungous matter, but every part of the cysts, sacs, or pouches, in which it may be confined. The attempts to cure the disease by cutting it out, have been attended with such invariable ill success, that this practice has been abandoned by some surgeons, who, in preference, and with somewhat better prospects, have resorted to amputation.—See *Practical Observations on Surgery*.

DIFFERENCE.—In its early stage, fungus Hæmatodes is generally attended with less acute pain than what is experienced in cases of cancer. The tumour also has a less definite boundary than cancer, and it is more difficult to say where the diseased structure terminates, and where the healthy commences. When the

disease is in the breast, there is less tendency, than in scirrhus cases, to disease in the axillary glands, which may remain healthy, though the disorder in the breast may have advanced to suppuration and ulceration. In the breast the disease is also much quicker in progress than scirrhus. (*Sir A. Cooper.*) Also in cases of excruciating carcinoma the viscera are not in general affected at the same time with cancerous diseases; but in the greater number of fatal cases, the disorder will be found to have extended in the subject to a variety of places. A scirrhus tumour also from its commencement is hard, firm, and incompressible, and is composed of two substances, namely, one hard and fibrous, the other soft and spongy. The scirrhus tumour is situated in a gland, and does not admit of being separated from the latter part, so that the two substances are blended. When ulceration occurs, the fungoid tumour is not diminished by this process, as in scirrhus, but a fungus is emitted, and the whole swelling grows with increased rapidity.—*See Observations on Fungus Hæmatodes, or Cancer, by James Wardrop. 8vo. Edinb. 1809, &c. &c.*

GANGLION.*

An encysted elastic tumour, formed in the sheath of a tendon, and containing a fluid like the white of an egg. It most frequently occurs on the back of the hand or foot, commonly without pain, without causing any alteration in the colour of the skin. They seldom attain a large size; though, if they do not disappear of themselves, or are not cured while recent by surgical treatment, they occasionally become so large as to cause considerable inconvenience, by obstructing the motion of the part, and rendering it painful.

CAUSES.—They frequently occur without any accident. They are often occasioned by bruises and violent sprains.

TREATMENT.—Discutient applications, compression, fire,

* Anatomically, a ganglion is a term applied to a natural knot-like enlargement in the course of a nerve. There are, for instance, in the abdomen the semi-lunar and solar ganglia.

the thumb; continual pressure on ganglions by means of lead, bound upon the part with a bandage; frictions with oil of origanum, or camphorated mercurial ointment, provided treatment do not cause the ganglion to inflame, an event ought to be studiously avoided, since, when irritated too long, ganglions have been converted into fungous diseases of the malignant kind.

When a ganglion inflames, which is frequently the case, the grows out a fungus of a very malignant nature. The practice, in this instance, ought not to make an opening into the ganglion, or, in fine, do any thing that is likely to cause the parts to separate or slough. "Ganglions may be cured by sufficient pressure," says Sir A. Cooper, "to rupture the cyst, and some have recommended placing the hand affected upon a hard surface and then striking the ganglion several times with the fist or mallet." By compression strongly with the thumb, with or without a piece of money, the cyst of a fresh ganglion may burst; and effuses into the adjoining cellular texture; after which, if the pressure being continued, the opposite sides of the cavity unite by adhesive inflammation, and the return of the disease is prevented.

Ganglions below the knee have been cured by means of blister, &c. When, however, they resist all attempts at palliation, and are a source of pain and inconvenience to the patient, they should be carefully dissected by means of a longitudinal incision in the skin covering them, separating it, and cutting every particle of it off the subjacent tendon or fascium. Care must be taken not to make any opening in the cyst, but to let out its contents, and make it collapse. The skin is then to be brought together with adhesive plaister, and a dressing placed over the situation of the tumour, with a view to close the wound, and obliterate the cavity by adhesion.

GANGRENE.

DEFINITION.—Gangrene may be considered as a partial death of one part of the body, while the other parts are healthy. *Sir A. Cooper.*

CAUSE.—Excessive inflammation of a part or parts. Inflam-

mation, when it is extremely active, occasions a destruction of vital power. At other times, when there is a less degree of inflammatory action, but when the powers of the part are exhausted, the life of the part will also be destroyed ; so that gangrene is produced either by an excess of inflammatory action, where the powers are natural, or by a less degree of inflammatory action where the powers of the part are feeble. It is frequently the effect also of a debilitated constitution.

SYMPTOMS.—The symptoms of gangrene differ according to the manner in which it is produced. When gangrene is the result of high and active inflammation, the pain attending its production is exceedingly severe ; the inflammation is very extensive, there is generally a blush to a considerable extent ; and for the most part, though not always, a considerable degree of swelling. The secretions from any sore which may exist ceases, for the part no longer perspires. The surface of the skin becomes of a dark colour ; it is said to become purple, but it is rather of a brownish tinge. The cuticle is raised ; a vesication is produced, and when this breaks it is found to contain a bloody serum. When the serum is discharged, the skin assumes a gangrenous appearance and becomes perfectly insensible. The vesication extends to parts beyond the ulceration ; the constitution suffers considerable derangement ; there is a high degree of irritative fever ; the pulse is often exceedingly quick, very small and weak, generally irregular, and sometimes intermittent. Gangrene seldom takes place without delirium, and also is attended with vomiting and hiccough. Hiccough, indeed, is the characteristic sign of gangrene taking place, though the affected part may be situated at a distance from the stomach. “When gangrene arises from a diseased state of the constitution, the stomach is extremely deranged, and this derangement of the stomach is followed by a spasmodic contraction of the diaphragm producing hiccough. This symptom, therefore, does not arise from any alteration in the action of the diaphragm, but from its sympathy with the diseased state of the stomach.”—*Sir. A. Cooper.*

These are the symptoms when gangrene is the result of a violent inflammatory action. But gangrene is sometimes the effect of a low

inflammation, as when it is produced by the application of cold. Care must be taken in these cases not to apply heat very early; even the common heat of the bed frequently occasions inflammation in such cases, which is extremely liable to proceed to gangrene, in consequence of the diminished nervous influence of the part. In this climate it generally happens that inflammation succeeds the application of cold, after an interval of two or three days. By the use of some slight means of treatment, this inflammation is generally suspended; and it is by the repetition of inflammation, rather than its severity, that the powers of the system become at last exhausted. In colder climates than our own, the part exposed to cold becomes white, and the suspended circulation is commonly restored by rubbing the part with snow. If, however, it be not very carefully treated, inflammation and sloughing are apt to follow. If a part be completely frozen, inflammation instantly ensues in a short time, and after continuing for a few days is followed by a destruction of the vital power. These are the symptoms observed in cases where gangrene is the result of a high degree of inflammation, or of diminished power. If gangrene is produced by either of these causes, the process of mortification soon commences.—*See* MORTIFICATION.

TREATMENT.—In the treatment of gangrene the first indication is to attempt to soothe the parts by the application of leeches, in order to check the excessive action. It generally happens in cases of gangrene that the body will not bear any considerable degree of depletion; but local depletion by means of leeches may be resorted to. Thus, in compound fracture of the leg, for example, gangrene may be prevented by the application of leeches, when it would not be equally safe to take blood from the system. In large towns it is seldom safe to take away blood from the system of patients to prevent gangrene; though, in the country, a different practice may be observed. Soothing fomentations and blisters should also be adopted, to diminish the excessive action which threatens the life of the part. To prevent gangrene, it is found necessary to bleed, not more than eight or ten ounces to be taken away, lest the vigour of the circulation, and consequently the nervous power of the constitution, should

be too much diminished. The secretions of the intestinal and liver ought to be restored by means of two or three grains calomel at bed-time; the system tranquillized, and the irritability which leads to the destruction of the life of the parts, diminished by means of opium.

Should the gangrene have been the result of cold, the treatment must be different to the preceding. In these cases the action of the part is feeble from the diminution of nervous power and it will be proper to restore it to a healthy state by stimulus of the most gentle kind. The best application therefore, for this purpose, is the camphorated spirit of wine, with gentle friction. When the first effects of cold are removed, it will be proper to apply cold poultices to the part. When parts are frost-bitten in colder climates, the common practice is to restore the circulation by rubbing them with snow. When gangrene, however, has commenced, some gentle stimulus must be applied to the part. A poultice of stale beer-grounds, mixed with linseed meal, to prevent the gangrene from spreading to the surrounding skin. Divergent fomentations are also used for the same purpose. During this local treatment, the constitution, which is debilitated by excessive action, must be supported. This is best effected by the exhibition of opium and ammonia. "From seven to ten grains of carbonate of ammonia, with twenty drops, or half a drachm of tincture of opium, two or three times a-day, or even more frequently, or once every four hours."—(*Sir A. Cooper.*) An excellent medicine of the same kind, consisting of a bolus of five grains of the carbonate of ammonia, with ten grains of musk every four hours, is used in Guy's Hospital, where it has been known to produce the best effects in sloughing sores. Bark was formerly extolled, though little or no reliance is now placed upon it; a similar result, in all probability, may be obtained from quinine. The port wine poultice is an admirable application in gangrene and sloughing sores; also spirit of turpentine in the same cases, for the purpose of stimulating the parts.—*See MORBID ACTION.*

GLAND.

DEFIN.—Anatomically, a gland is an organ composed of blood-vessels, nerves, and absorbents, and destined for the secretion or excretion of some particular fluid. A gland is differently designed, and is either

Follicula, or a follicle; namely, a small bag appended to the extremity of a duct, in which the secretion is made, and from which it is evacuated by the duct.

Lacuna, or a little sac opening into the passage, and into which, generally, mucus is secreted, and is discharged when matter moves along the passage, as in the urethra.

Crypta, which is a soft body, consisting of vessels not completely surrounded with a membrane. The large intestines and lungs furnish examples of this apparatus for secretion.

Acinus, a round body, not regularly invested with a membrane.

The liver is principally composed of acini.

The glands of the human body are anatomically divided into two principal classes, either according to their structure, or the fluid they contain. As regards their fabric, they are divided into three classes:

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| 1. Simple. | 3. Conglobate. |
| 2. Compound. | 4. Conglomerate. |

According to their fluid contents, they are more properly divided into

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| Mucous. | Salival. |
| Sebaceous. | Lachrymal. |
| Lymphatic. | |

Simple glands.—These are small hollow follicles, covered by a peculiar membrane, and having a proper excretory duct, through which they evacuate the fluid contained in their cavity. The mucus glands of the nose, tongue, fauces, trachea, lungs, intestines and urinary bladder, the sebaceous glands of the skin, the anus, and those of the ear.

—These simple glands are either dispersed, or are connected to each other, forming a heap, so that they are not covered

by a common membrane, but each hath its own excretory duct which is never joined to the excretory duct of another gland. The former are termed solitary simple glands, the latter aggregate or congregate simple glands.

2. *Compound glands*.—These consist of many simple glands, the excretory ducts of which are joined in one common excretory duct—as the sebaceous glands of the face, lips, palate, and various parts of the skin, especially about the pubes.

3. *Conglobate Glands*.—These are also called lymphatic glands, and are those into which lymphatic glands enter, and from which they go out again—as the mesenteric, the lumbar, &c. They have no excretory duct, but are composed of a texture of lymphatic vessels cemented together by cellular membranes: they are the largest in the foetus.

4. *Conglomerate Glands*.—Composed of a congeries of many simple glands, the excretory ducts of which open into one common trunk—as the parotid gland, thyroid gland, pancreas, and the salivary glands. Conglomerate glands differ but little from compound, yet they are composed of more simple glands than compound.

OBS. The excretory duct of a gland is the duct through which the fluid of the gland is excreted. The vessels and nerves of glands always come from the neighbouring parts, and the arteries appear to possess a high degree of irritability. The use of compound glands, as already observed, is to separate a particular liquor, and to change it. The use of the conglobate glands is unknown.

GLAND, PROSTATE.

A very large, cordiform, firm, gland, situated behind the neck of the urinary bladder, and the bulbous part of the urethra. It secretes the lacteal fluid, which is emitted into the urethra by four or twelve ducts, that open near the verumontanum during coitus.

The prostate gland is very liable to inflammation, sciatica, cancer, and on the authority of Desault, Hunter, and Dr. Baillie, it is subject to scrofula. The most frequent disease, however, of the prostate, consequently that which most interests the surgical surgeon, is a slow hardening and enlargement of it, some-

minated scirrhus, whereby its natural size, which is that of a non chestnut, is sometimes gradually changed to that of a fist. (*Petit.*) The observations of Desault, Hunter, and Everard Home, describe swelling of the gland to be most common towards the decline of life.

ACUTE INFLAMMATION OF THE PROSTATE GLAND.—This complaint is not confined, like the chronic enlargement, to late years of life, but attacks persons of any age, and generally terminates in suppuration.

SYMPTOMS.—The most prominent symptom which characterizes this complaint, is violent pain immediately after discharge of urine, and in this respect the disease resembles stone. As the inflammation advances, an abscess in the prostate produces retention of urine; which may be relieved by a common catheter, passed about the fourth day, when matter will be perceived to escape through it, when the patient will be greatly relieved, generally speaking, the disease is not so clearly manifested by the symptoms as to satisfy the mind of its true nature, until the matter escapes by the catheter: this, coupled with the other appearances, stamp its true character. Rigors do not attend the formation of this matter.

MEDICAL TREATMENT.—This consists in taking blood from the arm and administering mild laxatives, with antimonial medicines.

CHRONIC INFLAMMATION.—Chronic inflammation of the prostate gland is the consequence of age and not of disease. When the affection produces partial retention of urine, it should be considered as a salutary process, for it prevents incontinence of urine, which in old people, would almost constantly take place, were it not for this preventive. It certainly makes the urine pass more than natural; but this inconvenience may be excused, when it is the means of preventing a continual wetting of the clothes.

SYMPTOMS.—The first circumstance by which it is known that a person has chronic enlargement of the prostate gland, is the length of time he requires for the purpose of voiding his urine; the next that the urine has a particularly powerful smell, from its being ammoniated, in consequence of some urine remaining in the bladder after each discharge. Remember, there-

fore that in this complaint the whole of the water, each time attempted to be expelled, does not pass away. The next symptoms observable, are pain and numbness in the glans penis, the prepuce not possessing its usual sensibility; sense of weight and uneasiness in the perinæum, relieved by pressure with the finger; pain in the back of one or both thighs, in the loins, and at the origin of the sciatic nerve, and course of the ureters; the testes are flattened, the reason of which is, that pressure has been exerted upon the rectum by the swollen gland. Persons having enlarged prostate for any length of time, generally have likewise prostatic hæmorrhagiæ, and hemorrhoids; when the enlargement of the gland is considerable, the patient will kneel, resting upon his hands, with his knees widely distended, and thus continue for a tedious time, passing only a few drops of urine, after the most persevering efforts, and with the most excruciating pain. Besides what is already stated, the ammoniacal smell of the urine, as the disease advances, becomes highly offensive, and at length the urine becomes white or milky; this appearance shows that the inflammation has extended to the mucous membrane of the bladder.

DIAG.—If the urine be much retained, it has the appearance of coffee, occasioned by an admixture of blood with it; which has led many practitioners to suppose, for the moment, that the cause was one of stone; but, on questioning the patient all doubts on that point will be satisfactorily removed. If he be desired to stand and jump firmly on the floor, he will do so; if you ask him whether he can ride over a rough road without much pain, he will tell you that he can; such doings and replies as these you would not obtain from a patient having stone.

At length the enlargement of the prostate, in many cases, proceeds until it occasions complete retention of urine; this, however, may be the effect of retaining more urine in the bladder for a longer period, than it ought; or it may have been the result of checked perspiration, either from cold weather, or from having imprudently laid aside some flannel covering; when the retention has been brought about by either of these latter-mentioned causes, in conjunction with an enlarged prostate, exciting on such occasions a copious perspiration will often afford relief. When

ter is introduced into the bladder of a patient having chronic enlargement of the prostate, you will find the urine of a very colour, and of an exceedingly offensive smell. Such are the symptoms which accompany this kind of enlargement of the prostate; at least, they are such as I witness.

POST MORTEM EXAMINATION.—Upon dissection of those who died of this disease (and, without dissection, nothing at all of the matter is known), the prostate is found enlarged somewhat laterally, but most frequently the enlargement is in the posterior part, situated in the middle, or third lobe. Well, as the prostate enlarges, it is pushed forward; in consequence of which the urethra becomes curved immediately before the apex of the prostate; indeed, the coming forward of the prostate causes the urethra almost to double upon itself; the curve thus formed, is at the symphysis pubis; and it is in this situation that the difficulty of passing the catheter in diseased prostate is found. Tracing the course of the urethra, behind the curved part, that is seen much enlarged; the next thing we notice is, that the urethra itself is considerably elongated, that is, from an inch and a half to two inches; which increase of length is behind the pubes, and is owing to this circumstance that you are under the necessity of carrying on the catheter so great a distance after its point has passed the arch of the pubes. Then, as to the prostate itself, and that it may increase to a most enormous size laterally, thus giving rise to retention of urine. But that enlargement occurs posteriorly in the third lobe * frequently occasions retention of urine, for the enlargement is situated immediately behind the orifice of the urethra; thus the urine collects behind the swelling, presses it upon the mouth of the urethra, and forms a complete barrier to its passage. It is of great importance to understand this; indeed, a correct knowledge of the morbid

John Hunter first pointed out a fact which ought never to be forgotten by a practical surgeon—namely, that the swelling of what is now called the middle lobe of the prostate gland, often raises the sound over a small stone in the bladder, and prevents it from being felt.—See *Treatise on the Venereal Disease*, p. 170.

anatomy of the parts is altogether of consequence, because, if information were wanting there would be the greatest difficulty in passing the catheter; whereas, if this knowledge be possessed there will be no difficulty at all, and the urine may be drawn with the greatest facility. It was owing to the imperfect knowledge of the anatomy of these parts that retention of urine formerly proved so often fatal, which occurrence is now very rare; the reason is, that within the last forty years frequent dissections have caused these diseases to be well understood, and an improved mode of treatment has been the result.

Although the enlargement of the middle lobe of the prostate will give rise to retention of urine, by plugging up the orifice of the urethra, yet the lateral enlargement, although of great magnitude, does not produce any such effect. Behind the prostate are frequently found sacs formed in the coats of the bladder. These sacs are produced in the following manner:—the muscular fibres of the bladder give way, and between these fibres the mucous membrane protrudes; thus, in reality the sacs are elongations of the mucous membrane. We also find the bladder much enlarged in this disease; as also the ureters and the pelvis of the kidneys.

Q. How, then, when diseased prostate exists, is it to be known, and what are the diagnostic signs?

A. The enlargement laterally may be readily ascertained by introducing the finger into the rectum; but the enlargement of the middle lobe cannot be so learnt.

Q. In what way, then?

A. By the introduction of a catheter or bougie, and the latter is the best; it will be found to stop suddenly: a catheter is then to be introduced, for the purpose of drawing off the water; the instrument will be resisted in its common course; and the handle must be depressed a good deal, with a view of tilting its end over the enlarged gland; thus the end of the instrument will be rising perpendicularly, as it were, behind the pubes. These are the means you are to employ to obtain a correct diagnosis.

With regard to the cause of retention of urine, in those cases of enlargement of the prostate, where the disease exists in the middle lobe, it generally arises from the urine having been allowed to

in the bladder for too long a period, thus collecting in so much a quantity that the swollen lobe is pressed forward against the mouth of the urethra, and thus closes the entrance to that passage.

The causes of enlargement of the prostate, is often the state of libidinous age; old people frequently feel a greater degree of excitement than the constitution is capable of supporting, and this is the consequence; powerful excitement is by no means suitable for aged individuals.

TREATMENT OF ENLARGED PROSTATE.—Very little can be effected here by medicine; it is a disease over which medicines exert but very slight influence; the oxymuriate of mercury, however, in very small quantities, may be given. This is the treatment only for the enlargement of the gland. But when retention of urine takes place, what plan of treatment are you to adopt?

When no urine whatever can be passed, and when there is great pain at the neck of the bladder? Why, blood must be drawn from the arm, leeches applied to the perinæum, purgatives administered, and the patient put into a warm bath.

If these means should succeed in procuring relief, the best medicine that can afterwards be given for the purpose of preventing the return of the retention, and at the same time of lessening the inconvenience which sometimes attends the complaint, is a mixture of fifteen drops of the liquor potassæ, five drops of opoponax, and an ounce and a half of mist. camphor. If you add fifteen or twenty drops of the balsam, it then produces a stimulating effect, and does harm; administer it in the quantity mentioned, in conjunction with the other medicines, to which is added 3ij. Mucilag. Gu. Acac. Other medicines, as the carbonates of soda and magnesia, the liquor potassæ, and opium, are occasionally given; but, as the latter produces costiveness, it is decidedly improper. The first medicine described will be found sufficient. It will afford considerable relief, which is all that can be expected, for we must not dream of making a cure.—*Sir A. Cooper.* When called upon to relieve retention of urine, from enlarged prostate, by the introduction of a catheter, the instrument should be between seven inches in length, and a quarter of an inch in diameter. In consequence of the pressure within, a broad instrument will

answer better than a narrow one, for being bulbous at the end it will readily ride over the enlargement. When introducing the catheter, you will meet with no difficulty until you reach the curve which the enlargement of the gland has produced in the urethra; the handle of the instrument is to be here slightly raised, for the purpose of insinuating the point through the curved part. Having passed this, you are then to depress the handle completely between the thighs, so as to occasion the point of the instrument immediately to rise perpendicularly above the pubes. There is no other difficulty of introducing the catheter in this disease than is experienced under ordinary circumstances.

In puncturing the bladder for enlarged prostate, if such an operation be indispensable, it must be done above the pubes.

In the treatment of diseased prostate, an elastic gum catheter is sometimes introduced into the bladder, and kept there: in passing an elastic gum catheter, the removal of the stilette will sometimes cause it to enter with ease, when it would not previously pass at all. If it be deemed requisite to leave the catheter in the bladder, Sir A. Cooper prefers one of pewter rather than of elastic, for it can be curved down before the scrotum, and, by plugging up the end, the patient may move about as he likes, and, at any time he wishes, can expel his urine. Thus the instrument becomes productive of great comfort. If a pewter catheter be employed, it should be quite new, and ought not to be worn for a longer period than a fortnight, for the urine acts upon the metal, and renders it brittle, and may probably cause the instrument to break if the time be extended beyond this period*.

Enlarged prostate occasionally occurs in young persons.

* Mr. Hey has particularly pointed out one advantage in swellings of the prostate gland, which belongs to elastic catheters,—namely, that their curvature may be increased while they are in the urethra. In a case where the prostate was much enlarged, and finding some obstruction near the neck of the bladder, he withdrew the stilette, in the doing of which, he accidentally pressed the tube, which then entered the bladder. In fine, Mr. Hey experienced that the act of withdrawing the stilette increases the curvature and lifts up the point of the catheter.—See *Pract. Obs. in Surg.* p. 293, &c.

was admitted into Guy's hospital, having symptoms of in consequence of which he was sounded, and the operation ofotomy was about to be performed: the sounding, however, was on inflammation of the bladder, which terminated in the death; upon dissection, it was found that the symptoms for which he had been sounded, were produced by an enlarged prostate.—*See Sir A. Cooper's Lect.*

REMARK.—Persons will apply to a surgeon, for some supposed point in the bladder, and, upon inquiry, they will tell him, they can pass their urine; now, if the disease consists of enlargement of the prostate, some urine will still remain; desire them, therefore, to make water, and then introduce the catheter: if the case be of enlarged prostate, you will be enabled to draw off from the point to a pint of urine, having a strong ammoniacal smell. A patient thus circumstanced, need only be taught how to introduce the catheter for himself, and his danger will be at an end.

According to Sir Everard Home, a stricture may be distinguished from an enlargement of the prostate gland by the following circumstances:—The distance of the obstruction from the external orifice, is to be determined by passing a soft bougie, and to be left in the cancre for a minute, so as to receive an impression from the obstruction. If the bougie does not pass farther than seven inches, and the end is marked by an orifice of pear form (it being immaterial as to the size of the orifice), the disease is evidently a stricture; but if it passes further on, and the end is blunted, a disease in the prostate gland is to be suspected. A flexible gum catheter, with a stilette very much bent, which in most cases of enlargement of the gland, may be introduced into the bladder, is the best instrument for this purpose.

GLAUCOMA.

A disease of the eye in which the vitreous humour becomes of a texture, more dense, and presents a sea-green hue, and contraction of the pupil. It occupies the fundus of the eye, and may be seen by looking at it when you are standing directly before the patient, not by looking at the eye sideways. The dis-

ease has its acute and chronic forms, the latter has not unfrequently been taken for cataract.

TREATMENT.—By moderate antiphlogistic treatment, with gentle administration of mercury, and similar means, a check may be given to the chronic form of glaucoma, though you may not generally succeed in restoring vision. The best that can be done is to prevent the disease from getting beyond the point reached at the time you see the patient, and to preserve the degree of vision which the patient may then possess.

OBS.—Glaucoma may be mistaken for a different disease, as it has a greater resemblance to cataract than any other. It resembles without any change by which it may be distinguished from inflammation of the eye.

GLEET.

DEFIN.—By gleet is commonly understood that stage of gonorrhœa when the discharge ceases to be infectious. There are considerable doubts indeed whether there actually be such a complaint as gleet, according to this definition, “for,” observes A. Cooper, “I cannot help believing that a gonorrhœa never ceases to be infectious.”—*Surg. Lect.* The opinion of John Hunter is, that gleet differed from gonorrhœa in being uninfected, and in the discharge consisting of globular bodies, contained in a slimy mucus instead of serum; also, that a gleet seems to take its rise from the habit of action which the parts have contracted. Mr. J. Hunter likewise entertained a suspicion, that some gleets were connected with scrofula.

SYMPTOMS.—Gonorrhœa, when neglected, sinks into a gleet, and is known by the discharge changing its colour, and the pain attending the inflammatory stage ceasing. Sir Astley Cooper, who has advocated, and has adduced some palpable proofs, against the supposed non-infectious nature of gleet, holds that a medical man is warranted in saying, that a discharge of a gleety kind is not infectious. If the discharge is from a stricture it is not infectious; if it be from an abscess in one of the lacunæ, it may be known by its being absent for a week or more, and then returning profusely, but not so in gonorrhœa; the discharge is generally suspended for some time, in an abscess of one of the lacunæ.

returns, which is not the case in a clap; and the matter laid in an abscess of the lacunæ is not infectious, while the discharge which begins a gonorrhœa, and terminates in a gleet, never loses its power of producing infection. Women of the town, who constantly have a gleet on them, would not perhaps communicate a gonorrhœa to a debauchee; but let a man fresh from the army have intercourse with a woman under such circumstances, he would immediately have a clap.—*Lect. on Surgery, M.S.*

Symptoms.—The discharge from a gleet is generally transparent, afterwards yellow, and if there be much excitement, green. If the excitement be very considerable, the discharge will be tinged with blood. Gleet is rendered purulent and bloody from excesses of the venereal kinds. In this state, if the urethra be examined after the following appearances will be found:—inflammation extending for two or three inches down the urethra; and if the urethra be laid open within four-and-twenty hours, it will be inflamed as far as the seat of gleet, but pale in the other part. If the discharge does not proceed from the vesiculæ seminales, or the prostate gland, or the prostate, but from the lacunæ; consequently “what is said about seminal weakness is nothing but folly and absurdity; there is no truth at all in it. The discharge commonly called gleet, proceeds from the lacunæ of the urethra; for instance, a person has a costive motion, a drop or two of pus, or of a ropy fluid, proceeds from the vesicular seminales; it is quite a different case to that called gleet; both are quite different as to their seat and origin; and from the nature of the discharge itself, it may with certainty be pronounced when it proceeds from the vesiculæ seminales.”—*Lect. Citat.*

Treatment.—The medical treatment of gleet consists in the use of sweet spirits of nitre, and the balsam of copaiba, mixed with mucilage. The following form is laid down by Dr. J. Cooper:

Spirit. Æther. Nitric.	3ij.
Balsam. Copaib.	3j.
Mistur. Camph.	3iv.
Mucilag. G. Acac.	3j.

Mistura cujus Capiat Cochleare Magnum bis vel ter die.

If this should not succeed, Cantharides with the chio tu
tine made into a pill is recommended :—*e. g.*

℞ Lytt. Pulv. gr. $\frac{1}{4}$
 Terebinth. Chi. gr. v.

Fiat Pilula ter die sumend.

When the first fails, the second is the medicine usually
employed by medical men.

The local treatment consists in the use of bougies and
tations; this is the most successful treatment, every other is
rior to it. A bougie should be passed every other day, acco
to the irritability of the patient, using injection at the same
From this plan there will be no risk of stricture, becau
bougie will prevent it. Some persons apply to the urethra
unguentum hydrargyri nitratis; also the unguent, hy
nitric. oxyd. which should be diluted. The best injection
with the oxymuriate of mercury—about a quarter of a gr
three ounces of water, will be quite strong enough to beg
may be increased after a time, from half a grain to an ou
water. If it should not do any good in this latter form, it
not be made any stronger, for it is likely to produce consid
irritation,—in general, however, it is an excellent injection.
sulphates of copper, and cuprum ammoniatum have been r
mended, and each has had its advocates.

The sea bath cures more gleet than the common cold
which is enjoined in the general treatment; and a cur
sometimes be accomplished by an injection of diluted sea-
In every plan of treatment, rest and tranquillity are of the
importance; and after the failure of the usual modes, it i
that riding on horseback will occasionally effect an imm
cure. Sexual intercourse protracts the cures, and freq
brings back the gleet with increased severity of symptoms,
in excess, a circumstance which often leads to the suspicio
fresh infection. Gleet in females are treated in nearly th
manner as in the male subject, with the exception that th
pentines have no specific effect on the vagina; and the astr
injections used may also be made stronger than those in
for the opposite sex. When there is a general constitutio

, the cold bath, sea-bath, bark, steel, and other tonics, may be administered according to the urgency of the case. All violent exercises ought to be avoided, and the diet regulated accordingly.

GONORRHŒA.

ss.—Gleets are often accompanied with a relaxed state of the constitution; and independent of gonorrhœa, they are sometimes the consequence of other affections of the gonorrhœa; for instance, stricture is almost invariably accompanied with a gleet, and is, occasionally, disease of the prostate gland.

GOITRE, *see* BRONCHOCELE.

GONORRHŒA*.

There are two poisons communicated by venereal intercourse; the one poison of gonorrhœa or clap, the subject of the present article, which, falling upon a mucous surface, produces from thence a discharge of infectious matter; the other, the poison of syphilis, when applied to the skin, (*see* SYPHILIS) or, as far as is known, when present, to any surface, produces ulceration and inflammation, forming a sore called chancre; the discharge from which, being absorbed into the absorbent glands, occasions bubo, and, being admitted into the circulation, produces inflammation and ulceration of the throat, on the skin, the periosteum and the bones.

CAUSES.—Inflammation of the lacunæ of the urethra, and particularly the lacunæ magna.

Symptoms of VIRULENT GONORRHŒA.—At certain intervals, a few days having elapsed between the application of the

gonorrhœa was formerly considered to be only a modification of syphilis. This was an opinion which prevailed until Mr. Hunter's time, and it was required by the old surgeons to be necessary to give mercury for its cure. Mercury only aggravates it. "It is," observes Mr. Abernethy, "a mere disease, not followed by any constitutional symptoms. Nay, it is decided a separate disease from the old lues or venereal disease, by act of parliament; for in the days of the good Queen Bess, an act was passed for regulation of certain brothels, which were licensed by the government; and it was 'further enacted, for the benefit of her majesty's loving subjects,' that certain classes of females in these houses should be kept separate from the rest of her majesty's 'loving subjects, should burn their ———.'" *See* also *the*

infection and the occurrence of gonorrhœa, the patient feels a slight degree of heat, with a tingling or uneasy sensation at the orifice of the urethra. The margin of the opening swells, and becomes red, and then very quickly the mucous discharge shows itself. The next circumstances which take place are the following:—the urethra begins to be affected with heat, and he experiences pain in discharging urine; this state is called *catarrh urinæ*. The pain increases till it becomes, in many cases, excessively severe: there is an appearance of threads mixed with the urine, which arises from the adhesive inflammation in the lacunæ of the urethra. The next effect is a considerable diminution of the stream, the swollen state of the urethra contracting the diameter of the canal. The urine is often discharged in two, three, or four streams, in consequence of the contracted and irregular state of the urethra. At first the discharge from the urethra is mucous, but after a little time it assumes a purulent appearance. The matter becomes yellow, and if the inflammation is very considerable, green, and often intermixed with blood, so as to give a sanguinous appearance to the discharge. You are enabled, therefore, from the colour and appearance of the matter, to judge of the degree of inflammation in the urethra. The inflammation is of the erysipelatous kind, but there is no appearance of ulceration. If ulceration were produced, the membrane of the urethra would soon give way. It is merely a secretion from the mouths of the vessels. Ulceration does occasionally take place in the lacunæ, but not in the urethra itself; when the inflammation runs high, it extends down to the bulb of the urethra.

These are the circumstances which occur with respect to the appearance of the matter. It should be observed, that although the appearance of the gonorrhœal discharge is purulent, it is not really the character of common pus. If you examine it by the aid of a magnifying power, it will be found that, though there may be some few globules of pus, the greater part of the discharge is mucus. The time this matter will continue to discharge is indefinite. It is said that gonorrhœa will wear itself out, but it will sooner wear out the patience of the patient. "I have known it," says Sir A. Cooper, "continue for months, and continue

ious during all that time. It sometimes continues for so long
e, notwithstanding all the means which may be employed for
re, as to be an opprobrium to our art. In no case, however,
you to rely on the efforts of nature for its cure; for, in
al, you may very much expedite the cure by adopting a
ous method of treatment."

ides these external effects on the urethra, gonorrhœa takes
an internal course. It does not confine itself, in its external
, to the beginning of the urethra, but often produces an
eclatous inflammation of the glands and frænum, occasioning
nn into the prepuce and phymosis. The absorbent vessels
dorsum penis often become enlarged and hard, and pro-
little abscesses, which go on to suppuration. The glands of
coin are sympathetically affected, and in a first gonorrhœa,
a fail to become enlarged and painful. Where this effect
place from gonorrhœa, several glands of the groin are affected
the same time; whereas, in the absorption of the poison of
s, a single gland only is enlarged on each side. Abscesses
y rarely occasioned by a sympathetic enlargement of the
of the groin from gonorrhœa; they may almost always be
ted by proper attention on the part of the surgeon. "When
the glands of the groin are sympathetically affected, I am
that this is not a strictly proper term for this species of
on, because the swelling undoubtedly arises in consequence
gonorrhœal inflammation running along the course of the
ant glands; it is a continuation of the inflammation along
urse of the absorbent vessels."—*Sir A. Cooper*. With refe-
to the internal course of gonorrhœa, the effusion in the
often proceeds further than the original seat of the inflam-

Swelling and suppuration often take place in the mouth
lacunæ; matter is very commonly accumulated in the
and especially, as already observed, in the lacuna magna,
may be known by a swelling and fluctuation on the sides of
isium. Irritation and inflammation also take place in the
spongiosa, producing that painful state of the parts termed
(see CHORDEE, p. 154.); in which the penis feels as if it
und down, so as to prevent a complete extension. The

penis is sometimes curved, and sometimes turned considerably on one side. The next effect of gonorrhœa is the production of stricture (*see* STRICTURE) which is generally seated near the neck of the urethra, and arises from the diminished diameter of the canal, in consequence of the thickening of the part from inflammation; another effect is an inflammatory state of the muscles of the perineum, accompanied with great irritation, and violent spasmodic contractions.

The inflammation sometimes extends itself to the spot where the vasa deferentia* open at the verumontanum,† producing swelling, which was absurdly called *hernia humoralis*. When it extends to the prostatic part of the urethra, there is great inflammation at the neck of the bladder; the patient is often under the necessity of pressing on the perineum when he makes water soon after inflammation of the testicle begins.

It rarely happens that an old man gets this disease without having bitter reason to repent of his folly. It is generally accompanied with an enlarged state of the prostate gland, and rarely escapes without experiencing the most excruciating sufferings from this cause. The bladder becomes affected, in consequence of the gonorrhœal inflammation; it becomes highly irritable, and the patient experiences a constant inclination to water. Thus gonorrhœa produces various effects, not only external but in its internal course; such as abscesses in the testis, cunæ, stricture, inflammation of the prostate gland, and irritability of the bladder. It is not so simple a disease, therefore, as one might at first be disposed to imagine. "*There is no comparison,*" adds Sir A. Cooper, "*as to the difficulty of getting rid of syphilis and gonorrhœa: syphilis is a disease which a child can generally cure; gonorrhœa is a disease which very often baffles the longest experience, and the greatest professional skill.*"

* The vasa deferentia are ducts which arise from the epididymis, and pass through the inguinal ring, or each side, in the spermatic cords, into the cavity of the pelvis, and terminate in the vesicula seminalis. Their use is to convey the semen secreted in the testicle, and brought to them by the epididymis, into the vesiculæ seminales.

What is the time in which the gonorrhœal symptoms appear after connexion?

"The usual limit is from four to seven days,—it is seldom less than four, and very rarely exceeds seven days. I have known it," says Sir A. Cooper, "however, occur within twenty-four hours after connexion; and sometimes a fortnight or longer will elapse before it appears. I have known an instance in which it was not noticed for fourteen weeks, in consequence, I believe, of the general indisposition of the patient."

TREATMENT.—The treatment of gonorrhœa is founded on two principles; the disease may be either treated simply, by diminishing inflammation, or it may be treated by producing a change in the position of the part, by which the disease is removed in a short time.

It is wholly unnecessary to give mercury in any form of the disease. When a patient applies with a first clap, it seldom happens that he can be cured by the same means which may subsequently be employed in subsequent attacks. The first clap is usually much more difficult to cure than those which subsequently occur.

A. Cooper's plan of treatment.—When the patient applies to the surgeon with his first clap, as there will be generally a great deal of inflammation, Sir Astley advises the sulphate of magnesia with the infusion of senna*. Afterwards the submuriatic hydrargyri, with decoction of colocynth, but merely as a purge; there being no need for giving calomel, unless it be intended to act on the liver, as on the intestinal canal. Having purged the patient freely, he is directed to take diluting drinks, of which he can never take too much. Two drachms of the carbonate of potash, or subcarbonate of soda, should be taken in a quart of some sweet drink in the course of a day; capillaire or tea will answer the purpose very well; some advise the gum of acacia. The decoction of saucis has been found a very excellent diluent in this disease. Soda water is often beneficial, but it must be ascertained

*An ounce of the sulphate of magnesia mixed with six ounces of the infusion of senna, and three table spoonsful given two or three times a day, so as to keep the patient very actively.

whether it produces irritability of the bladder; for, in some sons, it increases instead of diminishing irritability. If it increases very much the inclination to make water, it should be continued; if it does not produce this effect, it is a very cellent diluent.

The penis should be suffered to hang for a considerable time in warm water, which will relieve the inflammation, and produce nearly all the good of a warm bath. When the ardor urinae and pain from chordee is very severe, twenty drops of the liquor potassæ, with from three to five grains of the extract of cornel in the *mistura camphorata*, may be given with considerable advantage. This is the plan to be pursued during the first week. Lint dipped in the *liquor. plumbi subacetatis dilutus* may then be applied to the part. Do not use an injection in the first instance, but pursue this plan during the first ten days. At the end of this time, when the inflammation has in a great degree subsided, you may begin by giving the patient the *balsamum copaibæ*.*

By this plan you will generally succeed in curing a gonorrhœa safely and expeditiously. If, instead of using an injection, you suffer the discharge to run on, week after week, you will be assured to lay the foundation of stricture.

If a patient apply to be cured for a second or third clap, you will not proceed in this way, but give him the *balsamum copaibæ* immediately, which will, in general, put a speedy stop to the discharge. The inflammation of a second clap is comparatively slight, and, in general, it will only be necessary to give the

* "An ounce of the balsam may be mixed with an ounce of the mucilage of acacia, and four ounces of the *mistura camphorata*, and a table-spoonful may be given morning and evening. Having given this mixture for two days, the discharge will be very considerably diminished, and you may then order an injection of the *liquor. plumbi subacetatis dilutus*. This is the mode, gentlemen, of curing which gonorrhœa, as far as I know, is to be cured in the safest and most expeditious manner. In the third week I continue to give the *balsamum copaibæ*; and the best injection which can then be employed, is the *liquor. plumbi subacetatis dilutus*, with the sulphate of zinc."

℞. *Sulphatis zinci*, gr. vj.

Liq. plumbi subacet. diluti, ℥iv.

for a week, and then begin with the injection of the liquor plumbi subacetatis dilutus, and the sulphate of zinc. In a first instance it is better to begin with the liquor plumbi subacetatis dilutus, because this is less irritating, and afterwards use it in combination with the sulphate of zinc. The treatment which is necessary to subdue inflammation in a first clap is, in the first instance, entirely unnecessary in subsequent claps. Various other means are employed in the treatment of gonorrhœa; half a scruple of the sulphate of copper in an ounce of rose water is a useful injection; a solution of the oxymuriate of mercury is a very irritating injection, if of any strength, and should not be resorted to in the first instance. It is used in the proportion of one grain to twelve ounces of distilled water. The use of strong injections should be continually adopted. If they produce much inflammation, they should be suspended; and if, on the other hand, they excite no pain at all their strength may be gradually increased. If the injection does not answer the purpose quickly, you will only be laying the foundation of stricture. It is much better to vary the injection than to persist in using the same one, if it does not speedily put a stop to the discharge. It will often happen that a patient will continue for a length of time under the hands of his surgeon without getting rid of his discharge; under these circumstances, Sir Astley Cooper recommends the immediate adoption of bougies with injections. The use of the former will increase the discharge for a time; but being followed afterwards with the use of an injection of the sulphate of zinc (See INJECTIONS) will readily succeed in effecting a cure. Towards the number of times the patient should inject, three or four times a day will be quite sufficient. The injection should be gradually increased in strength, so as to produce a slight degree of irritation; though it is considered a preferable practice to vary the injection rather than to increase its strength in any degree.

There are other means, as previously observed, of curing gonorrhœa by producing a change in the action of the urethra, for example, by the use of cubebs; the value of which (Sir Astley Cooper observes) may be known by applying to any merchant

acquainted with it; though in all probability it might not be advisable to employ this remedy at once for a first gonorrhœa where the symptoms of inflammation run very high in young irritable persons; delaying its use until the expiration of a day or ten days, by which time the inflammation may be considerably abated. "It (*cubebs**) appears," says Sir Astley Cooper, extols it in the most unqualified terms, "to produce a specific inflammation of its own on the urethra, which has the effect of superseding the gonorrhœal inflammation. They who have used *cubebs*, and do not acknowledge its value, as a remedy for gonorrhœa, cannot have made any accurate observations on the subject. It is a remedy of a most admirable and useful kind, and may be given with advantage even in the inflammatory stages of gonorrhœa, provided the inflammation does not run excessively. It is a most useful remedy also for the cure of gleet, as it is of use where gonorrhœa has continued for a length of time. In the early stages of gonorrhœa, when the inflammation is just beginning, it often succeeds in removing the disease in a very short space of time; and the greatest advantage may be derived from combining its use with that of the balsam of copaiba, in the following manner:—

" Take	Balsam of copaiba	℥j.
	Mucilag. G. acacia	℥j.
	Cubebs.....	℥ij.
	Camphor mixture.....	℥iv.

" MIX.—This will make an admirable mixture when the balsam of copaiba alone is beginning to lose its effect."—*Surgical Lect.*

* " This Indian spice, a native of Java, formerly held a place in our *Pharmacia Medica*; but from its being inferior in pungency and aromatic value to pepper, it fell into disuse. It has, however been lately introduced into surgical practice for the cure of gonorrhœa, in which complaint it is pronounced to be a specific, if taken in the early stages."—See *New London Medical and Posolog. P. Book*, p. 151. " A short time ago it was introduced into this country in very small quantities; but now, such is its acknowledged efficacy, that whole ship loads of it are annually brought into the port of London."—*Sir A. Cooper's Lect. MS.*

clubebs given at the commencement of the complaint will frequently bring it to an end in a few days; and in other when it will not arrest the discharge it will ease the pain. For this purpose not less than two drachms of the pepper should be taken three or four times a day. The longer the complaint is delayed before the remedy is used, the less likely are you to stop it by the employment of the pepper."—*Lawrence's*

Abernethy's plan of treating gonorrhœa is as follows:—"When I meet with a case," says Mr. Abernethy, "of gonorrhœa, I direct the parts to be sponged with a little tepid water, and to apply a warm sponge to the perineum; or to use a hot-bath, to draw away all the secretions from the part, and not allow any inflammation to take place which might become a source of irritation. The prepuce, or foreskin, should also be drawn forwards, to protect the mouth of the urethra from the irritation of a foreign body. The patient should rest a few days, adopt a diet, and take a little gentle aperient medicine, not such as to irritate and disturb the bowels; for if he did the complaint would be made rather worse than better. He should drink plentifully of some mild tepid drinks, as toast and water; or some mucilaginous drink, as linseed tea, and the like. By doing so, the urine becomes very much diluted, does not prove so irritating to the sensitive surface of the urethra, over which it must pass, and consequently the scalding will be very much lessened.

As to the running, when you have removed the inflammation from the *digestive organs* right, it will cure of itself. But some persons are very anxious to have the running stopt, though it is not what I would advise; it is the relief of the disease, and that is its cure. I am satisfied that many serious diseases are cured by the methods used, from an undue anxiety to stop the running.

Injectsions, bougies, and so on, often prove sources of great mischief, therefore it is paying for the removal of the disease at too dear a rate. I should rather advise the attention to be directed to the occasional use of some mild aperient medicine, so as to bring the *digestive organs* to rights; keep them so, and the discharge soon disappears.

“There is no necessity to keep a man upon a weak low diet a long time, for by doing so you weaken the patient too and the discharge will continue. I have often known persons who, therefore, after the violence of the inflammation had been removed, kept themselves upon a very spare diet, go into a bath and there, forgetting their claps, drink more wine than is intended. They have come to me the following day, and with considerable consternation, informed me that the discharge quite ceased.

“There are various remedies which have been employed for the purpose of removing the chronic kind of discharge, which, from certain irregularities of conduct, has been kept up. *Cuba* has been strongly recommended; the *balsam of copaiba* and injections, *but I cannot say I like them*. I believe there is no doubt if used carefully, they will succeed; but the way in which they are generally used is highly objectionable, and frequently lays the foundation for far more serious diseases.”—*Surgical Lectures*.

In some bad cases of gonorrhœa it may be adviseable to draw blood from the arm; or from the loins or perineum, by means of cupping glasses, or by leeches; to purge, to administer stimulating and saline medicines, with antimony. In these cases the patient should be kept at rest, in a recumbent position, and on the approach of the bowels, approaching closely to the antiphlogistic plan of treatment. If the bowels have been cleared, the liquor ammoniæ acetatis, or nitre, combined with the supertartrate of potass, or any other medicines combined with antimony, in pretty considerable quantities may be freely administered. Mucilaginous and diluent should be largely taken, in order to dilute the urine, and make it less stimulating; for instance, barley water, linseed tea, or arabic water. In this object, alkaline remedies are found of assisting, particularly the liquor potassæ, which may be given in any of the above-mentioned vehicles; and with a view to the scalding, the best mode of administering it will be to give ten drops to be taken immediately after each occasion of drinking water. If given at distinct intervals the effect is lost; but

are suggested, it will have an effect on the secretion before the patient wants to pass his urine again.

After having adopted these measures, considerable pain arises about the bladder and urethra, it will be adviseable to put the patient in a warm bath, the hip-bath; and to administer Pulv. Ipecacuanh. Comp., or opium. When the pain continues very troublesome, it may be occasionally relieved by the application of opium in the form of injection.

In milder cases of gonorrhœa, a milder kind of antiphlogistic treatment may be adopted. Empty the bowels, keep the patient on low diet; give him nitre and the supertartrate of potash, and diluent drinks. Injections are used for the purpose of removing the symptoms, after adopting the antiphlogistic means enumerated. These usually consist of the sulphate of zinc, sulphate of copper, oxymuriate of mercury, or nitrate of silver; of the three former, two or three grains to an ounce of distilled water; and of the latter, not more than one grain to the

inflammation of the mucous membrane of the urethra runs through a certain course, and comes to a natural end without entailing any future ill consequences on the patient. There are, however, some instances in which there is reason to suppose that secondary symptoms have followed from gonorrhœa; but these cases are so few, that many individuals who perhaps have seen a case of the kind, will hardly believe in the possibility of its existence; but those who have, recognize the possibility of secondary symptoms from it. Mr. Carmichael says that gonorrhœa is sometimes followed by eruptions of the skin, pains of the head and limbs, and ulcerations of the tonsils; but that the treatment of these does not require the use of mercury, the antiphlogistic treatment accomplishing all that is necessary.

There are some other circumstances occasionally observed in gonorrhœa; the inflammation of the mucous membrane of the urethra may cause swelling and inflammation of the glands of the prostate—that is, may give rise to what is termed a syphilitic bubo.—(See BUBO.) In this case, if the antiphlogistic

measures, which the local measures require, be adopted, and patient kept at rest, there will not be much trouble with it of this kind; at all events, the treatment is to be considered upon the ordinary principles."—*Lawrence*. See PHIMOSIS, PHIMOSIS, HERNIA HUMORALIS, WARTS, &c.

GONORRHŒA IN FEMALES.—In females gonorrhœa is rather less violent than in males. Its seat is in Cowper's glands on each side of the urethra, at the os externum; on each side of which are two small openings, sufficient to admit the head of a probe.

SYMPTOMS.—There is a great degree of surrounding inflammation; the orifice of the meatus urinarius and lacunæ discharge matter; there is pain in making water; and, in some severe cases, it commonly happens that there is considerable irritation of the bladder, of which the shortness of the urethra is the cause. The inflammation of the orifice extends down the meatus urinarius, to the internal coat of the bladder. The meatus urinarius, Cowper's glands, and the extremity of the vagina are red, and the carunculæ myrtiformes swollen. In addition to the circumstances here mentioned, on a post mortem examination of a female who died of gonorrhœa, Sir Astley Cooper observes, "I found the urethra very red, and red streaks proceeding from the termination of the meatus urinarius to the bladder, and the bladder inflamed."

Children, from one year old, and even under, up to the age of puberty, are frequently the subjects of a purulent discharge from the pudendum, chiefly originating beneath the preputium of the penis; the nymphæ, orifice of the vagina, and the meatus urinarius are in an inflamed state, and pour out a discharge. The linen and the rest of the clothes are marked with it. This complaint should be known by every medical practitioner, to guard against mistakes which might affect the character and life of innocent individuals, who might unjustly be suspected of having had an improper intercourse, and, as the result of which, contracted a loathsome disease. When a child has the discharge in

there is heat of the parts, slight inflammation, and this sometimes increases and goes on to ulceration. This disease sometimes occurs in children at the time of cutting their teeth. The treatment to be adopted is to apply the black-wash; and give calomel and rhubarb, combined with jalap.

The treatment in female gonorrhœa consists in directing the patient to take diluents. There is no medicine, hitherto known, which has a specific influence over the discharge in females; diluents may, however, be depended upon. The local inflammation may be appeased by the use of such lotions as the liquor plumbi acetatis dilutus, &c.; a sponge dipped in these should be introduced into the vagina, and allowed to remain there for a certain time, and frequently removed and cleansed. The patient should have aperient medicines prescribed.

GONORRHŒAL RHEUMATISM, AND GONORRHŒAL OPHTHALMIA.

The first of these affections is not an unfrequent disease. It often occurs that gonorrhœa produces a rheumatic and painful swelling of the joints. Whether it is by the absorption of the matter, or the constant irritations produced by the inflammation of the urethra, is not precisely known; but certain it is, that gonorrhœa produces ophthalmia and rheumatism, and when a single drop of matter has been applied to the eye. The

Astley Cooper, in his Lectures, gives the following historiette on this subject: "If I were to tell you how often I have met with such cases, I may say that I have met with thirty in the course of my life. The last case was in the city:—a gentleman came to me and asked me to see a woman with him who had a gonorrhœa on her. I went, and found that she had a discharge from the preputium clitoridis. I said that there was nothing new as this. There was considerable inflammation, and it had even proceeded to ulceration, which I told him would give way to the use of the black wash with calomel. 'Do you tell me so?' (he replied) 'Why, suspicion fell on one of the servants; but he will not confess. If he had appeared before Mr. Bailey, I should have given my evidence against him; for I was sure of what you have just now told me.' I told him, (returned Sir) 'that if the man had been hanged upon his evidence, he would have had to be hanged too.'"

inflammation generally attacks both eyes, and is of long duration.

TREATMENT.—The same remedies that are used in gonorrhoea are applicable here; balsam of copaiba, or some form of turpentine, will be found the best; and to these may be added local treatment as the state of inflammation demands. But regards gonorrhœal rheumatism, some form of turpentine may be exhibited, e. g.—either the balsam of copaiba, turpentine, or olibanum. For different opinions respecting the nature and treatment of Gonorrhœa, see a *Treatise on the Venereal Disease*, by J. Hunter, 1788; *Practical Observ. on Venereal Complaints*, by J. Swediaur, M. D. edit. 3; *An Inquiry into some of the Effects of the Venereal Poison*, by S. Sawrey, 1802; *Hernandez, Essai Antiquique sur la Nonidentite des Virus Gonorrhœique et Syphilitique*, Toulon, 1812; *R. Carmichael's Essays on the Venereal Diseases which have been confounded with Syphilis, &c.* 4to. Lond. 1814; and *his Observations on the Symptoms and Specific Distinctions of Venereal Diseases*, 8vo. Lond. 1818, &c. &c.

GRANULATION.

DEFINITION.—By the word granulation is understood a reformed part, generally red in colour, and having the power of secreting pus.

The mode in which granulation is produced, is very similar to that of adhesion, though differing in one respect from the latter process. When an abscess, for instance, has been opened, or when a wound has been produced, if the abscess be not immediately closed, or if the edges of the wound have not been brought together, inflammation is excited, and this inflammation occasions an effusion of the fibrin of the blood upon the surface of the wound. The fibrin is poured out in a layer which covers the surface of the wound; this layer soon becomes vascular, for blood vessels which are elongations of the vasa vasorum of the disorganised vessels, are forced by the action of the heart into the fibrin which has been deposited, and this layer consequently becomes vascular.

The difference between the mode of union by adhesion and granulation, is, that in the latter the vessels shoot to the surface

layer which has been thrown out, terminating by openings on the surface of the newly formed substance, and secretions, at the same time that a layer of lymph or fibrin, as it is correctly termed, (*see* ADHESION p. 11.) is effused. The fibrin is poured out, besides this purulent secretion from the vessels, as a second layer, into which the vessels shoot as before. The vessels supporting the first layer are the means of supporting the second layer, where the vessels terminate, as before, by openings on the surface of the substance effused. In this manner a second layer is formed till the cavity becomes filled.

REMARKS.—Granulations are distinguished by their uneven surface; they are extremely vascular; they are generally red in colour, and secrete matter. In ulcers recently formed granulations are absorbent surfaces; but if the ulcers have existed for any long time, the absorbent vessels readily take into the system any substance which may be applied to them. In this way we frequently see persons salivated by the use of injections of the oxide of mercury. Ulcers, however, are frequently the means of producing baneful effects upon the constitution, by the readiness with which they absorb any substances which are applied to them. Thus, arsenic applied to the surfaces of sores is very frequently absorbed into the system; and on that account this mineral is regarded as a very dangerous external remedy. Also mercury when applied to the surfaces of sores is very readily absorbed into the system; and produces excessive costiveness, pain in the head, and torpor of the system, which is only removed by the frequent administration of active purgatives. The effects on the constitution, when absorbed from the surface of granulations, are very much the same as when introduced into the stomach. Granulations possess nerves as well as arteries, veins, and absorbent vessels; they are sometimes extremely sensitive; but not far from being the case in all granulations; such as in granulations arising from bone in an uninfamed state—these are not so. Granulations, however, which shoot from the cancellated spaces of the bone, are sometimes extremely sensible; but when inflammation passes away, the sensibility of the part is

diminished. The same occurs with respect to granulations arising from tendons (as for instance the tendo Achillis) which are entirely insensible. So those arising from fascia, and the neurosis or muscles are endued with little sensibility in general, therefore, granulations arising from parts of great sensibility are sometimes exquisitely sensitive, those arising from parts in a great measure insensible, or entirely so, as tendons, are not so sensitive. Granulations are very readily united to each other by bringing the edges of granulating surfaces in contact so as to produce the adhesive inflammation. The knowledge of this principle is very often useful in the practice of surgery. A man raised a considerable portion of his scalp from the skull, and the pericranium throws out granulations, whilst the raised scalp is granulating. Instead of waiting for the tedious process of the union of both surfaces, by granulations filling the cavity, it is simply necessary to bring the two granulating surfaces together and bind them well down with adhesive plaster, and they will soon to inosculate. Granulations are not easily formed on the surface of an abscess, nearest the surface of the body. They are not endowed with the same powers as parts originally formed—they more readily ulcerate and mortify.—*See Hunter on the subject p. 473. et seq. 1794.*

HARE-LIP.

HARE-LIP is sometimes single, that is, the fissure is on one side—sometimes double, being then on each side; and is occasionally attended with want of teeth in the upper jaw; also with the velum pendulum palati and uvula. Sometimes in double hare-lip the only thing between the fissures is a small projection of cartilaginous substance attached to the tip of the nose; the soft palate, in those cases, is generally wanting, and the turbinated bone exposed.

OPERATION.—In the operation for the removal of hare-lip the simple principle is union by adhesion or the first intention. In the single hare-lip the operation is performed as follows: the edge of the divided lip, on each side, is to be pared off by

small bistoury, taking care to remove enough, for immediately after the operation the parts are hard and callous, and will not readily heal. This being done, all that remains is to apply the ligatures, of which there are to be but two. One is to be applied immediately at the edge of the lip, namely, at the lowest part of the lower portion, where the red part or line of the lip begins; the second is to be introduced exactly mid-way, between the first and the middle of the wound towards the nose; thus the last ligature is situated half-way between the angles of the wound at the lower part, and the fissures at the upper.

Considerable bleeding in performing this operation will sometimes occur from the labial artery; there will not, however, be any difficulty for applying a distinct ligature to the vessel, because the nature at the angles of the lip can be so tied, as shall pass the artery, and stop the hæmorrhage. On the fourth or fifth day after the operation the middle ligature may be removed, and the fifth or sixth the other; this is, generally speaking, what should be done, though the surgeon must be governed by the state of the parts as they are found at the time they are examined for removal of the ligature.

TREATMENT.—When the edges of the lip have been brought together, and the ligatures applied, no after treatment will be necessary. The best plan is to let the blood remain over the wound, and suffer it to clot there, and do not sponge it off.

In operating for the *double hare-lip*, it has been recommended to remove that portion of skin which sometimes exists between the fissures. That, however, is not the best plan; for that portion of skin ought to be allowed to remain; for it will be found of support, and of considerable utility in rendering the operation perfect; the edges of this portion of skin, therefore, are to be dressed in the same manner as directed in the first operation. When the hare-lip is double, both sides are not to be operated on at the same time; one must be suffered to get well healed before the other side is touched. Should the jaw project, as is sometimes the case after this operation, the deformity may be much diminished after the wounds have quite healed, by placing on the most prominent part a flat piece of lead enclosed

in lint; confined to its situation by means of a tape or r carried round the head. When attached to the top of the it should be separated from that part, and the operations performed in the manner here directed.

OBS.—The operation for hare-lip ought never to be performed on very young infants, but deferred until the period of dentition. Before this period, children are not competent to undergo operations, nor ought they to be performed for hare-lip, unless the subject has reached the age of two years. The silk ligatures are preferable to the silver pins formerly used in this operation. Ligatures used ought not to be waxed, in consequence of the substance having a tendency to induce suppuration and ulceration.

HÆMATOCELE.

A bloody tumour; a soft fluctuating tumour of the testicle containing a fluid; on the puncturing of which, however, a quantity of blood of a watery consistence, or a thickish blood of a dark colour escapes.

CAUSES.—Injury to the testicle, sometimes in consequence of the division of a vessel in the operation for hydrocele, (HYDROCELE); blood is effused into the cavity of the tunica vaginalis, and hence hæmatocele, which means a bloody tumour.

TREATMENT.—The same as for hydrocele. If the contents be troublesome from its size, the tumour is to be punctured; if the contents be fluid, after puncturing, the cavity may be injected as in hydrocele. Under other circumstances, that is, if the contents consist of this coagulating fibrin of the blood, it is necessary to make an opening, so as to expose the interior of the tunica vaginalis effectually to clear out the contents, leaving the surface of the tunica vaginalis to granulate by the application of a poultice.

HÆMORRHAGE.

Loss of blood, or as it is technically called, hæmorrhage, is the consequence of wound; it is frequently dangerous, sometimes fatal, and is always alarming to the patient, as well as to those who are ignorant of what ought to be done after it has taken place. But the danger of bleeding is not confined to the precise

the injury is received, nor immediately after it; for the *hæmorrhage* which directly follows the wound may stop, but the *hæmorrhage* may be renewed at some distance of time, and the patient may die. It is, therefore, of great importance to adopt immediately such effective means for treating wounds of blood-vessels, as shall prevent dangerous consequences.

ARTERIAL AND VENOUS HÆMORRHAGE.—Arterial hæmorrhage is distinguished from the venous by two circumstances—*first*, by the colour of the blood, which is of a bright scarlet; and, *secondly*, by the circumstance of its being thrown out of the wound, from the divided vessels, in jets, or as it is technically expressed *per saltum*; that is, by bounds or leaps; though it is not to be taken in its literal sense, for the blood is not exactly thrown in a series of single projections; the stream of blood from a wounded artery is like that from a wounded vein, is uninterrupted; but the stream rises higher, or is projected further from the body at each contraction of the left ventricle of the heart acts. The quantity of blood, lost at a given time, and the effect which that loss will produce on the system, depend chiefly on the size of the wounded vessel. A complete division, or a large wound, of the femoral or brachial artery, of the common carotid, or external, or internal carotid artery, generally produces so great a loss of blood as to be almost immediately fatal; though this termination must not be understood as universally applying, for bleeding from a wounded vessel is, in measure, modified by the nature of the division of the external parts. If the external wound be free, so as to allow of an easy escape to the blood, then a wound of large arterial vessels is suddenly fatal; but if the external wound be small, so that the escape of the blood is impeded, then the event may be different.

SPONTANEOUS CESSATION OF HÆMORRHAGE.—When an artery of the second order is wounded or divided,—for instance, when one of the three arteries of the leg, the anterior or posterior tibial, the peroneal, or either of the three arteries of the fore-arm, the radial, or interosseal, or any of the primary branches of the common carotid,—profuse hæmorrhage ensues. A considerable quantity of blood is lost in a short time, but the patient faints, and the *hæmorrhage* stops—death does not ensue immediately, and the pa-

tient recovers: hæmorrhage may come on again at a distant period. Repetitions of the bleeding may occur, and thus the patient may be ultimately exhausted from successive losses of blood. When arteries of smaller size are divided, the blood flows more or less freely for a time, but the hæmorrhage ceases spontaneously, and no permanent ill consequences ensue. It may sometimes happen that a wound of an artery of the second order, such as the radial, ulnar, or interosseal, or one of the arteries of the leg, may not be attended, ultimately, with fatal consequences, although no measures are adopted to restrain the hæmorrhage. The bleeding may stop, and the orifice of the artery may be obliterated by a natural process without any recurrence of the hæmorrhage. An exemplification of this remark may be witnessed in the case of amputation of the leg, where it is often found necessary, previous to tie from one to six arteries; but the rest, which of course may be extremely numerous in a wound of this kind, cease bleeding spontaneously, undergo certain changes, and no further hæmorrhage takes place from them. Sometimes in the amputation of the thigh, it is only necessary to tie the femoral artery; in an arm case, the brachial artery; or only one artery in the operation of the leg, the hæmorrhage from all the rest having been arrested by a natural process; the consequence of the orifice of the divided vessels contracting, becoming smaller and smaller, and ultimately seeming to close entirely. This natural contraction of the orifice of a divided artery is favoured by exposure to the air, or by the application of cold water—by sponging; so that when the part is exposed to the air, such, for instance, as a wound in removing a breast or in amputation, it will be found, previous to the parts being exposed; but when the parts are united and brought together, more especially when the wound is covered with a considerable quantity of dressing and cloths, so as to produce heat, hæmorrhage will recur in the arteries that had ceased to bleed. At the same time that the divided orifice of the vessel contracts, the blood coagulates in the extremity, and a clot is formed which sustains the effect of blood from the artery.

The retraction of the divided arteries within the cellular

surrounds them, has been mentioned as contributing to the suspension of hæmorrhage; we see, however, where arteries are seated in textures of a dense and unyielding kind, that wounded, they bleed more obstinately; hæmorrhage does not so suddenly, as when it arises in the softer parts which resist the contraction of the arteries; thus, in removing a portion of the mammary gland, small vessels are very often seen to come from the denser part of the gland, so as to render ligatures vain, the denser substances preventing the orifices from retracting, which they would do if situated in softer parts. The retractile power observable in wounded arteries of the skin, they do not possess here, but continue bleeding. It appears probable, therefore, that this retraction of the orifices of divided arteries may, in some instances, contribute to the suspension of hæmorrhage. The circumstances thus contributing to the spontaneous cessation of hæmorrhage are, 1. The contraction of the orifice; 2. The accumulation of blood within that orifice; and 3. The retraction of the vessel within the cellular sheath. Faintness may be considered as one of the natural means by which hæmorrhage is stopped.

LEGAL MEANS OF ARRESTING HÆMORRHAGE.—The surgical means resorted to in order to arrest the flow of blood from arteries, are *pressure, styptics, ligature*. In the case of a wound, and even of a large artery, it is sometimes found that digital pressure will answer the desired purpose; and as an example of a wound that is occasionally made in the brachial artery, to arrest the flow of bleeding, may be adduced. And as a temporary means of restraining hæmorrhage, pressure on the arterial trunk of the limb above the situation of the wound may be mentioned. For instance, if the wound has been received on any part of the thigh, pressure on the femoral artery, where it passes the inguinal ring of the groin, may be made. With the same view the same means is employed in performing operations. Again, in amputations of the shoulder, pressure made upon the subclavian and axillary vessels in that part, is perfectly effectual in restraining the hæmorrhage until a ligature be applied. In cases of wounds

either of the arm or leg, where bleeding has occurred, and suspected to take place again, a tourniquet is frequently loosely placed round the limb, so that if necessary it may be afterwards tightened; but this can only be a temporary proceeding, as it produces swelling of the lower part of the limb, and indeed a painful condition, that if the pressure was continued, it would terminate in mortification. This kind of pressure, therefore, is to be applied as a temporary mode of arresting hæmorrhage.

Great reliance has been placed on styptics in stopping the flow of blood from a part. The exposure of a wound to the open air, and the application of cold to it, by sponging it with cold water, may have a powerful influence in checking bleeding; and thus far may be considered as styptic; which technically speaking is a term applied to substances of an astringent nature, such as concentrated solutions of alum, and the sulphate of zinc, on which great reliance is placed. Oil of turpentine has been used for the same purpose. None of these, however, can be relied on for arresting the bleeding from a large artery. The only safe mode to stop bleeding from wounded arteries, is by the application of ligature.—*See* LIGATURE, STYPTICS, TOURNIQUET, &c.

HEAD, INJURIES OF.

Wounds of the scalp are attended and followed by more serious symptoms than wounds of the integuments of any other part of the body; which, in a great measure, is to be attributed to the nature and connexions of the parts. The subcutaneous matter is condensed, and closely attached to a firm and unyielding tendinous expansion; and betwixt these tissues and the periosteum, a loose cellular tissue is interposed, so as to allow of motion of the parts. They are highly vascular, with the exception of the occipito-frontalis fascia, and betwixt them and the internal parts a free communication exists. Injuries of the scalp coverings, though at first apparently trifling, and consequently looked upon as of no importance, and unattended with danger, may assume a very alarming character.—*See* APONEUROSES in general.

TREATMENT OF WOUNDS OF THE HEAD.—After the initial

In injury, the scalp ought to be shaved, and the wound cleansed of clots and foreign substances. If a large flap of integument is detached, it should be replaced, and retained as nearly as possible in its natural situation; and if, for this latter purpose, slips of adhesive plaister and methodical compression prove insufficient, it will be necessary to employ a very few points of interrupted sutures: these, however, must be removed at an early period, namely, when either adhesion or suppuration has commenced, and ought, if possible, to be altogether dispensed with, being apt in this situation to produce injurious effects by their irritation. Dressing is afterwards applied. On the occasion of swelling, heat, and pain, the parts are to be well fomented with a decoction of chamomile flowers, and afterwards covered with a bland soft poultice; and should these symptoms continue, the fomentation ought to be frequently repeated. Fomentations and decoctions are also the best applications when a day or two has elapsed between the receipt of the injury and the patient's application for cure.

If constitutional symptoms are to be moderated, and may, in some instances, be averted, by the exhibition of antimonials and emetics; and by general blood-letting, when required and authorized by the symptoms and the state of the constitution. Scarifications and incisions are to be employed according to circumstances, in order to lessen the vascularity of the part, and to prevent the formation of matter, which, if already secreted, must be discharged.

In many unpromising cases of lacerated scalp, when a great part of the cranium has been exposed, and partially deprived of periosteum, a rapid cure has taken place without the formation of much matter. The detached scalp, though torn and lacerated, ought not at first to be removed, it being more prudent to leave nature to determine how much must be destroyed. When the sloughs, if any, have separated, and granulation has commenced, the loss of substance is rapidly repaired in this manner, more especially when the patient is young and healthy. Full or partial support by bandaging is required in many

cases, or by a handkerchief, split cloths, or a roller applied in various forms.

Injuries of the scalp are liable to be followed by erysipelas, perhaps more so than injuries to any other part of the body. The treatment when it ensues is the same as that of erysipelas of other circumstances, excepting, perhaps, that as from the situation of the injury the head is more likely to suffer in those cases a rather more active antiphlogistic treatment may be expected. It happens sometimes that blood is effused in consequence of injuries to the head, under the aponeurosis of the occipito-frontalis muscle.* The effusion of blood may extend under almost the whole lateral and upper part of the scalp, lifting it up from the bone which can hardly be felt. Although ecchymosis may be very extensive, the blood which is thus effused will be absorbed, if the effusion be stopped by the ordinary antiphlogistic plan of treatment. The head should be shaved and washed with lotions, and other means also employed calculated to check the vascular action. It is not necessary in this case, to make any incision to allow the effused blood to escape, even if it should be extensively effused as to raise the scalp.

Blood may be effused under the pericranium, between the membrane and the surface of the bone; and in this state ecchymosis occasions a feeling hardly to be distinguished from that produced by fracture of the skull. The border of the effusion presents a firm hard edge to the touch, exactly like that of a fracture; and no person, however experienced, could distinguish between them. The whole of the injured part, therefore, should be examined, the configuration of the sharp border observed, and the other symptoms noticed, in order to determine whether

* *Occipito-frontalis. Digastricus cranii. Epicranius of Albinus. Occipitalis et occipitalis* of Winslow and Cowper. A single broad digestive muscle that covers the cranium, pulls the skin of the head backwards, and, at the same time, draws up and wrinkles the skin of the forehead. It arises from the posterior part of the occiput, goes over the upper part of the os parietale and os frontis, and is lost in the eye-brows.

tion of the touch in question arises from a fracture, or merely from the causes above-mentioned.

If the wound of the scalp should penetrate through its whole thickness and through the aponeurosis of the occipito-frontalis muscle, the inflammation that supervenes may attack the cellular membrane which connects the aponeurosis to the pericranium. When it occurs, forms rather a serious case, and is thought that many of the older writers considered as *inflammation of the aponeurosis occipitalis*, although that is a part, like other fibrous structures, very little liable to inflammation. In this situation inflammation of the cellular membrane may occur, in consequence of a wound of the scalp, such as the one now described, having been injudiciously treated, or its management neglected. Such cases require the most active antiphlogistic plan of treatment.

Injuries of the head or fractures of the skull, and the mechanical injury which is the result, vary considerably. There may be a fracture of the bone—the bone may be merely cracked, or a piece of glass, or a china bason may be. A slight fissure, or crack, known by what is termed a capillary fissure of the skull, may be observed. There may be two or more such cracks, radiating from the point on which the violence is directed. Sometimes there are so many of these, and proceeding in such various directions, that the fracture is called a comminuted fracture. The injury, too, may be accompanied with a depression of one of the sides, or, indeed, of both sides of the fissure—though more commonly of one, that is, one side of the fracture is beaten in under the other; and it may not simply be depressed below the edge of the other; but it may be depressed considerably below that, it may be pushed in upon the membranes, and even upon the brain itself. This is called *fracture with depression*, and hence is made the most important division of a fracture of the skull into simple fractures, or those in which the bone is merely divided or separated, and fractures with depression—those in which there is a beating in of one or both of the sides. See FRACTURES OF THE SKULL, COMPRESSION, CONCUSSIONS OF THE BRAIN, &c.

HECTIC FEVER.

The constitutional disturbance which takes place when inflammation arises in the cyst of a chronic abscess, and when collection and continued suppuration occur, has obtained the name of *fever*. It is, in fine, a disturbance of the system, arising from weakness occasioned by long continued and serious local disturbance. Hence it has been sometimes called *suppurative fever*, though this name would be objectionable, because suppuration very commonly occurs without any symptoms of hectic, whilst, on the other hand, hectic fever may take place where there is no suppuration.

CAUSES.—Hectic fever occurs in various *medical* as well as *surgical* cases. In extensive pulmonary disease of a tubercular character, though the disease may not have proceeded to the extent of suppuration, there may be symptoms of hectic; and in the affection of some important joint of the body, in which the collection of matter may not have taken place, hectic may have occurred. After a serious injury, such as a bad compound fracture, or inflammation of the limb will generally supervene, and, in conjunction with this serious local disturbance, there is a corresponding inflammatory fever; matter forms in consequence of inflammation, and a palliation of the symptoms succeeds; but will be a recurrence of the inflammation, fresh purulent collection will take place, and fresh febrile symptoms accompany them. In this manner the strength of the patient becomes considerably reduced, and after a length of time the local disturbance becomes altered; the limb is no longer swelled, red, and the seat of excessive phlegmonous abscesses, but it is, perhaps, shrunk in a cedematous, instead of having the firm swelling which characterises phlegmonous inflammation, and probably a discharge of thin matter takes place. Together with this change of the local symptoms, there is a corresponding alteration in the constitutional disorder. The local disease has renounced its acute, and assumes a kind of chronic character; and a similar alteration occurs in the febrile symptoms. The patient now becomes hectic, that is, has what may be called a kind of *chronic fever*.—*Lawrence*.

SYMPTOMS.—Whether hectic fever be the consequence of the excited state of the local affection proceeding from a severe inflammation, whether it be connected with the irritation arising in the neighbourhood of the chronic abscess, or whether it depend on a slow disturbance in some important organ of the body (such as the lungs or aorta); there is considerable disturbance in the circulation, and there is an accelerated though feeble pulse, varying from 100 to 120 and upwards, remaining often for weeks and even months at that point without sinking below that point. The patient sometimes is heated, chilled. The surface of the body is now red and hot, now pallid and cold, and frequently it is bathed in profuse perspiration. Slight degrees of excitement are sufficient to produce flushings, which induce perspirations. The tongue is moist and perhaps clean; the functions of the digestive organs are more or less disturbed; and towards the latter part of the disease, a diarrhœa comes on, which can hardly be restrained by means that are employed. The perspirations in the latter part of hectic are very profuse, and the discharge by the bowels is also very excessive—and hence the terms *colliquative sweats*, *colliquative diarrhœa*, which merely mean *melting*, as if the body were melting away under the profuse discharges by which it is melted. Great restlessness and discomfort at night are also attendant on the debilitated patient. The symptoms of hectic fever, however, do not remain at the same degree during the whole forty-eight hours; on the contrary, there is a very striking exacerbation towards evening, and an equally well marked remission of symptoms in the morning. Towards evening the pulse is accelerated, the body heated, the patient feels restless and uncomfortable, and in the course of the night he probably is bathed in profuse sweats, the disturbance terminating in the morning. In the morning, he is comparatively free from the disturbance and so remains some part of the day. Such are the principal features of that condition which constitutes hectic fever.

TREATMENT.—If hectic fever were to be regarded merely as a state of *excitement*, it might be supposed necessary to adopt some measures calculated to reduce that, but the powers of the system

must be taken into consideration. No direct means of this could be borne; they would merely lessen the powers of the system, without doing any good. The object then, in that is to sustain the strength of the patient—to keep up the power of the system by means that do not at the same time excite. We would, then, be inclined to give the lighter kinds of tonic medicines, the *dilute mineral acids*, with bitters, such as bark, cascara and gentian; permitting the patient to take, according to appetite, in moderate quantities, light, but nutritious, diet. The dilute mineral acids (particularly the dilute sulphuric acid) possess as much power as any other, in checking the profuse perspirations during the hours of sleep. When the patient gets noisy and passes uncomfortable nights, narcotics may be occasionally necessary, administered regularly in adequate doses every few hours; attending, at the same time, to the state of the bowels, so that costiveness may not thereby be induced. It is on the whole, merely a palliative plan; and, at the same time, we must endeavor to administer mild nourishment to support the patient's strength and enable him to repair those local injuries, for this is essential to the cure of the fever.

* * It has been the subject of doubt whether hectic fever can be cured? The real question is, whether the disease that causes the symptoms can be cured; or whether that local excitement can be removed which produces the general disturbance. If this can be done, hectic fever may be cured; but in most instances the local disease is of a very serious kind, very frequently irremediable; and if a stop cannot be put to the constitutional symptoms excited by it cannot be arrested. It cannot be expected that hectic fever will be cured, while the cause of it remains in full force. But, in cases where the local disease admits of a removal, as in severe disease of a joint (the hip joint, for instance), which can be removed by amputation, it will be found that all symptoms of hectic will very speedily cease when the cause is cut off. The pulse will then sink, the appetite be restored, and, in fact, health be regained.—*Dr. Ferri-
rence*. “Many a man labouring under a great degree of heat

appearing excessively weak, has been completely relieved after the removal of a limb, and the large wound made by the amputation has healed kindly."—*Abernethy*. Mr. Hunter has given some reasons in support of the opinion that the quantity of hectic fever is proportionate to the importance of the organ in the animal economy, and the want of power, for the repair of the injury. Thus there is more fever in disease of a large organ, than in disease of parts that are of less consequence. And it will be proportionate to the want of power in the part repairing the injury, as joints which have little restorative power, are more likely to produce hectic fever.

HEMERALOPIA.

Hemeralopia, or night-blindness, is a disorder of the eyes, in which the patient sees very well during the day, but the sight is defective as the night approaches, is totally suspended at night, and again becomes perfect as the sun rises. This affection rarely witnessed in this country, although one occurrence has lately been announced; though it is equally uncommon between the tropics, and appears to have arisen from excessive stimulation of the retina, occasioned by the light to which the eye is exposed in those regions during the day. Though this affection will last for a considerable time, it does not terminate in loss of sight; on the contrary, it at length subsides, and vision is recovered.

TREATMENT.—Blisters to the temples will be found the most efficacious mode of treatment; mild antiphlogistic remedies, and rest.

Cases of nyctalopia have been related, which is just the reverse of the above, that is, blindness during the day, with recovery at night. In individuals labouring under strabismus, there is such an intolerance of light, that they may be said to be blind during the day, they cannot bear the light, and yet those individuals, on the approach of twilight, can see—this is certainly a nyctalopic condition of the

HEMORRHOIDS.

Under the term of hemorrhoids, or piles, are included certain states of the disease of the lower part of the rectum which, though differing in some respects in their external appearances, do not probably differ much in their essential characters.

VARIETIES AND DISTINCTIONS, &c.—Certain individuals are subject to loss of blood from the anus, coming on sometimes at pretty regular intervals, and unattended with any other disease about the part. This constitutes what is vulgarly called the *bleeding piles*, and to this the technical name of *hemorrhoids* is more particularly applicable. In other instances persons are subject, without loss of blood, to occasional attacks of heat, inflammation, and pain about the margin of the anus, or a little within it, with a swelling or thickening of the mucous membrane, raised into tumours of the size of a pea, or a bean, or even more considerable, and having a bluish tint. These are also called piles, and sometimes, in common as well as in medical language, they are called *blind piles*.

When individuals have suffered long from this latter affection, prominent growths occasionally are formed on the margin of the anus, sometimes a little within it, sometimes on the very surface of the bowel, acquiring the size of a hazelnut, or even the size of a walnut, and these are called hemorrhoidal excrescences, which seem to be degrees and modifications of one and the same affection; and the blood-vessels of the rectum appear, in this instance, to be essentially the seat of the disease. In the case of the discharge of blood, there seems to be a distended state of the blood-vessels, which occasions them to give way, and hence the hemorrhage that takes place. In the blind piles, to which, according to Lawrence, the name of pile is more properly applied, there is an occasional enlargement of the vessels, and subsequently a subsidence of that enlargement, so that the parts return to their natural state; but in the hemorrhoidal excrescences there is a permanent state of tumour produced.—*Surg. Lect. Bartholin's Hospital*, 1829.

CAUSES.—Piles are sometimes the consequence of costiveness, the pressure of hardened fæces on the rectum; also of long continued diarrhœa; so that opposite causes occasionally produce the effect. The cause of piles is also frequently to be traced to disease of the liver, and congestion of the veins in the intestinal canal. The difficulty of transmitting the blood through the prostates, occasions a congestion in the hemorrhoidal veins; obstructed secretions in the intestinal canal tend to the same effect.

Hemorrhoids are a very common sequel of pulmonary consumption; the subjects of that disease being very commonly, or later, the subjects of internal piles, with prolapsus ani. Hemorrhoids have existed for a considerable length of time, excrescences are produced in consequence of inflammation. The manner in which these excrescences are produced is as follows: the union of the pile glues the sides of the virus together; the matter is poured out, which becomes organized, and a swelling, in which there is a number of vessels, is produced. The excrescences project from the surface a little way up the canal, which is chafed and rendered extremely irritable from this cause.

There are, then, as already observed, three states of the rectum in this disease—first, as it is affected by external piles; secondly, by internal piles, accompanied with prolapsus ani; and thirdly by excrescences, which are the remnants of the piles, and possess a high degree of vascularity.

Symptoms of External Piles.—When a person applies to himself external piles, he complains of pain in passing his stool, and tenesmus after the discharge. On examination of the rectum, you discover a projection of a livid appearance, which, after three days, becomes so solid as not to yield to pressure. Blood is coagulated in the hemorrhoidal veins; after a time, the piles become inflamed, the patient feels uneasiness in going to stool, and observes that his fæces are tinged with blood. In due time the pressure of the fæces on the internal part of the pile brings down the pile, so that it becomes external. The pile is brought down in this way every time the patient has a stool, and he is under the necessity of pressing upon the part

for some time, in order to return the rectum into its original situation. This is a great tax on his time, as well as a cause of considerable suffering; the bleeding is at this time very considerable, and the discharge is attended with great irritability of the rectum.

At length inflammation takes place, which adds greatly to the patient's suffering, and he is often unable to return the rectum when it has descended. A person is thus exposed to considerable inconvenience and suffering from this complaint, and he is anxious, after a time, to have it removed.

Prolapsus ani is to be considered as the effect of internal hemorrhoids. The author knew a person, who held a situation which required constant attendance in the early part of the day, who was under the necessity of rising at a very early hour, in order that he might have his evacuation, and have sufficient time to return the rectum. A piece of lint dipped in oil, should be applied when a considerable bleeding takes place from the pile or piles. There is sometimes a discharge of matter, and now and then the pile becomes ulcerated.

TREATMENT.—On being consulted for external piles, and when there appears a little livid projection at the anus, which has existed only for a short time, and yields readily to pressure, some aperient should be administered; avoiding carefully, however, any purgative which manifests a decided influence on the rectum, such, for instance as aloes. Castor oil, or sulphate of magnesia with infusion of senna, should be given, so as to produce a copious secretion from the intestines. Saline purges produce the greatest effect when a considerable secretion from the intestines is desirable. If the secretion of bile from the liver be wished, the submuriate of mercury or the blue pill, with saline purgatives. In this way the veins of the intestinal tube are relieved and congestion removed. In addition to this plan of treatment apply leeches to the swollen part. The best local application is the liquor plumbi subacetatis dilutus. In this way you will generally succeed in getting rid of the disease in this stage. If the pile has continued till it has become solid, a different plan must be pursued. Put the point of your lancet into the pile, puncturing the part, and squeezing it between your fingers,

press out a clot of coagulated blood. When the pile has diminished, and the vein ceases to be swollen, the liquor subacetatis dilutus, with a purgative, will get rid of the

So much for the treatment of external piles in their component; the treatment of internal piles is more difficult.

TREATMENT OF INTERNAL PILES.—It requires a great deal of force in many cases to enable a surgeon to make up his mind to the best treatment of particular diseases.

The result of Sir Astley Cooper's experience on this subject is as

—“Internal piles commence by a sense of weight and pain in the rectum; you are seldom consulted, however, until the disease

manifests itself by prolapsus ani. As a prolapsus ani is entirely the effect of the piles, this effect will scarcely cease, unless the causes

be removed. You may diminish it in some measure by local applications, and it is right to try to do so, but you will not ultimately succeed. With this view, when the part has

swelled, you may use a decoction of oak bark and alum, injected into the rectum (with a common gonorrhœa syringe) two

grains which may be increased to four grains of alum in an ounce of decoction of the oak bark. But this treatment will seldom

succeed when the disease has advanced to any considerable extent; the way of effecting a cure, in such cases, will be to remove

the piles, and the question then arises, how they may be best removed, a question which experience can alone solve. I used to

consider the removal of the piles by excision the best mode, because the pain produced by it very trifling, as compared with

that of the prolapsus very easily cured in this way. It is not to treat such cases by ligature than by excision. The

application of a ligature, however, is exceedingly painful, if it is applied too tightly; it should only be applied so as to interrupt the

arterial supply, and destroy the life of the part without exciting much pain. Leave the ligature on the part if the pile be of considerable

size, as the ligature is apt to slip, more especially if the pile be large, a straight needle, threaded with a double liga-

ture should be passed through the centre of the pile, and tied on each side.

This will excite little pain, and prevent the ligature from coming off. The time in which the ligature comes away is

from five to six days. The patient should be, for some time after this operation, in the recumbent position.*

There are other circumstances, however, to be attended to in the treatment of piles. Internal piles are accompanied with a high degree of fever; they are covered with adhesive matter rounding the rectum, and the sphincter ani is affected with moderate symptoms. Under such circumstances the patient is not to be freely purged. The treatment here consists in the application of leeches, venesection at the arm, fomentation and poultices; for were the intestines to be excited under these circumstances it would add so much to the irritation, that the patient were purged once, he would not be able to bear a second time. An attempt must be made, in fine, to allay the irritation by general treatment; if the inflammation continues

* "I have never seen," says Mr. Lawrence, "any inconvenience arising from cutting those tumours away with a pair of strong scissors. You may make the patient force out the rectum by straining as at stool, and seizing the tumour with a pair of forceps, or with a hook, draw them out, and then cut them off at their bases, repeating this proceeding till you have cut away the whole. It is expedient in removing these tumours, to cut into the middle of the part of the bowel; if you leave a portion of the affected part behind, the patient sometimes has a considerable bleeding, and the tumour may be reproduced. If you also cut into the sound part the bleeding is not so great. In several cases I have removed the excrescences very frequently with scissors, and have never seen the bleeding proceed to any injurious extent, even when several have been removed at one time. As these tumours have generally attachments within the sphincter, the blood will accumulate in the bowel above it; the patient feels as if he had a motion to go to stool, and then he voids a large quantity of coagulated blood, and no further bleeding afterwards takes place. After cutting off the excrescences, however, in this way, it is well to be on your guard against the occurrence of bleeding; you should, of course, before you perform the operation, have the bowels well cleared; let the patient remain in a horizontal posture for some hours afterwards; let the parts be raised, and covered with cloths dipped in cold water; let that be continued for some hours, and there is no further fear of bleeding. The only reason, I apprehend, for having recourse to the ligature would be the fear of bleeding; and if that were resorted to, it would be necessary to tie almost every one of the tumours, and thus the operation would be very much prolonged."—*Surgical Dictionary, Bartholomew's Hospital*, 1829.

considerable time, an aperient must be exhibited once in three or four days, but not oftener. Sometimes internal piles undergo radical cure.

If the prolapsus remains for some time after the removal of the tumour, the best treatment is to inject astringent lotions into the tumour, and to apply the unguentum gallæ to the part. If the tumour be obstinate, a little incision may be made by the side of the sphincter ani, with a view of producing the adhesive inflammation, so as to glue the rectum to the cellular tissue surrounding it. This, however, cannot be done without danger in some consti-

HERNIA.

DEFINITION.—Hernia is a generic term, and is used to signify the protrusion of any viscus from a cavity; though surgeons generally confine it to protrusions of the viscera from the cavity of the abdomen. (*Sir A. Cooper.*) In children who have a malformation of the bones of the head, a projection of the brain will sometimes protrude through the skull, and this is termed hernia cerebri. There are also instances, though very rare, of the lungs protruding through the intercostal spaces. But protrusions of the abdominal viscera are of the most frequent occurrence; and this arises from the relaxation of the parts contained in the abdomen, and the relaxation of the abdominal parietes. The answer, then, to, What is hernia? ought to be, *protrusion of any viscus from its natural cavity.* Ibid.

SPECIES.—There are four species of hernia more frequently met with than others: *e. g.*

- | | |
|--------------|---------------|
| 1. Inguinal. | 3. Umbilical. |
| 2. Femoral. | 4. Ventral. |

Inguinal Hernia, called sometimes spermatocele, takes the course of the spermatic cord; it varies a little in different cases, but generally follows this course.

Femoral hernia passes behind Poupart's ligament, on the outer side of the femoral artery and vein, between these vessels and the iliopectineal band.

Umbilical hernia takes the course of the umbilical chord, passing through the opening in the linea alba behind the umbilicus;

this sometimes never closes, an opening consequently remains through which the umbilical hernia protrudes.

d. Ventral hernia is a protrusion of the intestines through different lines of the abdomen, the *linea alba* (excepting at the umbilicus) *lineæ semilunares* and *transversæ*, which protrusion is called ventral, in contradistinction to the umbilical.

OBS. Besides the four above-mentioned kinds of hernia several others occur, as the phrenic or diaphragmatic, and which in some cases occurs between the œsophagus and aorta; and now and then between the aorta and vena cava; but these do not admit of surgical relief, and are not known to have existed until after dissection. Hernia is also sometimes found between the vagina and rectum in females, called perineal hernia; and in males between the rectum and bladder, having the same name. There is likewise a hernia situated in the vagina, called the vaginal hernia, the nature of which is ascertained by putting the finger into the vagina, when on a tumour being felt, on the patient laying down, it is easily reduced; but it immediately returns when the erect posture is resumed. Hernia sometimes takes place in the foramen osseum and a hernia may now and then be seen in the ischiatic foramen. These species of hernia are very rare when compared to inguinal hernia.

The four different species of abdominal hernia, all of which require different modes of operation, are,

1. The *oblique*, or that species of inguinal hernia which follows the course of the spermatic chord. 2. The *direct* protrusion directly out of the abdomen through the external abdominal ring. 3. The *congenital hernia*, the hernia in contact with the testis or rather with the tunica vaginalis. 4. The *encysted hernia*, the hernia within the tunica vaginalis, formed within that coat.

VARIETIES.—Hernia is subject to several varieties; first, it is subject to a variety in *size*—an occurrence which necessarily depends from the difference of its course in different persons.

* An oblong tendon opening in each groin, through which the spermatic chord in men, and the round ligament of the uterus in women, pass. Through this aperture the abdominal viscera fall in inguinal hernia.

sometimes happens that there are herniæ with the external covering so thin that the peristaltic motion of the intestines is seen through it; this is more frequently the case in large hernia.

Astley Cooper observes in his lectures, that he has seen the orifice of the stomach pulled down to the abdominal ring; that he has seen the bladder in a hernial sac, an occurrence which more frequently takes place in the oblique than the direct inguinal hernia.

Hernia varies also as regards its *contents*, containing at one time intestine, at another, omentum; and sometimes both. Hernia is generally to be found in the intestines of children; and omentum is frequently met with in the very young.—(*Sir A. Cooper.*) Hernia sometimes enters the spermatic chord, and splits it into two parts; the spermatic artery and vein laying before, and the vas deferens behind. In a large hernia a peculiar mode of operating is required.

ANATOMY OF OBLIQUE INGUINAL HERNIA.—To render this kind of hernia well understood, which takes the direction of the spermatic chord, an accurate acquaintance with the latter is indispensable.

Spermatic Chord.—The spermatic chord emerges from the abdomen midway between the spine of the ilium and pubis; and in this place it will be met with just opposite to the iliac artery. As it protrudes through the opening where the spermatic chord goes out, carries the peritoneum with it, and a covering of the fascia transversalis; and when it is dissected, the first thing met with is the fascia transversalis, which surrounds the spermatic chord as it passes from the abdomen; and as the chord takes its course through the inguinal canal, a covering is given off which winds on the cord itself.

Inguinal canal begins at the point where the spermatic chord enters the abdomen, and terminates at the lower abdominal ring. It is about two inches in length, and contains the chord; it is closed anteriorly by the tendon of the external oblique fibres, and posteriorly by the internal oblique and transversalis muscles, and posteriorly by the fascia transversalis, where stricture most frequently occurs. The spermatic chord then descends obliquely through this canal; and as it passes through the lower abdominal ring, it receives

a covering from the edge of the external oblique, called the fascia of the chord.*

Q. When the hernia has protruded through the fascia transversalis, how are the spermatic and epigastric arteries situated with respect to it?

A. The epigastric artery is always on the inner side of the hernial sac, in the operation; consequently, there would be danger of wounding the vessel unless you cut inwards.

Q. How then is the stricture to be divided?

A. It is to be divided directly *upwards*, or upwards and outwards; which direction will steer clear of the epigastric artery.

Q. How is the spermatic artery situated at the origin of the hernial sac?

A. The hernia is above, and the spermatic artery could only be wounded by cutting downwards.

Obs.—There is no danger in operating for hernia of wounding the spermatic artery: the epigastric is the only artery in danger, and that in the event of its being cut inwards. After the hernia has protruded through the fascia transversalis, it is situated in the inguinal canal; the next place it reaches is just under the arch formed by the tendon of the internal oblique and transversalis muscles: and here it receives a covering from the cremaster muscle. Above the sac, then, are the internal oblique and transversalis, and beneath it the fascia transversalis; then, having passed through the inguinal canal (which may be two inches or from one to two and a half long) it reaches the lower abdominal ring; and at this part the hernial sac will have two coverings—one from the cremaster muscle, and another, called the fascia spermatica, which it receives from the spermatic chord. As regards the spermatic chord, it is behind the hernia, and the testicle below it; the internal oblique and transversalis above it, and the fascia transversalis beneath it.

In dissecting a hernia below the abdominal ring, the fascia of the chord will be found applied tightly over the hernial sac, having the appearance of its being the sac itself; then there is the fibre

* Camper has published some excellent plates showing this fascia, and how much it is thickened in hernia.

ring derived from the cremaster; they being cut through and the hernial sac heave in sight having the appearance of peritoneum, which is to be pinched up with the fingers and tied, when water immediately escapes. The epigastric artery is situated very close to the hernia, * but somewhat to the pubic

Q Of what is the hernial sac composed

A It is generally thought that the hernial sac is an elongation of the peritoneum; but in the oblique inguinal hernia it is not an elongation but a real growth of that membrane.

Q What are the appearances usually presented on examining the hernial sac?

A On examining the lower part of the hernial sac, a dark red spot will often be seen, having a blue appearance, in the middle; and this point is studded with numerous vessels, and an ulcerative process has commenced.

Q Has the hernial sac any attachments?

A Yes; it is bound by firm adhesions, and cannot be returned into the cavity of the abdomen except in an incipient state, unless by a painful and dangerous process of dissection, which it would be unjustifiable to perform.

CAUSES OF HERNIA.—The causes of inguinal hernia are three, namely, unusual pressure of the abdominal viscera, pressure of the contents of the abdomen, or relaxation of the parietes. In the first case, pressure in consequence of enlargement of the abdominal cavity—the omentum and mesentery being loaded with a fatty substance—is a very common cause of inguinal hernia. The second is caused by the uterus as it ascends from the pelvis into the upper part of the abdomen into a very small space, and in

The epigastric artery is found sometimes close to the mouth of the inguinal hernia on the outer side. This species of hernia was first observed by Mr. Cline, sen., in the year 1777, on opening the body of a person who had been a patient of Mr. Hawkes of Chelsea. He was surprised to find the artery on the inner side of the epigastric artery; and he was in the habit of mentioning this case in his lectures. This circumstance led others to observe this species of hernia, and it is now well known to occur occasionally.

See Cooper's Lectures, MS. Copy.

this manner protrusion sometimes takes place. The hernia is sometimes seated in the thigh, and sometimes in the groin; but may be said to arise less frequently from gestation than from other causes. Hernia is very commonly produced by the increased action of the abdominal muscles, in consequence of some effort disproportioned to the strength of the individual applying it; hence it is that the injury is more frequently on the right * than on the left side, in consequence of the preference given to that side in making any extraordinary exertion, and the muscular efforts consequently made on that side. Another frequent cause of hernia is relaxation. Persons advanced in years are often subjects of rupture in consequence of bodily relaxation. Hernia may also be considered as a cause of hernia, from its producing relaxation of the abdominal parietes. Certain positions of the body dispose to the production of this complaint; such as that of stooping to lift great weights from the ground. Much exertion in a relaxed state of body is often a cause of hernia. Persons recovering from fevers, who are much reduced in strength, are extremely liable to hernia from any increased bodily exertion, such as riding on horseback, violent coughing, &c. The cause of direct inguinal hernia is generally some great exertion of the lower part of the abdominal muscles. It happens most frequently in persons who are the subjects of stricture.

SYMPTOMS.—Hernia is known by its acting in conformity with the abdominal muscles; dilates and expands on coughing. 2. From its course, beginning from above and gradually descending. 3. When the person is placed in a recumbent posture, the rupture returns. Its reduction in the recumbent posture.

* The proportion of hernia on the right to those on the left side is as sixty-five to thirty-five. People who reside in the country and who do not exert themselves in age, are much less subject to this complaint. It is said that in this metropolis one person in nine is the subject of hernia. Sir Astley Cooper does not think the proportion so large, though he should say that "this town which is favourable to the production of the complaint, from the bad state of the atmosphere, and the relaxation of body produced by it, the proportion of persons affected with hernia is about one in fifteen. The French people are much more the subjects of hernia than the English. This arises from the great activity of that people and the temperature of the climate."

is a striking mark of distinction, but not without exception ; besides if it be a hernia, when the intestine goes into the navel, there will be a gurgling noise. There is considerable facility in detecting the contents of the hernial sac ; in operation therefore, for hernia, it ought always to be done under the impression that intestine and not omentum is contained in the sac.

DIAG.—In distinguishing hernia from some other complaints, there is considerable difficulty. 1st. Hernia is sometimes confounded with hydrocele, of which there are several varieties. (See HYDROCELE.) It is distinguished from varicocele, which is an enlargement of the spermatic veins, by the varicocele beginning above, and gradually descending into the scrotum ; the swelling is of the hernial form ; and on the hand being applied when the patient coughs, it dilates considerably ; but when the patient lies down it disappears ; hence the disease is very likely to be mistaken for hernia. To make, however, the distinction, tell the patient to lie down, raise the testicles, and empty the veins ; then press firmly on the abdominal ring, and retain the finger firmly, and raise the patient from the recumbent position, and the swelling will return. In this easy manner then may varicocele be distinguished from hernia. The other disease that may be confounded with hernia is hydrocele of the spermatic cord ; and here our diagnosis fails when the hydrocele is situated above the abdominal ring. In the recumbent posture there is no appearance of it, but as soon as the patient rises it returns. It is situated above the ring opposite to the tendons of the internal oblique and transverse muscles. Pressure on this part might be of service. The diagnosis of hydrocele below the ring is easy—above it is difficult. The transparency of hydrocele, and its beginning in the scrotum, are the characteristic marks of that disease.

TREATMENT.—If the hernia be a reducible one, return the contents and confine it with a proper truss, which must be constantly worn. Let the patient avoid costiveness, and violent exercise. If it be an irreducible hernia, the patient must wear a suspensory bandage, without which he will be continually exposed to considerable danger from the possibility of the hernia

bursting, should he by any accident receive a blow on the part will also prevent it from increasing in size.

I. HERNIA, STRANGULATED.

A hernia is said to be strangulated, when it is not only confined within the parts into which it has descended, but when it is so much compressed by the narrow part through which it has passed, that the circulation in the intestine and omentum which have descended has in a great measure stopped. The hernia, in fine, is not incarcerated; but it is so constricted by the narrow orifice through which it has passed, that the circulation in the intestine or omentum is in a great degree impeded.

SYMPTOMS.—*Strangulated hernia* is known by the pain in the region of the diaphragm, the patient feeling as if a cord were tightly bound round the upper part of the stomach, constant eructation, vomiting, costiveness, pain at the part where the stricture is situated; the abdomen afterwards becoming distended with flatus in consequence of the accumulation of flatus in the intestine, vomiting more frequent, rejection of feculent matter from the stomach, &c.

TREATMENT.—Employ the taxis*, steadily, for ten or fifteen minutes; if this does not succeed, bleed to fainting, and afterwards attempt the reduction by hand; if this also prove unsuccessful, throw up the tobacco injection and wait a short time; and if the intestine is not returned, have the operation performed. The application of cold, as ice inclosed in a bladder, or the freezing mixture,† where ice could not be procured, has frequently caused the intestine to return. The continued application of cold sometimes effect the reduction; and should always be applied in cases where, during the interim, time is wanted to consult; and delays, at least, the return of inflammation. On this subject, Astley Cooper (whose excellent treatise on hernia ought to be

* The attempt at replacing by the hand, without the use of instruments those parts which have quitted their natural situation, is called the *taxis*.

† Nitrate of potass and muriate of ammonia, equal parts, and a table spoonful put into a pint of water, will produce a degree of cold equal to 26 of Fahrenheit; 6 degrees below the freezing point. Linen wetted often with the mixture and spread over a part, supports a considerable degree of cold.

every surgeon) observes, "I have had a little personal experience in this complaint, and have devoted no small amount of attention to it, and I would not waste more than twelve hours if the tobacco enema* and other means had been employed." I say the operation so long as is often done, is most certainly one of those precious and irrecoverable moments, which, if only employed, might have rescued a fellow creature from a premature grave.

A reducible hernia, though it may remain for years in one state, should also be regarded with apprehension; and it is necessary the surgeon should take proper means to prevent an increase of the tumor, and to obviate the great danger attendant on it. The proper course to pursue, is to apply a truss (*See TRUSS*) by which the hernia will be constantly kept up on the opening, by which the protrusion of the hernia are prevented from passing out of the abdominal cavity, and by which the patient is preserved from the risk of becoming strangulated.

CAUSE OF STRANGULATION.—A membranous band crossing the neck of the hernial sac. A portion of intestine entangled in a part of the omentum, &c. Strangulation is often produced although only a small convolution of the intestine has descended; and this convolution being elongated, does not occupy any additional space at the mouth of the hernia. The fact is, that the additional portion of intestine, though it consists only of a single volume, is drawn down with it a portion of mesentery, which, added to the intestine previously descended, so completely occupies the neck of the opening as to produce the symptoms of strangulation. Strangulation arises from a portion of intestine occasionally entangled in a part of the omentum.

External Appearance.—Upon dissecting a person who has a strangulated hernia, a considerable effusion of lymph

A decoction of boiling water poured on a drachm of tobacco, suffered to stand half an hour, is the tobacco injection; half of which only is to be used at a time. The effect of this is to quicken the pulse, and also to make the skin likewise becomes cold and pallid, and there is extreme stiffness of the muscles: and if the hernia be situated near the muscle and tendon, the effect will be considerable and instantaneous.

is found in the cellular tissue in the neighbourhood of the hernial sac; and if gangrene had taken place, the parts will be foamy, emphysematous; and wherever pressure is made with the finger, that is, the part pressed, will pit or be indented. On opening the hernial sac there will immediately escape a considerable quantity of serum, which depends on the nature of the hernia:—for instance, if it be an omental hernia, there will be but little; if it be intestinal hernia, then a considerable portion of this will be present. The omentum undergoes a considerable change in its colour, being much darker than natural owing to its vessels being filled with coagulated blood; it will likewise have an offensive smell, and if gangrenous, the smell will be highly putrid; its texture also becomes very much altered, not being so solid as before death, having a crackling feel, as if it contained water or air, and easily breaking by the employment of the trifling force. Behind the omentum will be seen the intestine (both are in the sac), having upon its surface a peel of adhesive matter glueing together such portions of the intestine as happen to be in contact. The intestine will be found of a very dark colour, if it be not gangrenous, for that is not the character of gangrene; and in operating for strangulated hernia, should the intestine be as dark even as port wine, still it would be justifiable to return it into the abdomen, for when it is gangrenous its appearance is different, having upon its surface a number of green spots, not green at every part, but here and there green spots interspersed over the whole surface. Persons, therefore, acquainted with the diagnosis of this disease look for *small green spots* which readily yield and give way to pressure with the finger. The general character of parts in a gangrenous state is, their elasticity, and their yielding to pressure.

Continuing the examination, as soon as the abdomen is opened into there will escape a considerable quantity of gas, and the intestines, wherever they are found in contact, will be seen marked upon them a red line, which, however, will only be perceptible in those situations where the different convolutions touch each other. The next circumstance to look for is the seat of stricture, which is sometimes found at the abdominal ring, though not gene-

in old hernia. In recent hernia, and those of smaller size the stricture usually occurs above the ring.

Where is the stricture commonly situated in strangulated

Opposite the tendon of the transversalis muscle—a circumstance often produced in consequence of the thickening of the sac, from the pressure of a truss.

Sometimes the stricture is an inch above the abdominal ring; other times, when the hernia is very large, at the ring; when the hernia is very small, the stricture is often two inches above the ring. And it is owing to this circumstance, the finger is often lost in oblique inguinal hernia before the stricture can be felt, so far above the ring is it situated. Sometimes the finger feels the stricture an inch above the ring, at an inch and a half, or even two inches; and in each of these positions it is very common. The third place in which the stricture is found, is at the neck of the hernial sac, in consequence of a membranous band crossing it at that part.

II. DIRECT INGUINAL HERNIA.

This species of hernia protrudes directly out of the abdomen, through the external abdominal ring. It was formerly supposed that it was always the course which inguinal hernia took. An erroneous supposition; though it does occasionally happen that it takes place in that direction in which it was supposed to occur. Direct inguinal hernia begins on the inner side of the epigastric artery, between it and the pubes; it does not take the course of the inguinal canal, but it passes through the middle of the abdominal ring. The length of this hernia is not more than an inch at the utmost behind the abdominal ring; it is not more than three-quarters of an inch behind it. It passes through the abdominal ring, and is received into the scrotum, where it has three coverings instead of two, as in the case of oblique inguinal hernia. In the latter, as already observed, it receives its covering from the external oblique; namely, the aponeurosis of the external oblique, and another covering from the cremaster, both of considerable density, and thicker than the hernial sac

24
 itself. Direct inguinal hernia passes on the inner side of the epigastric artery, and directly as it emerges from the ring is received under the fascia of the chord, which forms one covering. The cremaster passes over obliquely, so that the whole surface is covered by it. Besides these coverings it has one of its own, which is properly the covering of the hernia, half of which is formed by the tendon of the transversalis, and the other half by the fascia of the transversalis. This forms a complete tendinous pouch, in which the hernia is contained.

CAUSES.—The cause of direct inguinal hernia is generally some great exertion of the lower part of the abdominal muscles. It happens most frequently in patients who are the subject of stricture, being occasioned more frequently from the effort to expel the urine, than from any other cause. Direct inguinal hernia may truly be called a rupture. Whenever a tear of the parts takes place, *direct*, and not oblique inguinal hernia is produced.

TREATMENT.—When direct inguinal hernia is reduced, a truss should be applied, not so as to press upon the pubis; this will give pain, but upon the parts a little above the abdominal ring. Pressure should not be made upon the whole of the inguinal canal, as in the case of oblique hernia; but the truss should be so applied as to make its pressure bear towards the centre of the abdominal ring. When a direct inguinal hernia is strangulated, the patient is often in great danger, though it appears to be reduced, as the intestine may still be strangulated within the hernia.

Q. How do you distinguish direct from oblique inguinal hernia?

A. They are distinguished by the following circumstances:
 1st. Tracing the spermatic chord, it will be found that in direct inguinal hernia, the hernia is placed behind the spermatic chord, whereas in oblique inguinal hernia the spermatic chord is behind the hernia. 2nd. When the mouth of the hernial sac is traced, in oblique hernia, it is found above the abdominal ring, towards the spine of the ilium; whereas, in direct hernia, there is

termination inwards, towards the umbilicus, so that it passes in a direction from without towards the pubes; from above downwards, with a slight obliquity outwards.

—These are two points which can only be distinguished by those who have frequently observed the disease in the living, and who have also had frequent opportunities of examining in the dissecting-room, the bodies of those who have died of the disease. Bearing the above points in recollection, the general principles may be formed to direct any surgeon performing the operation for strangulated inguinal hernia. In what respect does oblique inguinal hernia differ from

the oblique inguinal hernia emerges from the abdomen, midway between the spine of the ilium and the pubes; whereas, the direct hernia emerges directly from the abdominal ring. One takes the course of the spermatic chord, and the other passes directly through the abdominal ring from behind; one is covered by the spermatic chord and the cremaster muscle, the other has additional coverings, derived from the tendon of the transversalis and its fascia.

—A surgeon unacquainted with these facts, will make his incision upon the hernia, and as soon as he sees the fascia of the hernial sac, he will make a little cut, dividing a few fibres, under which he will put a director, and proceed to slip upwards. Instead, however, of coming to the hernial sac, as he expected, he will find a covering to divide, which, for a want of the knowledge here in question, he did not anticipate. This covering, then, will be divided, and still not coming to the hernial sac, he will find that it is as great a loss as ever. Such a man should never perform an operation. But if a surgeon is acquainted with the anatomy of the parts, he knows that there are, of necessity, two coverings to divide before he comes to the hernial sac; and that in the case of an inguinal hernia there is, besides the coverings formed by the spermatic chord and the cremaster, a covering, like the peritoneal bag, composed of the tendon of the transversalis and its fascia.—*Sir A. Cooper's Lectures, MS.*

OPERATION FOR STRANGULATED HERNIA.—Having used the

means previously recommended without success, the operation performed as follows. The patient is to be placed on a table five or two to three feet high, with the legs hanging over the end; the hair having been removed from the pubes, so as to prevent it from getting into the wound; the incision is to be commenced from the upper part of the tumour, in whatever situation it may be, and carried along its middle to the lower part. By the incision the fascia of the chord is laid bare; and in doing this will divide a small artery (the external pudenda) which crosses directly opposite to the abdominal ring. This is to be secured at both ends, which will enable the operator to have a good view of the different parts during the remainder of the operation. Having secured the vessel, you scratch through the fascia of the chord, just below the ring, with considerable care, separating it from the cremaster muscle. A small opening being thus made, a director is introduced upwards to the abdominal ring, and downwards to the lower part of the swelling, and divide the fascia more or less, as may be required, which brings into view the fibres of the cremaster muscle, passing obliquely from above downwards, which covering is of considerable density, and must be opened with care; a director is to be introduced under it in the same manner as under the fascia of the chord, and there it is to be divided; and as soon as this is done, the hernial sac, which has a blue appearance, and semi-transparent, from the fluid it contains, becomes exposed. The character of the sac then, it is seen to be quite different from that of the coverings, and the one may be easily distinguished from the other.

Having laid bare the hernial sac, it is to be pinched between the fingers, without any force; by this means you feel distinctly the intestine and omentum within it. When the sac is raised so as to separate it from its contents, take the knife and make a small cut into it downwards, but in a lateral direction; place the instrument horizontally, so as to avoid the danger of wounding the intestine. The danger to which you would be exposed were you to cut downwards. As soon as an opening is made, water generally escapes, if the intestine be included in the sac, and there are no adhesions.

Having opened the hernial sac, a director is to be introduced

as the abdominal ring, and then it is to be divided up to the tent, and downwards in the same way to the lower part of the .

When both omentum and intestine are in the sac, the former will be found before and the latter behind; there will also be a migration of omentum at the upper part.

The hernial sac being opened, the great difficulty commences. The next to feel for the stricture. Put your little finger into the hernial sac, and ascertain if it be situated at the abdominal ring; and if it is, spread the omentum on the fore and the intestine like an apron, so as to cover it entirely; by this plan the intestine is less liable to be wounded, and it adds accordingly to the security of the patient. A probe-pointed bistoury is then passed, guided on the finger, and the stricture divided to a small extent—a slight motion of the knife will do it. The stricture being usually situated at the upper part of the hernial sac opposite the tendon of the transversalis muscle, or else in the hernial sac itself, in this case, what you have to do is, to divide the abdominal ring, to hook up the abdominal muscles, and draw them upwards towards the abdomen; then to pull down the hernial sac; by this means you expose the stricture and render the operation more safe to the patient. The practice was formerly to introduce the finger high up into the hernial sac, with the thumb on it, and thus divide the stricture; but in this way the danger is increased, as the parts are concealed from view. The probe-pointed bistoury now used, is blunt to the extent of a quarter of an inch, sharp for half an inch, and then blunt again; so that you introduce it on a director, or finger, and divide the stricture without fear of cutting too much.

The stricture being divided, the intestine is next returned; and where the intestine before the omentum if both be in the sac. At this stage a finger should be introduced to ascertain if the intestine is freely returned or not, and are not compressed at the place where the stricture was situated. If there be any air in the intestines projecting above the stricture, bring it down to the level of the stricture, and by this means they will be more easily returned. The intestines should be returned piece-meal to the cavity of the

abdomen, and then the omentum should succeed it. The direction in which you are to divide the stricture so as to avoid the epigastric artery, is *directly upwards*. The stricture is to be divided in the centre, and the cut made upwards, let the hernia be where it may, and there will, by following this rule, be no danger of wounding the epigastric artery.

There is some difficulty in ascertaining whether the intestine be gangrenous or not. If there be any dark brown spots upon it, do not let that prevent you from returning it. Sometimes the intestine adheres to the sac. If the adhesions be slight, break them down with the finger, or divide them very cautiously with the knife. If they are in general strong, the best plan will be to completely divide the stricture, so as to return the strangulation and leave the intestine in an irreducible state. An irreducible hernia is not dangerous, provided there be no strangulation. If the intestine be gangrenous it will be known from the appearance of thick green spots, which will admit of being easily broken down with the nail.

As regards the omentum, after the operation in strangulated hernia, it is more easy to treat than intestine. If the quantity be small and little changed in character, it must be returned to the mouth of the hernial sac, so as to seal up the opening, and thereby prevent the ready descent of the hernia at any future period. But it often happens that a considerable portion of the omentum descends; in this case, the different layers unite and form a solid mass. Under these circumstances you are to remove a large portion of the omentum with the knife, and return the remainder to the mouth of the sac, to plug up the opening. The bleeding vessels are to be drawn out with the forceps and lacerated, which will stop the hæmorrhage; but where they continue notwithstanding to bleed, ligatures should be applied on the vessels alone without including any part of the omentum. The ligatures must hang out of the hernial sac, and in three or four days they will separate. When the omentum is in a gangrenous state it will be known by the blood coagulating in the veins, and this is the criterion whether or not it is to be returned. If the blood be coagulated there will be a crispy feel. The omentum, in a state

gangrene, has nothing of the blue appearance seen on gangrenous surfaces; nor any of the green spots to be found on the intestines in a similar state. When the omentum is gangrenous, excision is the treatment always adopted; by cutting it away close to the neck of the hernial bag, leaving the remainder to plug up the opening. The vessels of course must be secured; and the hæmorrhage entirely ceased before any of the omentum be returned.

There is a peculiar sort of hernia which contains the cæcum. The gut sometimes descends into an inguinal hernia of the inside, and on dissection is found adhering to the posterior surface of the scrotum. This cæcum is not enclosed in the hernial sac, but the hernial sac is before it. Those who have studied the anatomy of the viscera know that the cæcum is confined posteriorly by cellular membrane, and that the peritoneum passes over it anteriorly on the posterior surface of the cæcum. There is no peritoneum, unlike, in this respect, to the other intestines, with the exception of the duodenum and colon. When the cæcum, therefore, descends, it brings down the peritoneum in front; but behind there is merely cellular membrane, by which means it is confined to the scrotum so securely, that it is impossible in many cases to return it; then the stricture must be divided, and the intestine allowed to remain. When the bladder protrudes in a hernia, it is covered anteriorly by peritoneum, but posteriorly it is confined by cellular membrane, the same as the cæcum. When the cæcum is included in a hernia it will be known by the *Appendix cæci vermiformis*.

TREATMENT AFTER THE OPERATION.—The integuments are brought together and retained in apposition by means of sutures which should only include the skin; and if adhesion can be effected, a great advantage will be gained. After the operation for strangulated hernia there are two things from which the patient is to be apprehended;—*first*, that the intestines may not perform their office, and the fæces not pass in their natural course; and principally, that peritoneal inflammation may come and produce the same effect as if gangrene were present. The operation, should be to close the wound as completely as possible, and for this purpose slight pressure will be of service. If

the hernial sac remains open, the process of adhesion will be difficult; but if adhesion of the sac takes place, peritoneal inflammation will probably be prevented. After the integuments have been brought together by means of sutures, slight pressure should be made by dossils of lint, and the parts should be supported in a suspensory bandage, which will be of use also in preventing formation of matter in the scrotum. The patient should keep a horizontal posture; and he should have his evacuations on flannel, and not be allowed to get up. In five or six hours after operation, give a little sulphate of magnesia or castor oil. "The more motions a patient has after the operation for hernia the better. It will be necessary to keep up a free discharge from the bowels by opening medicines, or the patient will die."—*Sir J. Cooper*.

The history of a case is generally this: In four or five hours after the operation the patient has a motion, and in the course of twenty-four hours two or three, and he will be supposed to be doing well. On the following day there will be no motion; the abdomen is tense and tender to the touch, and vomiting comes on only. The patient at this time is in the greatest danger; he must bleed largely and purge him freely by medicine or injection. If venesection has been resorted to before the operation, peritoneal inflammation does not usually follow. Calomel with opium—five, and in some cases ten grains of calomel, and from one to two grains of opium. It will be useless to give calomel with any other medicine than opium, for it will be rejected. Purgative clysters, with cathartic extracts should also be administered. Great danger is to be apprehended for some time after the operation; and even those who have two or three motions within the first twenty-four hours often die. The patient will sometimes be affected with hiccough; this is not the result of gangrene or peritoneal inflammation, and must be treated by bleeding, general and local, fomentations and purgatives; which may be aided by a little opium. For some time the diet is to be low. When the danger is past, cordial or some broth and a generous diet must be directed.

OBS.—The operation for strangulated hernia should always

examined before there be any peritoneal tenderness : there will be tension of the abdomen from inflation of the intestines ; tenderness from peritoneal inflammation, if present when the operation is performed, renders the issue doubtful ; because, by the division of the stricture liberates the parts which are inflamed, yet it does not retard peritoneal inflammation ; it should consequently be made a rule to operate before any symptom of it pass. *Secondly*, you may wait a longer time in old persons, than you perform the operation, than in the young or middle aged. In a boy, for instance, a very short time should elapse before other means have been used ; in an older person you may wait longer, because the parts are generally more relaxed.

III. HERNIA IN THE INGUINAL CANAL.

A small hernia occurs above the abdominal ring, and does not go through it at all, which is equally as dangerous as a hernia many times its magnitude. This is a case which it is difficult to cure in the living subject. The symptoms are those of strangulated hernia, with a fulness on one side above the abdominal ring which is not observable in the other ; tenderness upon pressure of the part where the fulness is, and a great disposition to vomit.

Operation which it will be necessary to perform in this case is to make an incision along the course of the inguinal canal, a little obliquely above the abdominal ring, so as to avoid making the wound large. The incision of the integuments lays bare the edge of the external oblique ; which being exposed, and an opening made through it, the hernia immediately appears projecting through the edges of the wound. The hernial bag is covered by a thin process, which passes from the upper aperture, through which the hernia proceeds. As soon as the hernial sac is cut, a little fluid escapes. The stricture will be found at the point into which you are to introduce a small director, and directed by making a slit upwards with a probe-pointed bistoury.—*Case, on Inguinal Hernia.*

HERNIA, INGUINAL, IN THE FEMALE.

This disease is of less frequent occurrence in the female than in

the male, in consequence of the smallness of the parts through which the ligamentum rotundum descends. Hernia in the female therefore, is comparatively rare. When it occurs, the course which it takes is similar to that of inguinal hernia in the male: comparing the ligamentum rotundum in the former case, to the spermatic cord in the latter. It begins midway between the space of the ilium and the symphysis pubis—its origin being seated on the external side of the epigastric artery. It then enters the inguinal canal, passes along the canal, under the internal oblique and transversalis muscles, till it reaches the abdominal ring where it emerges. Hernia in the female is commonly small, especially in the labia; the sac is much more considerable above the abdominal ring than below it. On this account there is considerable difficulty in the performance of an operation for this hernia.

In dissecting a hernia in the female, you will find, immediately below the labia, a fascia covering the hernia similar to that in the male: the abdominal ring gives off a fascia, which descends into the labia. When the hernia is reducible, it requires a truss similar to that used by the male; as it is generally small it will give way to pressure after about a twelvemonths' use; though it will be proper to continue the truss for two years longer.

OPERATION.—When this hernia is strangulated, the operation for it differs in some respects from that required for inguinal hernia in the male. When the incision is made upon the hernia below the ring, you will find that the peritoneal bag does not contain either intestine or omentum, and that nothing but a watery fluid escapes. This leads you to slit up the abdominal ring: on putting the finger within it, something will be felt contained in the sac above the ring—this is generally intestine, but sometimes a portion of omentum descends with it. Having divided the tendon of the external oblique, you will find that a convoluted mass of intestine has descended, and you will then look for the hernial sac which is generally about two inches above the abdominal ring. In the male, the inguinal canal is considerably shortened by the approximation of the upper to the lower opening, but in the female the canal undergoes little alteration, and the orifice of the hernial sac will in general be found at the distance of at least

ings from the abdominal ring. Having slit up the tendon of the external oblique from an inch to an inch and a half, and directed an assistant to draw it up, a director is put within the sac, the stricture is felt for and dilated upward or outwards towards the iliac process of the ilium. The general rule is to divide it inwards, but it may be divided outwards with safety, as there is no danger in this case of wounding the epigastric artery, which is on the inner side.

IV. HERNIA, CONGENITAL.

ILLUSTRATION.—Hernia of the tunica vaginalis testis; but it does not always happen that hernia of the tunica vaginalis testis is congenital; it sometimes appears in the adult. The way in which it takes place may be thus explained: the tunica vaginalis descends to the abdomen a little before birth, so that a portion of intestine is very readily admitted into this part. It scarcely ever happens in the young subject that any thing but intestine is contained in hernia of the tunica vaginalis, the omentum not reaching so near as the orifice. If the tunica vaginalis be not closed immediately after the birth of the child, a hernia will make its appearance. The existence of this hernia is well known to nurses, who make the distinction between what they call a windy and a watery swelling. It sometimes happens that the tunica vaginalis, though closed, will not admit of the descent of a portion of intestine, because the orifice is extremely small, and the person will arrive at the age of from twenty to thirty years before the hernia shows itself. The descent of a small convolution of intestine is then entirely the effect either of relaxation or of some sudden or disordered exertion.

DIFFERENCE.—When intestine or omentum has descended into the tunica vaginalis, reaching to the lower part of the scrotum, the testis is involved in the swelling, so that it cannot be distinctly felt. This is a distinguishing mark between congenital hernia, or hernia of the tunica vaginalis, and common hernia—the former is more concealed and buried in the surrounding parts. In common hernia, the coverings of the hernia, namely, the fascia of the abdomen and the cremaster are thin; but the tunica vaginalis being

thicker than the peritoneum, the parts are not so readily distinguishable in hernia of the tunica vaginalis as in the common hernia. The testicle is besides considerably diminished in size in the late species of hernia, in consequence of the pressure on the sac preventing the free circulation of the blood-vessels in that part. In hernia of the tunica vaginalis, the spermatic chord is not unfrequently altered in its direction, the artery and vein being on one side, and the vas deferens situated posteriorly on the other part. It not unfrequently happens, in this species of hernia, that the testicle does not descend completely into the scrotum, and the peritoneal sac descends lower than the situation of the testicle.

TREATMENT.—When the hernia, of which we are now speaking, is in a reducible state, and a child is the subject, whose testicle is situated above the abdominal ring, the parent is to be advised to take no account to apply a truss, but to let the hernia extend itself until it has gradually brought down the testicle into the scrotum, and then, and not till then, to apply a truss; since the premature use of a truss would press upon the testicle, waste, and at length destroy it; but if the hernia be suffered to increase till the testicle has descended into the scrotum, there will be but little risk of its being strangulated in very young subjects, and when it has descended it will then be time enough to apply a truss. A truss with springs may be worn when the child is three months old. The reason why a truss has not been applied sooner is, that the parts were kept in so wet a state that a truss is very speedily destroyed. This reason, however, no longer exists; for Mr. Coles, of Charing-cross, has attained such a degree of perfection in the adaptation of trusses for all ages and both sexes, that they may be worn from the time of birth, if requisite, with the most beneficial result, let the species of reducible rupture be what it may.—See TRUSS. The pressure should be extremely light; for the most part, the parent should be recommended, at first, to have a truss made in the form of the common spring-truss, without any spring. A pad, retained by a leathern strap, should be placed upon the hernia, fastened round the abdomen of the child, and another strap passed between the thighs. As long as the child is kept in the horizontal position, and the arms, the hernia will, in general, be prevented from descending.

and, at the end of three months, a truss may be borne without inconvenience. As regards the treatment of congenital hernia, we are not aware of any particular treatment that can be considered different from that which is practised in the common inguinal hernia.

OPERATION.—The operation in strangulated hernia of the tunica vaginalis is more difficult than that in the common hernia, the contents in the former being more concealed and involved in the parietes than the latter. When an incision is made into the sac, care should be taken not to open the vaginal sac too low, for the two following very obvious reasons;—*first*, because the sac should always have sufficient tunica vaginalis to cover the incision, to prevent any unnecessary irritation; and, *secondly*, because the spermatic artery and vein are situated obliquely in the neck of the sac, and there would be danger of cutting through each of them. Three inches, therefore, of the tunica vaginalis should be divided. A considerable quantity of water is generally found within the intestines in the tunica vaginalis—a much greater quantity, indeed, than in the common hernia; because the tunica vaginalis is a more secreting surface than the peritoneum. In congenital hernia the stricture is generally about an inch and a half above the abdominal ring, opposite the tendons of the transverse muscle. When the hernia is very large, the seat of stricture will be found to be within half an inch or an inch of the abdominal ring; but this rarely happens.

There is no particular variation in the circumstances of this operation, which differ from those adopted in the common inguinal hernia. When the intestine adheres generally, the stricture is divided and the intestine left within the tunica; if the stricture be only at a particular point, it might be cut through; but to cut through any considerable portion of the tunica vaginalis, there would be great risk of dividing the spermatic artery or vein. After dividing the stricture, the edges of the wound are to be brought together, in order to promote adhesion. In this case the patient is left as he was found, with his irreducible hernia relieved from the dangerous symptoms of strangulation. The patient should wear a laced bag-truss after the operation.

- * * There is a particular species of hernia of the tunica vaginalis—namely, an *encysted hernia* of this membrane, which is very much concealed within the scrotum—a bag is situated within the tunica, not formed by peritoneum, but is a cyst produced in the following manner:—opposite to the situation of the abdominal ring adhesion takes place between the sides, and a pouch is formed leading into the tunica. A stricture crosses the pouch directly opposite to the abdominal ring, shutting it up; as the intestine descends into the upper part of the bag, the adhesion becomes elongated, and at length a sac is produced.

V. FEMORAL HERNIA, ANATOMY OF.

The superficial fascia of the abdominal muscles is given off from the tendon of the external oblique, which descends upon the spermatic cord, and is united to the edge of the abdominal ring in its descent. The stricture which is of considerable density, is continued to the thigh, and forms a covering of femoral hernia. The absorbent vessels and superficial veins are kept within their boundaries by this fascia. From Poupart's ligament two portions of fascia pass upwards—the fascia transversalis and the fascia iliaca. In cutting through the fascia lata a second portion of fascia will be found to be given off from the back of Poupart's ligament, which forms the sheath of the femoral artery and vein, which are separated from each other by a septum. The anterior crural nerve has no connexion with the sheath, but forms the outer boundary of the sheath on the outer side. It is into this sheath that femoral hernia descends. It begins to descend between the lower border of Gimbernat's ligament, which is the lower edge of Poupart's; the femoral artery being on the outer side, and the vein on the inner. The sheath becomes elongated when femoral hernia is produced; and it is turned over Poupart's ligament; so that the lower part of the hernia is doubled on the upper part, and its mouth is just opposite the fundus or basis.

OBS. When the peritoneum which covers the femoral hernia is protruded, it descends on the inside of the femoral vein, and is received on the inside of the crural sheath. Before the hernia protrudes, it elongates the sheath, which forms a covering

When a femoral hernia protrudes, it descends on the inside of the epigastric artery; and there is little danger of wounding this vessel, in the operation of cutting upwards and outwards. It should, then, be recollected that the epigastric artery is to the inside of the hernia. In the male subject, the spermatic artery crosses on the fore part of the tumour, but at such a distance from the place where the stricture is situated that there is little danger of wounding it in the operation for femoral hernia; since it would be but an indifferent acquaintance with the nature of the parts and principle of the operation, to carry the incision so high up; there being no necessity for it, as a slight touch of the stricture with a knife will be quite sufficient to allow of the return of the hernia. It should, however, be remembered, that on the fore part of the tumour, above Poupart's ligament, covered in the inguinal canal is the spermatic artery, which ought never to be in danger of being wounded. On the inner side is situated Gimbernat's ligament; on the outer side are the femoral vessels; and there is a stricture situated near the mouth of the hernial sac, but to the outer side of the epigastric artery. The part through which femoral hernia protrudes is the opening left in the *fascia lata*, to give passage to the femoral vessels, and the vena saphena. The femoral hernia is situated behind this fascia, but protrudes through the opening, and is situated on its fore part; the crural sheath is carried before the hernia, becomes elongated, and always forms a bag for the hernia.

§ 3.—Femoral hernia may be confounded with other diseases, and requires consequently no small degree of knowledge to discriminate its appearances from those of other complaints. It has the appearance of bubo; in some subjects it is small and very little perceptible, and projects very slightly. In dissecting a femoral hernia to ascertain the appearances that are to be met with, you will see, after laying open the skin, the *superficial fascia*, and a few superficial vessels: in consequence of the pressure of the hernia, the stricture is distinctly visible to the eye, and is a stricture of considerable density. Secondly, having cut through this fascia, the opening of the femoral vessels (*fascia propria*) becomes exposed, and a complete bag, so as to close the hernia, let its size be determined.

Note.—There are two sacs of the same form covering femoral hernia—the first consisting of the elongation of the crural sheath, the second of the peritoneal covering. Every case of femoral hernia will be found to have a bag or covering, formed of the crural sheath, except when the hernia has been so large that it has given way. Femoral hernia is subject to very little variety.

TREATMENT.—I. *Of reducible femoral hernia.* A different truss is required for this kind of hernia than in the inguinal species. The pad should be at right angles to the spring, placed lower down than in inguinal hernia, so as to cover the crural sheath, and the space through which the hernia protrudes. The truss that ought to be worn is a right angled truss, *i. e.* with the pad at right angles to the spring. It should, however, be observed, that femoral hernia is rarely cured by the application of a truss. A truss ought nevertheless to be worn, to prevent the farther descent of any of the parts, but the result is generally less successful than in inguinal hernia.—*See TRUSS.*

II.—*Of irreducible femoral hernia.*—In this complaint a truss ought also to be worn, with a hollow pad, so as to receive the hernia and confine it, giving the sides an opportunity to glue. There will also be a chance, if the hernial sac contains omentum, of the latter being absorbed.

III.—*Of strangulated femoral hernia.*—The symptoms of this complaint are more urgent than those of strangulated inguinal hernia; and the reason is, that the orifice through which femoral hernia protrudes is smaller, and the pressure consequently greater. The patient complains of more pain than in inguinal hernia, and rarely lives so long (if the stricture remain) as a person under the same circumstance with the other kinds of hernia. A patient has been known to die seventeen hours only after femoral hernia (femoral) had become strangulated. In femoral hernia the patient generally survives four days if the stricture remain, and in strangulated inguinal hernia a patient has been known to live a week.

TAXIS.—When called to a case of femoral hernia the taxis in the first instance must be resorted to in the following manner. The patient is to be placed on a bed, with his shoulders elevated,

is bent at right angles, to the body, and approximated to each other; so as to admit an arm only between—pressure is then to be employed on the hernia by pushing it directly downwards in order to get it below Poupart's ligament; but if the hernia be pressed upwards, without having first taken this step, it will merely be pushed farther above the ligament. The hernia must first be brought right below the level of Poupart's ligament, then kneaded between the fingers, and pressed upwards. The form of femoral hernia is different from that of inguinal hernia. The body of femoral hernia is turned upwards and forwards over the neck, and nearly at right angles to it above Poupart's ligament; consequently it will be mere folly to press it upwards till it has been first brought downwards, as the hernia would only be doubled the more upon itself. The taxis having failed, the tobacco injection (*see* p. 419) is to be employed, the patient bled, and the warm bath used. None, however, is to be lost in femoral, as there is less chance of strangling it than in inguinal hernia. These means having failed, operation must be performed without delay, which might occasion considerable mischief.—*See* TAXIS.

OPERATION FOR FEMORAL HERNIA.—The *first* incision is to be made in the course of Poupart's ligament, along the tumour, extending from one side to the other; the *second* is made at right angles to the first, towards the umbilicus, so that the two incisions resemble the letter **J** inverted. The angular flaps are next to be cut off, and reflected, so as to allow of greater room. By the first incision the superficial fascia, which is next divided is exposed, and the hernial sac, called by some the *fascia propria*, is brought into view. This in its turn is next cut through, and the hernial sac or peritoneal covering makes its appearance. The next point is to make an incision into the hernial sac with the greatest possible care, and then introduce a director to ascertain the seat of stricture.—Having opened the hernial sac, and exposed the intestine, in what direction are you to divide the stricture? Sir Astley Cooper advises the stricture to be divided directly *upwards* and *inwards*, a little inclined towards the umbilicus, in the following manner. After introducing the director, a bistoury, blunted at the point, is to be put on it, and

placed against the stricture. In this way there is no danger of wounding the intestine. The bistoury is to be gently raised, and with a slight touch of the instrument, the fibres will give way, and the intestine readily return into the abdomen. But it has been recommended to cut in the direction of Gimbernat's ligament towards the symphysis pubis; there will be no necessity for this as the stricture is not situated at Gimbernat's ligament: it is never known to be there. The seat of stricture in femoral hernia is at the crural arch, just where the intestine leaves the abdomen; and when this is slightly divided, the stricture gives way, and by little pressure the parts are easily returned. "I have known Gimbernat's ligament divided, under the supposition that it was the seat of stricture, whilst the stricture itself remained undivided and the patient died."—*Sir A. Cooper's Lect. MS. Copy.*

"The situation of the spermatic chord, which lies directly over the mouth of the sac, in part renders it expedient not to divide the stricture directly upwards, if you are operating on the male subject; but this same objection does not exist in females. The position of the epigastric artery on the outer side of the mouth of the sac, renders it of course quite out of the question to think of dividing the stricture *upwards* and *outwards*, that is, towards the superior spine of the ilium; the only course therefore that remains to be taken, is to divide the internal portion of the stricture, carrying the division close to the bone, and in a direction towards the pubis.* Even this mode of dividing a stricture, however, is not safe in all cases, for it happens, not uncommonly, that the obturator artery arises from the epigastric; and in such a case the artery might run along the inner side of the sac, the neck of which would thus be surrounded, on its outer, upper, and inner sides, by a large arterial trunk, and perhaps it would be hardly possible to escape dividing an artery, in whatever direction incision were made: but, fortunately in those cases in which the obturator artery arises from the epigastric, it usually runs on the outer side of the sac."—*Ibid.*

* The stricture in femoral hernia is (generally, if not always) produced at the thin short edge of Gimbernat's ligament; it is therefore found at the inner side of the sac; and there the division is to be made. This is

s.—Femoral hernia occurs much more frequently in the female than in the male. The surface between the spine of the ilium and the angle of the pubis is considerably larger in the former than in the latter; the transverse measurement of the pelvis is more considerable; there is consequently more space for the hernia to be protruded through, and thus femoral hernia is more common in the female, while inguinal hernia occurs more frequently in the male, for the opening through which the spermatic cord descends is necessarily larger than that through which the round ligament of the uterus passes in the female. Crural hernia may, however, occur in the male as well as in the female; the comparative frequency of the two kinds of rupture in the two sexes is only here alluded to.

VI. UMBILICAL HERNIA.

This species of hernia takes place through the opening in the linea alba, which the umbilical vessels pass through in the foetus; it is a circular opening and the orifice of the sac therefore is of a round shape. The parts come out directly from the abdomen, and the form of the rupture is very simple. In order to repress it, we have to apply a bandage that encircles the body, just in the horizontal direction. A bandage of this simple kind will keep the hernia reducible, in their natural place.

It is easily accomplished by carrying the bistoury *inwards* in a direction parallel to the bone; that is, by passing a director on the inside of the protruded parts, and cutting directly towards the pubis. The difficulty which is experienced in doing this, arises partly from the very close way in which the stricture embraces the protruded viscera, and partly from the depth at which the rupture is seated, so that you have to divide it in a part that is quite out of sight. You must trust entirely to your feeling; you cannot see the operation as you are performing, and you will therefore have the intestine carefully held by an assistant, and perhaps have the handle of a knife placed against the abdomen, so as to prevent all possibility of wounding it by the curved bistoury when you introduce. The knife is to be introduced under the stricture, so as to bring the cutting edge against the tendon, which is to be cut very gradually, the fibres of it being successively divided. A very small division of the tendon, of an inch, will be sufficient in this case to liberate the parts and to allow their return into the abdomen; and in this way the stricture may be divided without at all endangering even the main portion of the crural arch—you may divide as much as a quarter of an inch without at all separating the tendon of the arch to the pubis.—*Lawrence on Hernia.*

CAUSES AND SYMPTOMS.—Umbilical hernia is next to inguinal hernia in frequency, if not before it. It is very common in infants soon after birth. In adults where there is great obesity, in pregnant women, and children, this complaint is often met with. In infants it will soon be recognised by the situation of the core. Recollect the anatomy of the part, that there is an opening in the *linea alba*, and the peritoneum lines it internally. When a hernia takes place, this opening does not close; the peritoneum equally lines it with the other parietes of the abdomen: when the hernia therefore protrudes, the peritoneum is always carried before it, whether in youth or advanced age. Umbilical hernia is subject to little variety, either in form or size. Occasionally there are two bags of intestine, separated by a rupture.

TREATMENT.—I. *Of reduced umbilical hernia in children.* When the regular application of a bandage surrounding the body, is very irksome and inconvenient, sufficient pressure can usually be made without completely surrounding the trunk; by applying, for instance, one half of an ivory ball on the umbilicus, and over this adhesive plaster and a belt; the latter, however, will be of no use unless supported by straps which come round the lower part of the belly and thighs. A little waistcoat fastened by two strings will be of use. In cases of this kind, it was recommended by Desault, to return the parts into the abdomen, and then to surround with a ligature, that portion of skin which constituted the external tumour, and which contained the sac.

II.—*Reducible umbilical hernia in adults.*—In adults, at the commencement, the plan of treatment should be the same as in children; but, if by means of the ivory ball the hernia should not be returned within the opening of the umbilicus, a pad, covered with black silk, and fastened by adhesive plaster, is to be placed over the part. When the hernia is reducible a truss should be worn. It will seldom effect a cure, and is often liable to shift its situation; but a truss should be worn, as it affords a shield to the abdomen, where the hernia is pendulous, and there is much obesity. The truss that ought to be adopted in this species of hernia consists of two broad belts, which must come round and buckle over the abdomen. But as this is continually liable to change place

low belt joined to the broad one, should also go under the pen-
nus part of the belly.

III.—*Irreducible umbilical hernia*.—In this case, a hollowed
pad, on the same principle as the one employed in irreducibil-
femoral hernia, should be worn. It should be buckled
round the abdomen, and if omentum be contained in the hernial
sac it will be likely to be diminished in size, and the danger of
the sac bursting will also be prevented. In strangulated umbilical
hernia, before the operation is resorted to, the tobacco clyster
should be employed, as it has a greater effect in relaxing the mus-
cles and taking away the cause of the stricture in this than in any
other kind of hernia.—*Sir A. Cooper*.

Q Suppose you were called to a strangulated umbilical hernia,
would you endeavour to return it?

A If it were small, by the hand alone; but if it were very
large, the bottom or flat surface of a wooden platter must be
laid on the abdomen, and pressure thus effected. When
pressure in this manner has been kept up for some time, the
ring at the umbilicus becomes dilated, and the hernia returns.

OPERATION.—In the case of strangulated umbilical hernia the
operation is very simple, though it is not one of the most success-
ful. The plan to be adopted in operating, is to make first an
incision across the tumour, and then another at right angles, so
that the two may resemble the letter **J** inverted. The integu-
ment being thus divided, the corners of the incision are turned
outwards, by which means the hernial sac is brought into view;
this being carefully opened, the finger is to be passed to the
neck of the sac at the umbilicus, and a blunt-pointed bistoury
passed on it. The stricture is to be divided upwards, in the
middle of the ensiform cartilage. Having returned the intes-
tine the parts are to be brought together, and a flap formed
above to cover the opening. If adhesion of the sides of the
wound can be effected, the danger of peritoneal inflammation will
be lessened. Dossils of lint and adhesive plaster are to be ap-
plied over the wound. The after treatment is the same as for
other herniæ.

VII. VENTRAL HERNIA.

DEFINITION.—When a protrusion takes place in any other part of the *linea alba* than at the umbilicus, it is called a ventral hernia. This is a specimen of a hernial tumour on the *linea alba*, but not at the navel; it forms a small round tumour—it is a ventral hernia. The same name is given to ruptures that take place in other parts of the abdomen. Should a protrusion take place in the *linea semilunaris*, or in any other part of the abdomen, at a wound, it is called ventral hernia.

OBS.—Such protrusions as the above very seldom become strangulated; it is very uncommon to find it necessary to proceed to operation in the case of ventral hernia.—(Lawrence.) When ventral hernia occurs low down, and becomes strangulated, care must be taken, when operating, of the epigastric artery. The intestine generally protrudes either through the opening in the *lineæ semilunares*, or *lineæ transversæ* of the abdomen, which become enlarged.

VIII. OCCULT HERNIA.

There are other kinds of hernia occasionally observed, but they are very rare, and many of them hardly, if at all, distinguishable in the living subject. A protrusion has taken place at the aperture of the foramen ovale, through which the obturator vessels pass out. A protrusion has been known to take place through the sciatic notch. A protrusion may take place through the diaphragm, or through the natural openings in it. There are occasional instances in which parts of the bowels have been strangulated by some unnatural formation of the various folds of the peritoneum within the cavity of the abdomen, or in consequence of peritoneal chords surrounding the bowels in various directions. Since, in all these various occurrences, although they come under the name of hernia, hardly admit of being recognized during life, they come very properly under the denomination of *occult hernia*.

HERNIA HUMORALIS.

By hernia humoralis is generally understood a swelled or inflamed testicle—a common symptom attendant on gonorrhoea.

ly, however, sympathetic, and not venereal, in consequence of the same symptoms following every other kind of irritation of the urethra, whether originating in strictures, the use of injections, or bougies. Such symptoms are dissimilar to the diseased conditions arising from the application of syphilitic matter; for it is well ascertained that suppuration seldom supervenes, and if it really does, the matter is not of a venereal character.

USES.—Sympathy with the urethra; irritation at the mouths of the vasa deferentia, though were this the case, both testicles would usually be affected at the same time; stoppage of the discharge, &c.

TREATMENT.—Rest, and the horizontal position of the body; suspension, at least, of the testicle; bleeding, when the symptoms are high; leeches, or puncturing of the scrotum; fomentations, poultices, and cataplasms. Mercury, to remove the induration after inflammation has subsided; emetics, on the principle of revulsion, have been found occasionally beneficial; opiates, to soothe and relieve the pain. Should suppuration occur, mercury is not requisite; the common treatment only is requisite. Frictions with mercurial ointment, fumigations with aromatic herbs, are recommended by John Hunter for dispersing indurations, which remain after the subsidence of the disease. And, as the hernia humoralis appears to depend on the cessation of the discharge, Bromfield has advised irritating the urethra with a bougie to bring on the running again; though this practice is seldom followed by anticipated benefit. Sometimes the pain in hernia humoralis arises from a tumour, sometimes in the abdomen.—See TESTICLE.

HYDARTHURUS.

A word derived from the Greek, signifying water and a joint. It is a swelling of a joint. It is also called by the Greeks *hydarthron*, *hydarthros*; and *spina ventosa* by the Arabian physicians; and is named from its colour, a white swelling. In this country it is a very common and exceedingly terrible disease. The varieties of white swelling are very numerous, and might usefully be distinguished by particular appellations. Systematic writers, however, have been generally satisfied with distinguishing it into two kinds,

namely, the *rheumatic* and *scrophulous*. The last species of the disease is also distinguished by them into such tumours as primarily affect the bones, the ligaments and the soft parts; and in other cases where the ligaments and soft parts become diseased before there is any morbid affection of the bones. The knee, ankle, wrist, and elbow, are the most common seats of white swelling.—See JOINTS, DISEASES OF. SCROPHULA.

HYDROCELE.

DEFIN.—Hydrocele is an accumulation of water in the tunica vaginalis testis; the anatomy, therefore, of those persons who have it, that the fluid is contained between the tunica albuginea and the tunica vaginalis is extremely faulty.—(*Sir A. Cooper.*) The situation of the water in hydrocele is precisely similar to water in the pericardium.

Hydrocele is of two kinds, viz. first, of the tunica vaginalis and second, of the spermatic chord. The former is by far the most frequent; and when simply speaking of hydrocele, the affection situated in the testis is usually referred to. "Hydrocele of the tunica vaginalis is, in fact, dropsy of the serous membrane; it is an affection bearing exactly the same relation to the tunica vaginalis, that ascites, or hydrothorax, bears to the serous membrane of the abdomen or thorax."—(*Lawrence's Lect. see Lawrence's Vol. II p. 658, 1829—1830.*) It consists in a preternatural secretion of a clear, transparent, straw-coloured fluid into the cavity of the tunica vaginalis. The fluid that constitutes the tumour surrounds the testicle, or, at least, is in contact with its anterior and lateral surface.

CAUSES.—The causes of hydrocele are obscure. It appears to depend upon increased secretion, as the vessels are dilated, though there is generally an inflammatory action. The tumour generally forms without any apparent cause, gradually increasing, and, if left to itself, produces probably a very considerable swelling. In some instances, the fluid of hydrocele is deposited between the tunica vaginalis, under circumstances which indicate the existence of inflammation, enlargement produced by inflammatory action of the testicle. Under these circumstances, there may be

deposition of fluid into the tunica vaginalis; and this case, which combines enlarged tunica vaginalis and disease of the testis, and in which the fluid has been deposited under active inflammation, is technically called hydrosarcocele. But in the majority of cases in which the surgeon is called upon to operate, the deposition takes place without the existence of any symptom indicating inflammation in the membrane that produces it.

Symptoms.—Hydrocele commences at the lower part of the scrotum, is of a pyriform shape, largest two-thirds of the way upwards, a little less at the bottom, and smallest at the ring, and gradually ascends towards the abdominal ring, but it terminates generally a little above the testicle, that is, it terminates where the tunica vaginalis ends. This serous tunica ascends only a few inches above the upper part of the testicle, and the same distance limits the swelling in hydrocele. If, however, the hydrocele be of long standing, the tunica vaginalis gradually extends in front of the spermatic chord, becomes elongated in the direction upwards, and may be so much distended in this direction as to reach the opening into the abdominal muscles; it may pass upwards as far as the abdominal ring; and may even go beyond this, for the swelling in some cases.

The ordinary situation of the testicle in hydrocele is two-thirds of the way down the tumour, at the posterior part, though as regards this position it sometimes varies. The position, however, of the testicle may be easily discovered by a careful examination of the swelling, and by squeezing it with some degree of force at every part. When the testicle is pressed upon, that part of the tumour will be found most firm; the patient will manifest much uneasiness, and complain of a good deal of pain. The weight of the tumour is but comparatively small; when it is lifted, you will be struck at its lightness, which will at once convince the examiner that it is not a solid substance. The next thing to be observed is, if the part be not very much distended, that the swelling will be moveable, i. e. if it be firmly grasped at its base, the swelling will ascend, and the tumour increase at its upper part. Its signs, therefore, mobility, form, freeness from pain, and the

history of the case, constitute its distinguishing characters from other diseases. There are, however, two other marks by which hydrocele may be distinguished; one of them decisive, the other nearly so, namely, its *sense of fluctuation*, and its *transparency*, rather its semi-transparency—a characteristic feature which has been denied by some surgeons, in consequence of the thickening of the tunica vaginalis in old cases of hydrocele, and in persons who had long resided in hot climates, in whom the examination required both nicety and caution.

DIAG.—The *best* mode of distinguishing hydrocele is as follows—when a patient comes to you with a fluctuating swelling in the scrotum, in which the testicle is enclosed, order a candle to be brought; then, squeezing the tumour at the posterior part, distend the front so as to make it tense; apply the skin of the little finger and that covering its metacarpal bone at the outer side, to the surface of the tumour, and then cause the candle to be held close as possible opposite to where the two skins meet. In this way you will infallibly discover the transparency of hydroceles which are formed in this climate; and it is only the clumsy and awkward mode in which the experiment is made, that occasions any person to be unsuccessful in it, which, if conducted differently, would lead to a satisfactory result. I have seen individuals, however, from Sierra Leone and the West Indies, in whom the tunica vaginalis had become so much thickened as to render the hydrocele perfectly opaque.”—*Sir A. Cooper's Surg. Lect.*

Diseased testicle may be easily distinguished from hydrocele by its weight and flatness, and the pain and sickness which it occasions; and often by the discoloration of the skin covering it, by the semi-transparency and lightness of one tumour and the heaviness of the other. There is one disease somewhat difficult to distinguish from hydrocele, viz. hæmatocele: this is a collection of blood in the tunica vaginalis testis, and produces in an exactly similar tumour to hydrocele; but the history of the case is quite different, and the best guide. If you ask how it happened? the answer is—“Why I was riding, when the horse became restive, began to plunge, and threw me forward on the pommel of the saddle; I soon afterwards discovered this

"Then, if you inquire whether there were any marks or changes in the skin of the scrotum, the answer will be, "Oh, yes; it was black and blue." "Whenever you find a swelling thus suddenly formed after a blow, having the figure of hydrocele, you may be certain of its being blood. But you must guard against mistaking this complaint for diseased testicle. I was once present at Guy's Hospital when a healthy testicle was removed, owing to this error; and some years since, one of the first surgeons in the town, after having removed a tumour from the scrotum; and when the gentlemen were leaving the theatre, desired them to wait a moment, and he would show them the disease of the testicle. However, upon cutting the part open, the great bulk proved to be blood, and the testicle was in a perfectly sound state. It was an unfortunate occurrence as this a man must for ever regret."—*Lect. citat.*

How do you distinguish hydrocele from hernia?

Generally speaking, the distinction between hydrocele and hernia is, that in the latter complaint the swelling terminates a little above the testicle, so that the spermatic chord may be left free, though in the older cases there is not this distinction left for our guide; consequently, our diagnosis must be formed from the circumstances, such as the general pyriform appearance of the swelling, with the broader part downwards, and the narrower upwards, fluctuation, transparency, &c.

TREATMENT.—The treatment of hydrocele is either *palliative* or *radical*. The palliative treatment consists in puncturing the tumour with a small trocar, and letting out the fluid, by which we get rid of the swelling, and free the patient from the incumbrance which the tumour produces. The fluid again slowly accumulates, and the operation must again, of course, be repeated. The effect of it, therefore, is merely a removal for a time of the inconvenience produced by the enlargement of the scrotum.

For the radical cure of hydrocele various proceedings have been employed, in order to produce inflammation in the surface of the tunica vaginalis, and thus either to obliterate the serous membrane altogether, or put a stop to the unnatural secretion from it. One mode of proceeding has been termed the operation by *inci-*

sion, which consists in making an opening into the tunica vaginalis, and removing a small portion of it, or introducing some foreign substance between the margins of the incision, and then leaving the part to itself; the consequence of this is, considerable inflammation and adhesion of the tunica vaginalis to the testicle. Another is by *seton*, in which a seton is carried from one end of the tunica vaginalis to the other; that is, the seton introduced at the upper end of the tunica vaginalis, is carried through it to the lower end, so as to pass for two or three inches through the cavity of that membrane. A third mode is by *caustic*. A portion of caustic is applied to the scrotum externally, and when the slough has come away, a puncture is made into the tunica vaginalis; a piece of bougie, or some foreign substance of that kind is then introduced, and inflammation of the membrane is thereby excited. Another method is, after letting out the fluid of the hydrocele in the same manner as in the palliative cure, with a small trocar, to inject through the canula of that trocar some irritating fluid into the cavity of the membrane, the presence of which excites inflammation of the tunica vaginalis. The consequence of this inflammation is the prevention of the reaccumulation of fluid—this is the treatment by *injection*.

In the treatment of hydrocele by injection, the easiest and simplest mode, and that most commonly adopted, you first of all tap the swelling with a small hydrocele trocar, as you would simply to let out the fluid; and having evacuated the contents, you inject into the cavity of the tunica vaginalis, through the canula of the same trocar, a mixture of port-wine and water, two-thirds of it being wine, and one-third water; this is allowed to remain for five minutes, and then let out. "I am generally," observes Mr. Lawrence, "in the habit of injecting a second quantity of fluid on this occasion, frequently using port-wine alone, in order to be quite sure that a sufficient impression is made on the tunica vaginalis, to ensure the purposes of the operation. If you inject a second portion of port-wine and water, or of wine alone, let it remain in for the same length of time, and having let it out, close the wound with a bit of sticking-plaster.

In tapping the hydrocele, either for the palliative or the radical

cure, take care that you do not wound the testicle, the situation of which ought to be previously well ascertained. It is necessary that a certain quantity of fluid should be accumulated in the cavity of the tunica vaginalis to prevent an accident of this kind, for which purpose also you must first introduce the trocar perpendicularly, so as to go completely through the scrotum and tunica vaginalis; when you have entered the cavity of the latter, draw the instrument onwards obliquely for a short distance, and then withdraw the stylet, and push the canula forwards to its full length. There is some degree of attention necessary, more particularly in performing the radical operation, because, if you do not carry the trocar completely into the cavity of the tunica vaginalis, you may inject the port-wine into the cellular substance of the scrotum; so that during the operation, the integuments of the scrotum become so wrinkled and corrugated, as to alter considerably the relation between the different parts, the aperture of the tunica vaginalis being in this way thrown off the extremity of the trocar, so that this accident might easily take place. If you inject the fluid into the cellular substance of the scrotum, it is followed by a high degree of inflammation, with swelling of that membrane. It is necessary, therefore, that you should pay particular attention to a few points, in order to avoid the possibility of this occurrence.

The injection of port-wine and water into the tunica vaginalis, sometimes produces considerable uneasiness in the testicle, pain running up along the spermatic chord, and pain in the loins and at the lower part of the abdomen, sometimes to a very considerable extent. In other instances, however, the patient is hardly sensible of any inconvenience. In the course of two or three days after the operation, the testicle and tunica vaginalis expand and acquire a size at least equal to that which the tumour possessed previous to the operation; of course it is expedient that you should prepare the patient for this occurrence, by telling him beforehand what will happen; otherwise he may be alarmed by the supposition that his complaint has returned within so short a time from the performance of the operation. This is a kind of inflammatory hernia *humoralis*—inflammation of the testicle and

its coats, but unattended with much inconvenience. The patient keeps quiet, lies on a sofa, perhaps applies a lotion to the part and remains in doors for a time ; and probably, in about three weeks from the time of the operation, the swelling will have subsided, and the testis regained its natural size. The operation is sometimes attended with so little inconvenience, that the patient does not even confine himself within doors.

Other fluids may be injected in the case of hydrocele beside port-wine and water, e. g. brandy diluted, a drachm of the sulphate of zinc to a pint of water forms one ; indeed any irritating fluid may be used.

It has been observed that effusion of fluid into the tunica vaginalis of the testis, is sometimes accompanied with swelling of the testicle. We are sensible accordingly in certain instances, that a swelling of this nature partly consists of an enlargement of the solid part of the testicle, and partly of fluid, and when we have drawn off the water, we are better able to determine how much the swelling arises from the solid part. In a case of this kind the question is, whether the operation by injection, or any other mode of proceeding, for the radical cure of hydrocele, is more suitable. If the swelling of the testicle should be inconsiderable, twice its natural magnitude, and pretty hard, it has formed gradually, and without pain, as hydrocele usually does ; the surgeon need not scruple, under such circumstances, to perform the operation by injection, as, in most instances, the solid swelling of the testicle has afterwards gradually subsided.

Inflammation of the testicle will give rise to hydrocele ; for when the inflammation disappears, hydrocele forms. This may be generally removed by exciting absorption ; for which purpose *pilula hydrargyri composita* may be given, and a lotion of *liquor ammoniæ acetatis*, with some of the muriate of ammonia dissolved in it, applied to the scrotum. If left to itself, hydrocele will often undergo a spontaneous cure.

Sir Astley Cooper lays down the following important injunctions which are well worthy of the attention of all who may be called to treat this complaint. " Let me observe," says he, " that when you perform the operation for the palliative or the curative treat-

ant, withdraw the trocar the instant you believe that the canula is within the tunica vaginalis; and once having the trocar in, be careful to keep it there until the operation be concluded; and the most effectual way to do this is by grasping the tumour at the anterior part, so as to keep it tense where the trocar entered."—If you wish to accomplish this operation bloodlessly, to prevent internal bleeding, and the formation of hæmatocele, keep the patient, at the time you are doing it, in the erect position. There is no necessity for any after-application, as the following day the scrotum will be well."

The operation requires repetition in proportion to the dropsical tendency existing in the patient. In some it may be necessary once a month; in others once in three months; but, generally speaking, the usual time is every six months.

As insignificant as the operation for tapping in hydrocele may appear, it has been known, for the want of care and attention on the part of the patient, to cause the destruction of life. It is advisable therefore, in particular when it is performed on old persons, that rest in bed for some days afterwards be rigidly observed.

Sometimes happens, in constitutions which have a great disposition to inflammation, that the injection will act so violently as to produce suppuration. When there is danger of this, it may be avoided by the great pain and redness of the scrotum. When suppuration takes place, an incision is to be made with a lancet into the tumour and the contents discharged; and if the opening be not closed the cure will be effected by the adhesive process. Neither the operation for hydrocele by injection, simple as it is, altogether devoid of danger, there being instances where death has followed, and many in which life has been endangered by it.

HYDROCELE OF THE CHORD.—Hydrocele of the spermatic chord consists either in the formation of a cyst in the chord, or in the accumulation of a fluid in that cyst, which may increase to a very considerable magnitude, or in the deposition of fluid around the spermatic chord, or that it is diffused through the cellular tissue. The latter occurrence is very common. The operation which hydrocele of the spermatic chord takes place is in

the tunica vaginalis, between the testicle and the abdominal ring, sometimes extending over the ring, and on that account is often mistaken for inguinal hernia.

DIAG.—By the surgeon pressing his finger along the part until he passes the abdominal ring, he will be enabled to judge the nature of the tumour by its blue and semi-transparent appearance, by its being entirely unattended with pain, and by its not running into the abdomen like inguinal hernia.

TREATMENT.—The encysted hydrocele of the chord, which presents an isolated and detached fluctuating swelling, containing fluid, requires precisely the same treatment as hydrocele of the tunica vaginalis. The same injections may be used. But the best mode probably of treating this disease, is to make an incision in the tumour, for injection in this situation might be difficult and dangerous; to introduce the finger into the sac, so as to ascertain that there is no communication with the abdomen, and then to introduce a small quantity of flour to promote a slight internal irritation. In this manner the cure of hydrocele of the spermatic chord may be readily accomplished.

OBS.—The fluid in this form of hydrocele, does not present the same straw or lemon colour which is seen in hydrocele of the tunica vaginalis.

HYDROCELE IN INFANTS.—This disease sometimes occurs in infants soon after birth, and is either hydrocele of the tunica vaginalis, such as already described, which, in consequence of the thinness of the tunica and the transparency of the swelling renders the nature of the case very obvious; or it is a case in which there is a communication still subsisting between the tunica vaginalis and the cavity of the abdomen, so that the fluid contained in the former passes up by pressure into the cavity of the abdomen.

TREATMENT.—In simple hydrocele of the tunica vaginalis in an infant, it is hardly ever found necessary to operate. The hydroceles sometimes disappear of themselves. Generally a lotion containing a little of the muriate of ammonia, disperses the swelling.

OBS.—The hydrocele which communicates with the cavity

abdomen is more rare. Of course, the surgeon would avoid referring, as far as regarded an operation in a case of this kind, to a case, should he puncture the tunica vaginalis he must of necessity puncture the abdomen at the same time. The operation, frequently, should be avoided, unless some pressing circumstance exist indicating a necessity for resorting to it.

HYDROPHOBIA.

Canine madness. A disease arising in consequence of the bite of a rabid animal, as a dog or cat; and sometimes spontaneously. It is characterized by a loathing and great dread of liquids. The surgical treatment, for it appears that medicine has no control over this disease, consists in an early excision of the bitten parts or cauterizing them; the former method, however, is preferable.

Causes.—This peculiar affection belongs properly to the canine genus; namely, dogs, foxes, and wolves; in which animals only it seems to be innate and natural, scarcely appearing in any other, except when communicated from these.—*See MEDICAL, & VETERINARY BOOK, p. 260.*

HYDROPTHALMIA.

Increased secretion of the aqueous humour of the eye. Drops of the eye.

Causes.—On what this disease depends it is difficult to say. It is generally preceded by chronic ophthalmia.

Symptoms.—The eye more distended than natural; the cornea thickened; the sclerotic coat attached to the cornea has a blue tint, and the sight is affected; the motion of the iris impaired; and the disease at last, terminating in amaurosis. (*See AMAUROSIS.*)

Treatment.—Puncturing the cornea at a short distance from the sclerotic has been tried, and it is said with success. The various, indeed, recommended for this complaint are various, of almost opposite kinds, and have been tried generally without good effect.

INFLAMMATION.

CHARACTERS.—Inflammation is the means by which local injuries are repaired, it may therefore be considered as the restorative principle. It is usually attended by four signs, viz.

- | | |
|-------------|--------------------|
| 1. Redness, | 3. Increased heat, |
| 2. Pain, | 4. Swelling. |

a. As regards the first, or *redness*, this is the consequence of increase of the red particles of blood in the part, which may be sufficiently remarked when the inflammation is superficial, as in inflammation of the tunica conjunctiva of the eye.

b. The *second*, or increased sensibility, is the consequence of distension of the nerves by the greater quantity of blood being conveyed to them.

c. The *third*, or increased heat, an occurrence denied by late Mr. John Hunter, who proved by experiments sufficiently known, the non-existence of this character. Though, however, no increase of heat be manifested in internal inflammation, when it occurs on the surface of the body, an alteration sometimes of several degrees takes place; as was remarked on the inside of the thigh where a blister had been applied, the thermometer rose to ninety degrees; while on the inside of the opposite thigh where neither blister nor other exciting cause had been applied it only reached eighty-three degrees.

d. Lastly, the swelling, which is partly owing to an increased determination of blood to the spot, and also depends on effusion of the fibrin of the blood, which, in coagulating, deposits certain of the surrounding cellular tissue.

TERMINATIONS.—Inflammation has four terminations. 1. Resolution. 2. Suppuration, or secretion of pus. 3. Absorption. 4. Ulceration. 5. Gangrene. The *first* arises from the fibrin of the blood being effused into the cellular membrane, by which the parts become glued together. The *second* is composed of parts nearly similar to those of the blood, differing only in being swimming in a fluid resembling serum, and coagulating as it does, when exposed to the influence of heat. The *third* arises from an increased action of the absorbents, produced by pro-

joined with inflammation, by which the parts are absorbed.
The *fourth* consists in the destruction of the life of an inflamed

The arteries enfeebled by excessive action, are deprived of vitality, the blood coagulates in them, and gangrene is produced. These are the constitutional effects; the local ones are similar to those of irritation.—See IRRITATION, &c.

VARIEITIES.—Inflammation produces different results in different parts of the body: e. g. When it has its seat in the skin, it rapidly becomes more extensive, in consequence of the surface being unbroken. Its colour is very florid; it separates the cuticle in the form of vesications, which usually contain serum, and in some cases also fibrin; a serous effusion is also produced by it in the subjacent cellular tissue. In some instances it is preceded by fever; and in others it is followed by it. In the cellular membrane, inflammation produces an effusion which obliterates or forms; if it proceed it occasions suppuration, and produces an abscess, the contents of which are frequently discharged by the process of ulceration. In debilitated irritable constitutions, inflammation destroys the cellular tissue, and produces carbuncle, which is a sloughy abscess in the cellular tissue. Chronic inflammation produces tumours of various kinds, as the sarcoma or adipose; or, under peculiar circumstances, those of a malignant nature, as the scirrhus, fungous, &c. Inflammation of the scrotum is generally extensive, from the large surfaces they present; these are often seen inflamed in compound fracture, extending redness of the skin to a considerable distance, and, in this accident, it is a very unfavourable sign. When matter is produced by inflammation of the fascial texture, and is seen under it, great irritative fever succeeds until it be discharged; for instance, as in the palms of the hands, and soles of the feet.

Inflammation attacking muscles is known by the violent spasmodic twitchings which accompany it. Tendons are not very susceptible of inflammation, though they sometimes become so to a considerable extent. Punctured wounds of tendons are apt to produce tetanus more than wounds of other parts of the body. Matter formed under tendons burrows to a great extent, and pro-

duces violent irritation, as under the tendon of the occipito-frontalis muscle, and the covering of the temporalis.

In the absorbent vessels inflammation is marked by red lines on the skin in the course of these vessels, which form hard knobs from the skin itself participating in the inflammation. The absorbent glands become also inflamed, and both glands and vessels occasionally suppurate. They more frequently inflame from common irritation than the absorption of poisons. The arteries are rarely inflamed, unless after wounds, or the application of ligatures. Arterial inflammation may, however, prove very extensive when it occurs in individuals whose general health is considerably deranged; and instances are recorded where it has extended even to the heart. Veins inflamed from wounds become like hard broad cords, and extremely tender to the touch; and if it occurs from bleeding, it extends from the orifice at the flexure of the arm to the axilla, and often produces death. When inflammation of the veins is the consequence of a ligature on them, it will be found to be greater below than above the ligature. Nerves are very rarely inflamed, but when they become so the pain is excessive, and there is a tingling sensation in the parts to which the nerve is distributed. Wounds of nerves, though extremely painful at the moment, are followed by little irritation. Excessive pain in the nerves is called "*tic douloureux*."

Ligaments, like tendons, are not very prone to inflammation in healthy constitutions; but the synovial membrane, by which they are lined, is highly so, and the inflammation has a tendency to go on to the suppurative process. In scrophulous persons the synovial surface becomes inflamed, and the ligament covering it thickened, so as to produce great enlargement of the joint. Cartilage in joints ulcerates from inflammation, and often becomes entirely destroyed. The bones, like other parts of the body, are subject to inflammation; and when fractured, it is by this process that their union is effected. Suppuration, ulceration, and necrosis, or the death of the bone, also attack this structure; hence, like all other parts of the body, bones are subject to all the different processes of inflammation. Serous membranes, when inflamed, are remarkably disposed to pass into the adhesive

inflammation; whilst, on the contrary, mucous membranes generally run into the suppurative state.

Mr. Hunter made several experiments to confirm these facts, which have been verified by later physiologists.

HEALTHY AND UNHEALTHY INFLAMMATION.—Inflammation may be of the healthy or unhealthy kind. No wound can be cured without the former; even the small puncture made in the skin would inevitably destroy life, were it not for this salutary principle; a slight inflammatory action throws out upon the edges of the wound adhesive lymph, by which they become permanently united. When a ligature is placed upon a large artery, unless inflammation supervened, no good effect would be produced. The nature of the thing does in this case is, to form a clot of blood at the part of the vessel where it has been tied; inflammation supervenes, adhesive matter is thrown out, by which the internal surface of the artery become firmly glued together, and hemorrhage prevented. If the constitution be in an unhealthy condition, this process will not be effected; so that when the ligature comes away, the individual may die of hæmorrhage. Inflammation without any obvious cause is generally of the unhealthy kind, and arises from the irritability of the constitution, and an enfeebled state of the affected part. Hence inflammation is of two kinds, being either *general* or *specific*. The first is called the healthy inflammation; the second, or specific, is of a peculiar kind, and is called *unhealthy*. In this inflammation, the vessels have an entirely different action to what happens in the healthy state, and thus the fluids and solids as they secrete have a decidedly opposite character.

There are two descriptions of specific or unhealthy inflammation—the first is produced by a peculiar condition of the constitution; and the second, by the application of a poison. Gout is an example of the first kind. If a man for a length of time yield to every injurious excess, loading his stomach with food and wine, so as to weaken the digestive powers, he probably excites in his system what is called the gouty diathesis; he experiences dread-ful pain in one or more of his toes, &c. and severe inflammation, which frequently terminates in the secretion of a matter that speedily becomes solid, usually called chalk stone; that

name, however, is incorrect, as it has been proved by the analysis of Dr. Wollaston to contain uric acid and soda, consequently is now very properly named urate, or lithate, of soda. The formation of schirrus, or cancer, is another example of specific inflammation, arising from a peculiar state of constitution. But the best example of this kind is scrophula. Persons attacked by this disease have generally light hair, fair complexion, delicate appearance; when inflammation occurs, it is slow in its progress although easily excited; and at last ulceration taking place, the discharge consists of curdy matter, or a thin serous fluid, not at all resembling the pus which is formed in healthy inflammation.

The second kind of specific inflammation is caused by the application of poisons. Thus, in gonorrhœa, the matter secreted is widely different from common healthy matter, having, in the first place, a much larger quantity of mucous mixed with it; secondly, when applied to a secreting surface, is capable of exciting in the part an action by which similar matter and the same effects can be produced. The matter of small-pox occasions the same result, and as far as constitutional effects are concerned does not seem material how large or how small a portion of the poison is applied, the result in each case depending upon the state of the constitution.

IRRITABLE INFLAMMATION.—There is another kind of inflammation to which the name of *irritable* has been given; in which the nerves are much more affected than the blood-vessels. When a surgeon is called probably to attend a person, who tells him that he feels in a particular part, as the hand or arm, a most agonizing pain; and, if he be inexperienced in these matters, he will be inclined to doubt the correctness of his patient's statement the more so as no alteration can be discovered in the appearance of the part. The eyes are very subject to this torturing disease. But no parts are more frequently attacked by it than the breasts of young women. It produces such a degree of tenderness that they cannot endure the slightest pressure, and their stays consequently occasion great inconvenience; the pain extends to the shoulder down the arm, and even to the elbow, at the same time producing constitutional irritation. To cure these pains and general derangement

ant, such medicines must be given as will influence the sensations, but more particularly those of the uterus. The irritable inflammation frequently attacks the testicles, and renders them exceedingly sensitive, the slightest pressure causing very great pain. In these cases there is little or no alteration of size; if any difference, the affected one is the smallest. It has often been found necessary to remove the testicle in this disease. The bladder also is very commonly disordered by this irritable inflammation, and the symptoms in many respects resemble those of gonorrhoea. In both cases there is pain in making water, and the urine is frequently mixed with blood. The principal difference in the two cases is this—the irritable bladder is most painful when the bladder is *full*; the bladder that contains a stone, when it is *empty*. Upon dissection the inner coat of an irritable bladder has been found of the colour of red velvet.]

This irritable inflammation has been known to attack the rectum and produce excessive suffering, which was relieved by large doses of soda. Soda, rhubarb, and the compound powder of ipecacuanha are the best remedies.

PREDISPOSING CAUSES OF INFLAMMATION.—Irritable persons are much more predisposed to inflammation than others, and when it happens to them it is of a more dangerous nature than in persons who are not irritable. Thus in fevers, when the constitution has been much weakened, the parts on which the body has been resting become inflamed, and quickly mortify. But in persons, where the system is healthy and strong, although they may remain many weeks in bed, no such effects are produced. Even when there is great irritation, inflammation is always dangerous; and the application of a blister to the chest, for the removal of a virus after measles, frequently in large towns in particular, is attended with mortification. In like manner, mercury, by rendering the body irritable, disposes it to inflammation; and it is unwise to bleed a patient too soon after a mercurial course, on account of the inflammatory tendency.

EXCITING CAUSES, &c.—The exciting causes of inflammation are whatever produces an unnatural state of the part, calling upon it for its reparation, which she effects by the process of

inflammation, as bruises, warts, pressure, extraneous substance and the like. The manner in which Nature repairs these injuries will be explained under their respective heads.

PROXIMATE CAUSES, &c.—As regards the proximate causes of inflammation, there has been, and still exists, much difference of opinion. The opinion of Boerhaave of an obstruction in the smaller vessels, arising from the spissidity of the blood, is untrue; for, instead of the blood being thicker, it is thinner. Cullen's theory of spasm in the extreme vessels, is equally erroneous. These are merely the results of opinion not founded upon observation. *The true proximate causes of inflammation appear to be an increase of action in the vessels of the part, and an increase in the size of the vessels themselves.*

INFLAMMATION, ACUTE AND CHRONIC.—Inflammation is divided into the acute and the chronic form. The first usually goes through its various stages with great rapidity, while the latter is exceedingly slow in its progress, and is either the result of an acute inflammation, or owing to a peculiar state of constitution, occurring in persons who have lived intemperately, or who have been exposed to excessive and laborious exertion, or who are the victims of anxiety and disappointment. One of the best examples of the *acute* form of inflammation is witnessed in the breast during delivery. The adhesive stage is marked by hardness and pain; the suppurative by irritative fever, fluctuation, and throbbing pulsation; ulceration usually succeeds in a short space of time, and the matter is soon discharged. A good illustration of inflammation terminating in the chronic, is observable in gonorrhœa, which in the first stage requires the most active depletion, both local and general. An instance of chronic inflammation succeeding the acute may be seen in gonorrhœa. During the stages of this complaint, we are obliged to check the action of the vessels of the urethra, but afterwards to excite it by the balsam of copaiba, and slightly stimulating injections.

INFLAMMATION, ACUTE, TREATMENT OF.—The treatment of inflammation may be either local or constitutional, or both combined. When any important organ is injured, or its functions disturbed in consequence of the influence of the injury or

stitution, the treatment must invariably be constitutional, let the local be whatever it may; for no vital organ can be disturbed in its functions without producing general derangement, which will be more or less in proportion to the importance of the part wounded, and the extent of the wound. Inflammation, however, requires, in many persons, constitutional treatment, whether any important part be injured or not; as, in irritable habits, where even trivial local damage will speedily affect the entire system. The most powerful means of relieving inflammation is the abstraction of blood; the beneficial effects of which principally result from producing a diminution of nervous power; and that it does accomplish this is proved by the syncope which it occasions. The second mode by which venesection relieves, is by lessening the quantity of blood; for when there is much fulness of the vessels, the momentum will be necessarily great, and consequently the fluid will be thrown with greater force, not only to the injured part, but to every other part of the body. The third mode by which bleeding proves serviceable, is by facilitating the establishment of the secretory functions.—*See* VENESECTION. The second mode of relieving inflammation is by restoring the secretions: for whenever it occurs, at least, in any violent degree, the secretions are diminished or suppressed. The most important secretions are those of the liver, intestines, skin, and kidneys, and, when these cease to perform their proper functions, putrid fever is the consequence. To excite the intestinal canal, therefore, should be one of the first considerations. This may be effected by purgatives; and they afford relief in the same manner as the abstraction of blood from the arm; a pint of serum will frequently pass off with feculent matter after taking a cathartic. There is another mode in which they likewise prove beneficial in inflammation, and that is, by irritating the intestines: blood is consequently determined to them, drawn from the part inflamed, upon the principle that two increased actions are with difficulty kept up in the body at the same time. But it is of little service to act upon the intestines in inflammation, without also exciting the liver; calomel, therefore, should be given with saline medicines, and not salines alone. The

plan recommended is, to give calomel at night, and a saline draught in the morning. An approved aperient for adults is one grain of calomel with four of the comp. ext. colocynthydis; or two of the pil. hydrarg. with the colocynth. Castor oil is also of service; and the infusion of senna, with Epsom salts. In children calomel with rhubarb, scammony, or antimony, may be directed as aperients; and in addition to these means, the use of injections, and the warm bath, are the best means of restoring the secretions of the digestive organs.

The next secretion to be restored, for relieving irritation and inflammation, is that of the skin, for it rarely happens that a healthy pulse continues with a free secretion from the surface of the body. The best mode of producing respiration is by giving the antimonial powder with diluents, or the pulv. ipecacuanh. comp. As the powder, however, is apt to cause constipation, the antimonials are the best, and ought to be combined with mercury. The secretion of the kidney may be restored by giving diluents, squills, or acetate of potass. Extensive inflammation cannot be relieved without restoring the whole of the secretions. There are some cases, however, where bleeding will not afford relief, and for which Dover's powder (p. ipecacuanh. comp.) combined with calomel, and this happens more frequently in inflammation of the testis than in any other part. In the inflammation of old people bleeding must be adopted with caution. Another mode of subduing inflammation is to provoke a constant nausea in the stomach, giving a solution of emetic tartar in divided doses. This plan has been successful with children in croup.

INFLAMMATION, CHRONIC, TREATMENT OF.—The remedies employed in this instance ought to produce a slow and gradual action on the secretions; for if these remedies be attended with violent action, they will do harm instead of good. In diseases of the chronic kind, give calomel and opium. But the most common medicine, and probably as a general one the best that is administered in chronic inflammation, is Plummer's pill; it acts at the same time on the secretions of the liver, intestines, and skin; and if you succeed in restoring these, the disease, if repeated, will soon disappear; the absorbents are roused into a state

Increased activity, and the effects of the chronic inflammation are removed. Another excellent remedy for the removal of chronic complaints is the oxymuriate of mercury, combined with the compound decoction of sarsaparilla. In the hospitals it is merely given dissolved in spirits of wine, in the proportion of one-eighth of an ounce in half a pint of the decoction, to be taken in the course of the day—one-half in the morning, and the other in the evening; continued as long as may be thought necessary, watching its effects on the gums; keeping always in mind that mercury given in this way will tend to increase rather than destroy constitutional action.

The best alterative for the removal of chronic disorders in children, is one grain of the hydrarg. c. creta, and two or three grains of powdered rhubarb, mixed together, and given night and morning. This preparation is exceedingly mild, and will have a particularly benign influence on the liver and intestines. Also, a grain of the oxymuriate of mercury dissolved in an ounce of decoction of bark, and from ten to fifteen drops, according to the age of the child, given twice a-day, will be found a valuable medicine, and especially in those cases where there is enlargement of the mesenteric glands. Calomel and rhubarb, the hydrarg. c. creta and soda, will also be found medicines of much power in the chronic diseases of children. Lastly, as it is not advisable to give mercury to children, if it can be avoided, a medicine composed of two grains of rhubarb and five grains of the carbonate of soda, given two or three times a-day, will often render its use unnecessary; this compound acts as an aperient and powerful cathartic. [In inflammations it should be remembered that the vessels of the part are in a dilated state; and that the surrounding parts will give an increased action.]

Chronic inflammation is frequently produced through the influence of the mind—e. g. long continued grief will completely stop the secretion of bile; loss of appetite, from a sufficient diminution of gastric juice, is often occasioned by anxiety of mind; and even an ulcerated state of the stomach has been produced by a long continuance of the same cause. But whatever may be the cause of the stoppage of the secretion, some

enlargement will be the result; as swelling of the liver, of the testicles, or of the joints; the formation of common tumour as the fatty, or those of a specific kind, as the fungus.

LOCAL TREATMENT OF INFLAMMATION.—Some controversial opinions have been broached on the subject of cold to inflame parts; and though not a positive agent, it is nevertheless capable of affording great relief in these cases; first, by diminishing the calibre of the vessels; secondly, by lowering action, which it effects by decreasing nervous irritability. If cold be applied to the system generally, it has the power of lessening the frequency of the pulse to an extraordinary degree; though if applied in excess, it destroys life, by abstracting heat, without which the vital actions could not be sustained. On the living body, it is well known, that cold may be applied to a part until it actually becomes frozen. It frequently happens, even in this part of the world, during severe winters, that the lobes of the ears, and tips of the noses of those much exposed to the weather will become frozen; but, if timely attention be paid, they may be restored by rubbing them with snow. One of the best lotions that can be applied to an inflamed part is composed of ℥j. of rectified spirits of wine, and ℥v. of warm Goulard water is much extolled for reducing inflammation and diminishing pain; but when too long applied, or too strong, it has been known to destroy nervous irritability in too great a degree. In applying the spirit of wine lotion, the cloths ought to be so wet that the spirit may combine with the heat of the part, and carry it off in the form of vapour—in other words, evaporation is produced, and in this manner its effects are accounted for. The application of ice to a state of inflammation is not recommended; it irritates, and is apt to produce gangrene, and in the reduction of strangulated hernia it is advised to be applied in a bladder for the same reason; and not to be retained too long. [Cold, in fact, relieves inflammation, when locally applied, by the abstraction of heat, by lessening the diameter of the blood-vessels, and by diminishing the action of the part, through lessening its nervous irritability.]

The next mode of relieving inflammation is by the application of heat and moisture. The sedative effects of this plan are

amplified by what occurs when a person takes a warm bath : a man, for instance, goes into water heated to 100°. Fahrenheit, has a pulse at 75, which soon rises to 100; presently he perceives freely, his pulse becomes less frequent, yet soft; great relaxation follows, and were he not removed, he would absolutely die, so extensive is the exhaustion it occasions. This then is a direct proof of what heat and moisture can do when applied generally; and, when used locally, their action on the part is precisely the same. With the same view fomentations are directed, viz. to restore the secretions of the part, by which the tension of the vessels is removed, and the pain considerably abated. Fomentations are occasionally moderated, being composed of camomile flowers, poppy heads, &c., though they are not considered to possess any advantage over mere water, at least, where the surface of the skin is not broken. Upon the same principle, leeches are also used; and the kind of poultice is of little consequence, provided as in the preceding case, the skin be entire. The next mode of relieving inflammation is by the application of leeches, which relieve upon the same principles as poultices and fomentations. After the leeches drop off, the bleeding from the incisions must be encouraged by bathing the part with warm water, and wiping it frequently with a warm sponge.

As to some persons, and in certain situations, the application of leeches is attended with great inconvenience, for instance, in inflammation of the testicles; and particularly in private practice, when it is desirable a bleeding from these parts should be concealed, it is advised to puncture some of the small vessels of the scrotum, the patient standing in the erect position. In this manner, and with a little warm water and sponge, any quantity of blood is abstracted that may be necessary; and what of very great consequence, it may be stopped at pleasure, by placing the patient in the recumbent position, and applying cold water.

Counter-Irritation.—As the next best treatment in inflammation is a remedy whose power is very great; but the chief benefit that arises from its employment results from the drawing of the blood from the neighbouring inflamed parts, whereby the disease in the important organs is checked: e. g. a blister at the nape of the

neck, if early applied, will arrest an inflammation of the brain; a blister at the pit of the stomach will frequently subdue an inflammation of that viscus; a stimulating irritating lotion applied to the scrotum will often cure an inflammation of the testicle. But if carried to excess, counter-irritation will do harm; particular caution therefore must be observed in the manner of using it. In parts that have no immediate connexion, its effects are astonishing. In inflammation of the lungs, a blister applied upon the chest (parts between which there is no direct communication) will soon stop the disease, and prove the principal cause of recovery. Blisters, likewise, applied to the front of the body, as the abdomen, are extremely useful for the removal of inflammation of the liver, intestines, &c. Blisters are more generally used by surgeons for exciting counter-irritation than any other applications. Issues and setons are also occasionally adopted. Another mode is by the application of emetic tartar made into an ointment; some care, however, is necessary as to the surface on which it is to be applied, if irritation to any extent be intended, as it is apt to leave a permanent disfiguration of the skin.

The next circumstances to be attended to in the treatment of inflammation are position and rest; and, although medical men do not consider the human body as an hydraulic machine, nor indeed is it so, the fluids of the human body are in some measure governed by the laws of gravity: for instance, it would be foolish to attempt to cure extensive inflammation in a limb, if it were allowed to continue in the depending instead of the horizontal position. To obtain rest for an inflamed joint is one of the great principles in the treatment, and no good can be done without it. Indurations frequently remain after inflammation has entirely ceased. These are to be reduced by diminishing the circulation of the part, and promoting absorption; 1. by pressure; 2. by electricity; 3. mercury; 4. friction.

a. Pressure has the power of exciting the action of the absorbents in an extraordinary degree; and it may be produced by the use of rollers and strapping. *b.* Electricity is likewise attended with similar effects; acting strongly on the absorbent system. *c.* Mercury likewise does the same; and, generally speaking, is decidedly so than either of the other remedies mentioned. *d.*

accelerates circulation and absorption; and the way recommended by Mr. Grosvenor, of Oxford, (for stiffened joints,) was to apply both hands to the joints, at the same time moving them alternately up and down—a practice that has frequently in such cases been attended with much good effect.—*See ADHESION, &c.*

INJECTIONS.

Medicated liquors thrown into a natural or supernatural cavity of the body by means of a syringe: viz.

Take Sulphate of copper.....	grs. vj.
Distilled water	℥vj.
T. opii	℥j.

—For an injection.

Take Calomel	℥ij.
Mucilage of G. Arabic	℥ss.
Lime-water.....	Oj.

Put the calomel and mucilage well together, and add the lime-water gradually.

Take Carbonate of lead	℥j.
Comp. powder of Tragacanth	℥ij.
P. of opium.....	℥j.
Boiling water	Oj.

Take Sulphate of zinc	℥ss.
Distilled water	Oj.

—In gonorrhœa, &c.

Take Nitrate of silver	grs. ij.
Distilled water	℥j.

—For fistulous sores.

IRITIS.

The anterior portion of the continuation of the choroid membrane of the eye, which is perforated in the middle by the pupil, is, anatomically, the iris. It is of various colours, and its inner portion is termed the uvea.

Iritis, or inflammation of the iris, is a peculiar and specific deep-seated inflammation of the eye, existing in various degrees, acute or chronic, idiopathic or symptomatic.

CAUSES.—Iritis is sometimes brought on by causes immediately acting upon the iris; the wound, for instance, inflicted in the operation for cataract; exposure of the eye to very strong and powerful lights, or its exertion on very minute objects; and the inflammation thus produced by circumstances directly acting on the organ, is called *idiopathic iritis*. In the greatest number of cases, however, it seems to owe its origin to some morbid condition of the system, and one form of it has consequently been called by the German writers *syphilitic iritis*—a form most frequently witnessed as one of the secondary symptoms, when occurring in connexion with syphilis. Another form of iritis is frequently seen in gouty persons, called *arthritic iritis*, which is distinguished by the circumstance of the patient having had other gouty affections, and by the iris being generally changed in colour from effusion into its texture, but not exhibiting the tinct masses of lymph on its surface, the pupil being contracted and occupying the centre of the iris: whereas, in syphilitic iritis, in consequence of the effusion of lymph in the iris, it is apt to be irregular, and is very frequently contracted and drawn toward the internal angle of the eye.—See HYPORIUM.

SYMPTOMS.—In the acute form of iritis the symptoms are rapidly developed, and not easily checked; the iris changes colour; the inflammation usually begins in the pupillary margin of the iris, and soon extends, so as to occupy its whole surface, passing from this margin to the ciliary circumference, from the cornea to the sclerotica, and in the result affects the external as well as the internal parts.

Chronic form.—In the chronic form of iritis there is sometimes effusion of lymph, causing adhesion between the margin of the capsule of the crystalline lens, without any visible inflammation of the eye. This slow inflammation may equally be propagated to the more remote parts of the eye, as in the acute form. It may extend to the whole of the tennis of one eye, so as to render the retina wholly insensible, without occasioning any re-

producing any pain, or, in fact, any symptoms that have attracted the attention of the patient, or the persons attending; and, at length, the patient has only observed by accident that vision is lost.

TREATMENT.—Antiphlogistic; blood-letting, both general and local, to relieve the irritation, as in other inflammations of the eye.

In this complaint mercury is principally to be relied upon; it must be given, whatever quantities may have been previously administered, so as to affect the constitution, that is, until soreness of the mouth and gums be produced, or the saliva begins to flow. The best form is that of calomel, after bleeding, in doses of two or three grains, combined with about a third of a grain of opium, to prevent it from acting on the bowels, every fourth or sixth day, till the mouth be affected; in the more chronic forms of the disease, it may be given less frequently. The belladonna will be a very useful adjunct in this complaint; by dilating the pupil, the adhesions are often prevented from forming between the iris and the capsule of the crystalline lens; and when they are formed, it tends to elongate the adhesions. The belladonna may be applied, in the form of extract, around the eye, morning and evening.

PROGNOSIS.—As soon as the system has become affected with the mercury, the zone of the vessels will be seen disappearing, the pus absorbed, the aqueous humour becoming clear, and the eye losing its hazy appearance. In many cases a cure of iritis may be effected by the ordinary antiphlogistic means, though in most cases the mercury is to be chiefly relied upon, though not absolutely necessary in all.

IRRITATION.

ILLUSTRATIONS.—Irritation is either local or constitutional, and its effects are communicated from one part to another through the medium of the nervous system, so that the heart, brain, and lungs, almost immediately after an injury has been sustained, and the remotest part of the body, will have their functions more or less disturbed in proportion to the extent of the injury and distance of the part injured. All the actions of the body are

excited and sustained by internal and external impressions, which are called stimulants; the blood, for instance, being the stimulus to the blood-vessels; the bile to the intestines; and caloric, in certain degree, a stimulus to the whole system. Between all the different parts of the human frame there exist intimate relations which correspond with each other, and carry on a reciprocal course of action. The beautiful harmony produced by these concurrent phenomena is called sympathy. Thus, impressions not only produce effects on the part to which they are directly applied; but in consequence of the freedom of communication between the nervous system, parts of the body situated at a distance from those in which the original mischief exists become affected by it. The real nature of sympathy is yet unknown though we are acquainted with many of its effects. Thus numerous examples of sympathetic actions may be adduced—the communication that exists between the uterus and breasts is a striking instance of it; sneezing is a sympathetic action between the nose, velum palati, and the abdominal muscles; coughing, breathing, and the expulsion of the fæces, are among the numerous examples which might here be quoted in illustration of sympathetic action. But sympathetic action is also the result of injury and disease; becoming the cause of restoration on the one hand, or of destruction on the other, and this state of the body is called irritation. “It may be defined,” says Sir Astley Cooper, “to be an altered action, excited in the system by an unnatural impression. Thus sympathetic pain is experienced in the hand and foot from a diseased hip, and at the extremity of the penis when there is stone in the bladder, the passage of an uric calculus through the ureter occasions retraction of the testis and pain in the thigh; disease of the prostate gland causes pain on the inside of one or both thighs; a disease of the liver occasions pain in the shoulder; a diseased testicle, pain in the leg; irritation of the intestines, an itching of the nose.”

The sympathetic effects here described do not consist of morbid actions in the parts thus affected, but of disordered sensations. But morbid actions are also sometimes excited in parts near or at a distance from those originally affected. Inflammation

The testicle is frequently the consequence of irritation in the urethra; and swellings of the breast, of a morbid action of the uterus; but there is no organ so much affected by irritation, or sympathetic influence, as the stomach. For example, if a blow is received on the head, causing injury to the brain, vomiting is one of the first and most constant symptoms, being imparted to the stomach through the medium of the eighth pair of nerves, by which the injury is detected. Vomiting is produced when the testicles are injured, or intestines burst, wounded, or strangulated, or from a gall-stone passing the biliary duct; in fine, an obtuse injury in any part of the body will occasion sickness. Irritation is generally communicated through the medium of the nerves, of which there are two grand divisions in the body. The first composed of the brain, spinal marrow, and their nerves, which naturally convey sensation and volition; the second consisting of the grand sympathetic nerve, the centre of which is behind the stomach, in the semi-lunar ganglion and solar plexus. The modes of sympathetic communication are various. In some instances the course of irritation is from the irritated part to the sentient extremity of the nerves, as the pain experienced in the knee and hip from a disease of the hip. In other cases the course of sympathy is from the affected part to the origin of the nerve, as in the pain of the loins consequent on diseased testicles. Irritation on the nerves of the grand sympathetic is communicated to the stomach probably through the medium of the semi-lunar ganglion. All injuries to the stomach are attended with very serious consequences.

Irritation is termed local when only one particular part is affected; at other times it attacks the whole system. A decayed tooth will produce an abscess, and the matter will escape by forming an opening through the cheek. This ulcer will be very difficult to heal if the tooth remain; but if it be extracted, the disease quickly disappears, the cause of irritation being removed. The constitutional or general effects of irritation are frequently produced by very trivial local causes; and its degree, resulting from it, depends on several causes which are important to the part affected; for instance, the extent and nature of the injury, the

state of the constitution, age, and previous habits of the patient. It varies also in different persons—a wound, for example, that in one individual would be attended by the most dangerous consequences, in another might not disturb the functions of any important organ. This greatly depends on the state of the system at the time the injury is received. Irritation is greatest in children and least in aged persons; the former are very much affected by operations, whilst the latter are slightly so. “Children under two years of age, upon having stones removed from their bladder will frequently be carried off by convulsions; therefore, if it can be possibly avoided, never perform the operation on a very young child; at all events, not under three years of age.”—*Sir J. Cooper.*

* * One of the worst kinds of irritation is that occasioned by the absorption of morbid matter during dissection; too great care therefore, cannot be had of the instruments used in dissecting and opening bodies, as inattention on this point has caused the loss of many a valuable life.

TREATMENT OF IRRITATION.—The treatment of irritation arising from a local cause, consists principally in directing the remedies to that cause, or to lessen its effects on the constitution; but, on the contrary, when local disease is either promoted or aggravated by constitutional derangement, then the remedy must be directed to the disorder of the system; and as that improves so will the local affections disappear. The symptoms of constitutional irritation following injuries, are best exemplified in compound fractures; in these cases the irritation runs very high, and the heart, and brain, and stomach are much affected. Constitutional irritation must not be too suddenly subdued nor destroyed, as a certain degree of irritation shows that nature is endeavouring to accomplish the restorative process. All that is necessary is to keep it within bounds, to watch its progress carefully; and if necessary, to check its violence, but not to destroy it entirely. The means of reducing irritation are two:—

First.—By restoring to the different organs their various secretions, by which the outlets become opened, and fever diminished. A patient with a hot and dry skin, and his body altogether

I feel well and be relieved, if a free perspiration on the surface be promoted. To restore the secretions from the intestinal canal, aperients must be given; but when the irritation is very severe, the medicine must not be limited to any particular part, but directed generally, to produce the whole of the secretions. This will be best accomplished by exhibiting mercury (as calomel or the blue pill) to act upon the liver; saline medicines (as the sulphate of magnesia) to act upon the kidneys and intestines; and antimonials to relieve the skin.

secondly.—By allaying the excitement of the nervous system; which may be effected by the combination of opium and antimony, calomel, antimony, and opium, to act upon the skin and liver, as well as the nervous system. For an adult:

R. Hydrarg. submuriat. gr. ij.
 Pulv. Antimonial. gr. ij.
 P. Opii. gr. j.

F. Pilul. ij. assisted by saline medicines, as the sulphate of magnesia, or the liquor ammoniæ acetatis, with tinct. opii, the latter is a good medicine. The alkalies judiciously given, allay the irritability of some organs, as the bladder when this is in an irritable state.

In cases of irritation, venesection must be put in practice with great caution; for if carried to any great extent, the powers of the constitution will not be equal to the reparation of the injury. If the irritation is of a chronic nature, Plummer's pill will be the best medicine—five grains night and morning—it increases the secretions of the liver, intestines, kidneys, and bladder. If the blue pill be given, or calomel, it should be followed by an aperient in the morning, otherwise its action will be confined to the liver.

JOINTS, DISEASES OF.

Joints are liable to diseases more or less dangerous according to their particular nature, as well as exposed to accidents from external violence; and like other parts of the body, they are

subject to inflammation and abscess; their capsules frequently become distended with a watery secretion, and dropsy of the joint (*Hydrops articuli*) is the consequence. The most important diseases, however, to which the joints are exposed are, what were indiscriminately called some years ago, *white swellings*, *scrofulous joints*, and the *hip-joint disease*. Wounds of a joint, that is, where the capsular ligament is penetrated or divided, are often accompanied with a division of the lateral, or other ligaments, and sometimes also with that of the cartilages and bones. When the capsular ligament is wounded, it may generally be ascertained by the introduction of a probe, and frequently by the escape of synovial fluid; but as a similar discharge may issue from many wounds of the bursæ mucosæ, an erroneous judgment might be formed were the surgeon unacquainted with the site of these ligamentous membranous mucous bags. Boyer (see *Traité des Maladies Chirurgicales*, Tom. IV. p. 407) says that he has seen several cases in which a fluid resembling synovia was discharged from wounds of the sheaths and tendons.

OBS.—“Here the advice which I have given in another place, remarks Mr. Cooper, “respecting the temerity of being too cautious with the probe, is equally important, inasmuch as the introduction of this instrument into a large joint like the knee would be very likely to excite inflammation of the synovial membrane, and a train of dangerous and even fatal consequences, while the information gained by such employment of the probe is of little use, because whenever a wound is suspected to reach into the capsular ligament, exactly the same treatment should always be followed, as if the joint were positively known to be penetrated.”—*Surgical Dictionary*, p. 748.

PROG.—Although simple wounds, even of large joints, often heal favourably without any untoward symptoms, this is not invariably the case, since it is well known that the most alarming and fatal consequences have been known to follow. When properly treated, punctured wounds of the joints, according to Boyer, are not in general attended with danger; but as some of those wounds which were apparently quite simple, have been attended with very bad symptoms, and even terminated in death, the greater

circumspection is necessary in the prognosis. The treatment consists in endeavouring to heal the injury by the first intention; applying cold lotions, and employing venesection and topical bleeding, with other antiphlogistic remedies. Simple incised wounds of joints present only one indication, that is, to attempt to heal them by the first intention. The prognosis of an incised wound of a joint is not generally unfavourable when the edges have been immediately brought together, the cavity of the joint has not been long exposed, and the blood is not extravasated in it. It should, however, be remembered that wounds of joints do not always heal in the above favourable manner. Even of cases which appear the most trivial and simple, there are but too many which are followed by such aggravated symptoms, as either to prove fatal, or occasion a necessity for amputating the limb. In milder cases of a less grievous description, after the patient has recovered, the termination of the accident is converted into an ankylosed or stiff joint, by which its motions and functions are forever destroyed. Hence, in the treatment of these cases the most care should be taken to prevent inflammation, by every possible means, local and general.

Like other parts, the capsular ligaments of joints are often left in an indurated state, the consequence of previous existing inflammation; and sometimes coagulable lymph is effused on their internal surfaces, or organized cartilaginous or osseous bodies are formed within the joints. Mr. Brodie (see *Med. Chirurg. Trans.* IV. p. 216) observes that the usual consequences of inflammation of the synovial membrane, or capsular ligament, are,

1. A preternatural secretion of synovia.

2. An effusion of coagulated lymph into the cavity of the

3. A thickening of the synovial membrane, a conversion of it into a substance resembling gristle, and an effusion of coagulated lymph, and probably of serum, into the cellular structure, by which it is connected with the external parts.

When this inflammation attains to a considerable extent, an abscess may form in the capsular ligament, which will ultimately burst when the pus makes its way beneath the skin, and is,

sooner or later, discharged through ulcerated openings. The patient is attacked with febrile symptoms, and, occasionally, delirium and coma ensuing, death steps in and closes the scene. In these cases the inflammatory fever is very quickly converted into the hectic; in fine, when an abscess has taken place in a large joint, in consequence of acute inflammation, hectic symptoms almost immediately begin to show themselves, and the strong actions of the common inflammatory fever suddenly subside.

CAUSES.—Inflammation of the capsular ligaments often arises from cold—hence it is more common in the knee and ankle than in the hip or shoulder. It may be a consequence of the injudicious use of mercury, and, in particular constitutions, from rheumatism and general debility of the system. In these cases it often leaves one joint thicker than another, and it is less severe and less disposed to produce effusion of coagulating lymph, or a thickened state of the membrane, than when it is immediately local disease; (see *Brodie, op. citat. p. 218.*) in the latter case, the disorder is more likely to assume a severe character, and may, if of long duration, leaving the joint with its functions more or less impaired, and occasionally terminating in its total destruction. Falls or blows upon the joints, &c.

OBS.—Inflammation of the capsular ligament or synovial membrane, frequently assumes the chronic form, and is then very often confounded with other more serious diseases, under the common appellation of white-swelling.

SYMPTOMS.—According to Mr. Brodie, the following are the principal symptoms of the complaint: at first, although some pain is felt over the joint, the patient refers it principally to a spot, and it does not reach its height before eight or ten days. Sometimes even at this period, the pain is trifling, but at other times it is considerable, and every motion of the joint is distressing. In a day or two after the commencement of the pain, the joint is affected with swelling, arising entirely in the first instance from a collection of fluid in the cavity, and, in the superficial joints, fluctuation may be distinguished. This fluid, however, after inflammation has existed for some time, is rendered less perceptible, either in consequence of the synovial membrane being thick-

fluid, or lymph being effused; and the more solid the swelling is, the more is the motion of the joint impaired. The shape of the diseased joint does not correspond to that of the heads of the bones; but as the swelling is chiefly caused by the distension of the synovial membrane, its figure depends in a great measure on the situation of the ligaments and tendons, which resist it in certain directions and allow it to take place in others. Thus when the knee is affected, the swelling is principally observable on the anterior and lower part of the thigh, where there is only a yield-cellular structure between the extensor muscles and the bone. It is also often considerable in the spaces between the ligament between the patella and the lateral ligaments, because at these points fatty substance is propelled outward by the collection of fluid.

See *Brodie's Pathological and Surgical Observations*, p. 20, *et seq.*
At the elbow-joint the swelling occurs principally above the olecranon, or that process of the ulna upon which a person leans, and the extensor muscles of the fore-arm. In the ankle-joint the swelling is between the lateral ligaments and the tendons in front of the joint. In the hip and shoulder-joints, where the swelling is less frequent, the fluid cannot be felt, but the swelling is perceptible through the muscles. At the commencement of the disease in the hip, a fulness both in the groin and nates may be observed; but afterwards the nates become flattened, and the thigh wasted from want of use. The pain is usually confined to the hip, but there have been cases in which it was also referred to the knee.

23.—This affection may be distinguished from the case in which the cartilages of the hip are ulcerated, by observing that the pain is more severe at the beginning than in the advanced stage of the disease; it never amounts to the excruciating sensation in the other disease; and it is aggravated by motion, and by pressing the cartilaginous surfaces against each other. The wasting of the glutæi muscles is also preceded by a fulness in the nates.—See *Brodie in op. supra citat.*

TREATMENT.—If inflammation of the synovial membrane be the consequence of an ill-conducted course of mercury, Mr. Brodie recommends a trial of sarsaparilla; and when the disease is

associated with rheumatism, the medicines he advises are opium with diaphoretics, preparations of colchicum, and the other usual remedies in rheumatic affections. In the acute form of the disease, the antiphlogistic plan must be rigidly adopted; there are a few surgical cases indeed where topical bleeding is more strongly indicated. The violence of the symptoms, the strength, age, and pulse of the patient, must regulate the use of the lancet; but the application of leeches may be said to be invariably proper. And in which, fomentations to promote the bleeding. This practice is recommended to be daily pursued until the acute stage of the inflammation has subsided. Attention should also be paid to the state of the bowels, in conjunction with saline draughts and diaphoretics, and the *lotio plumbi acetatis*. In some cases the patient seems to derive more ease, however, from the employment of fomentations and emollient poultices, particularly when swelling has been produced rapidly, and is attended with considerable tension.

When the acute stage of the affection is subdued, the principal object is then to remove the effects which are left behind, namely the thickening of the capsular ligament, and parts surrounding the joint; stiffness of the joint, and pain when it is moved; fluid in the capsule, &c. In this case Mr. Brodie recommends the joint to be kept perfectly quiet, abstraction of blood from the part by means of leeches and cupping frequently repeated; the use of cold evaporating lotions until the inflammation has further abated, to which a blister may be applied, and kept open with the *saccharate*, or a repetition of blisters in succession. The blister should be of a large size, and if the joint be deep-seated it may be applied to it as near as possible; but otherwise, at a distance.—*See Pathol. and Surg. Obs. p. 30. et seq.*

After the inflammation has subsided, moderate exercise of the joint, and stimulating liniments are recommended. The *phosphor* liniment, strengthened by the addition of liquor ammoniac, or tincture of cantharides, or the following, to which Mr. Brodie seems to give a decided preference, may be applied:—viz.

Take	Olive oil.....	℥iiss.
	Sulph. acid	℥ss.

Mr. Brodie speaks also favourably of the effects of the antimonial ointment, in the proportion of a drachm of the tartar of antimony to an ounce of spermaceti ointment. Plaisters of ammoniac he considers as sometimes useful against relapses. Bleeds and setons are never serviceable unless ulceration of the skin has commenced. Friction, which Mr. Brodie considers more adapted to cases where the stiffness depends upon the state of the external part, than to others, where it arises from disease of the joint itself, may be either dry, or with ointments, employed, however, with caution. The steam of warm water, as recommended by Mr. Drew, and practised at the watering places, Mr. Brodie allows to be beneficial, but it requires the same caution as the employment of friction.

TREATMENT OF SCROFULOUS AFFECTIONS OF THE JOINTS.—

The great object, in these cases, is to preserve the limb in a state of rest. Next in importance to rest is the reduction of the heat of the part. Evaporatory lotions of water and spirits, or the plumbi superacetatis dilutus, with spirits of wine and water, may be employed. Rhubarb and the submuriate of mercury may be exhibited once a day, or every second day. But if the disease advances, and is not subdued, it will be necessary to employ some local counter-irritant. Blisters, tartar emetic ointment, vinegar poultices, issues and setons, are the various means for this purpose. If the joint suppurates, it will be best not to apply issues or setons close to the joint. Mr. Cline tried once to investigate this point, and the result of his observation was, that setons and blisters were employed, they should be employed at some little distance from the joint. Blisters may be applied over the joint, but they should not be so large as to produce considerable irritation; they should be kept open by the unguentum binæ. The tartar emetic ointment is a useful irritant in the proportion already mentioned. When the irritation has, by evaporating lotions, and other means, been lessened, no motion must at all employed, it will be necessary to put a splint under the limb, extending from the ham to the heel, and then to use it so that the joint may in time be restored to use. If no active or passive motion be employed, there will be no chance of

restoring the limb. This was the advantage of the late Mr. Greenough's plan, of Oxford. "I will not say that friction, when the inflammation is going on, is not injudicious; but I mean that when the inflammation is subdued you are not to leave the joint in a state of rest, but to use friction. Let me put you on your guard with respect to cases of common inflammation; in them you may employ motion earlier than in scrofulous disease. There is such a disposition to a return of these last affections, that you should never give any pain in the motion you use; the exercise should be so employed as not to excite the least uneasiness in taking it."—*Sir Astley Cooper.*

The next circumstance to be considered is, when does amputation become necessary? Formerly, limbs used to be amputated for scrofulous affections much more frequently than at the present day. The reason we seldom amputate is, that the affected limb may, with care and management, be often made more useful than an artificial one. In enlargements of the knee and ankle, it may be necessary now and then to amputate; but it ought never to be done unless the patient is labouring under great constitutional irritation, which threatens destruction to his life, or the limb has undergone such changes that it is not likely to be useful hereafter. For instance, in cases of scrofulous affections of the ankle-joint the foot often remains extended, and the patient is only able to walk on his toes. Here an artificial foot would be much better than the natural one. In scrofulous diseases of the knee-joint the tibia is often dislocated forwards; amputation of the femur and wrist is occasionally performed; that of the arm very rarely. See SCROFULA.

LIGATURE.

By a ligature is implied a thread, or silk, of various thickness, usually covered with white wax, for the purpose of tying arteries, veins, or other parts where adhesion is attempted. They should be round and very firm, so as to allow of being tied without the risk of breaking. The immediate effect of a tight ligature on an artery is to cut through the middle and internal coats, a circumstance that tends very much to promote the adhesion of the opposite sides of the vessel to each other. Hence the form and mode

Applying a ligature to an artery should be such as are most certain of dividing the above coats of the vessel in the most favourable manner. A broad flat ligature does not promise to answer the intention, because it is scarcely possible to tie smoothly round the artery, which is very likely to be thrown into folds, or to be puckered by it, and consequently to have an irregular lacerated wound made in its middle and internal coats. A ligature of an irregular form is likely to cut through these coats more completely at some parts than others; and if it does not perfectly divide them no adhesion can follow, and, secondary, hemorrhage ensue: a fear of tying the ligature too tight may often lead to the same consequences. Ligatures are for the most part made of silk and rubbed with white wax. Silk ligatures will perhaps answer the purpose best, and especially that form which is called, in the trade, 'dentists' silk,' which consists of a firm dense thread, so firm that a piece of very small size cannot break by pulling it with the finger and thumb. Common stout thread will also answer the purpose.

Remarks.—Attempts have been made to get rid of the irritation which ligatures produce in wounds by cutting off both ends of the ligature close to the knot; and such has been done after amputation, castration, removal of the female breast, operation for aneurysm, &c. and in no instance have any bad consequences resulted from cutting the ends close to the wound and leaving the knot in. In many cases the wound will unite, and the knot will remain without exciting any irritation; in some other cases, after the cicatrization of the wound, a small spot arises at the cicatrix, slight ulceration takes place, and the knot comes off. In every case where you expect the wound to suppurate, both ends of the ligature may be cut off, because the knot will come away with the suppuration. If, however, the wound be expected to unite by adhesion, the safest and best method is perhaps to cut off one of the ends, and leave the other hanging out of the wound. The ligature usually comes away in four or five days, sometimes continues so long as three weeks. Should it go on beyond this time, it may safely be drawn gently, and it will come away.

See ARTERIES, HEMORRHAGE, &c.

LITHOTOMY.

This is a painful operation, and one attended with danger. There are various sources of risk inseparable from the operation, which consists essentially in making an opening into the bladder, and forcibly drawing out the stone through it. The dangers of lithotomy, however, differ materially under different circumstances. Half of all the stone cases occur in patients under the period of puberty, in those the risk of the operation is slight, and if it be skilfully performed, the deaths are very small in number in these cases. In persons who have arrived at adult age and who are healthy, the risk is not very considerable; but in elderly persons, in those who are advancing in years, in those who have long suffered from the disease, and whose health is broken down by it, or impaired from other causes, as well as from the existence of stone in the bladder—where, from the long existence of disease, the stone has acquired very considerable magnitude, so that it cannot be extracted without much force—under these circumstances, particularly, the risk is considerable, and it becomes necessary for the patient to weigh well whether he will prefer submitting to the sufferings induced by the stone in the bladder, or run the risk of life, which is inseparable from an attempt to relieve him completely. This is a point which, of course, must be left to the patient himself in each instance, the nature of the risk being represented to him as accurately as it can be by the surgeon. Perhaps the most unfavourable cases for lithotomy are those in which the stones are of considerable magnitude.

Lateral Operation.—In the ordinary lateral operation, the stone is extracted under the arch of the pubis; that is, it must come out of some part of the space left between the rami pubis and the ischia. Now there is only a certain limited space left between the bones in this part, and this space is occupied by various soft parts, so that the stone cannot be brought out in this situation without considerably bruising, and perhaps laceration, of these parts, particularly when its dimensions exceed a certain magnitude. You cannot, therefore, but run considerable risk, if you operate under such circumstances. In many cases, if you

certain exactly the size of the stone before the operation was performed, it might be deemed more advisable for the patient to remain with it in the bladder, obtaining such relief only as cathartics are capable of affording, than to undergo the very great risk of the operation, when the stone is of that large size. With respect to the kind of operation which is most eligible, it may be observed, that although various methods have been projected at various times, it is now generally agreed that the lateral operation, which is performed by making an opening along the perineum, and cutting along the urethra into the bladder, is the best; it is now which is almost universally practised.

High Operation.—The stone may be extracted by making an opening into the anterior part of the viscus, above the pubis, and this is called the *high* operation. This operation was formerly practised, but it was abandoned in favour of the other; of late years, however, it has been revived and practised by one surgeon, Harris, and now occasionally adopted in St. George's Hospital.

Recto-vesical Operation.—Of late years another operation has been performed, that of making an opening through the rectum into the fundus of the bladder, and this is called the recto-vesical operation. By making an opening there the stone is accessible, and you have an opportunity of extracting it at that part of the pelvis where it is the widest. This operation, however, has hardly ever been practised in England.

If a stone is lodged in the urethra, the removal of it is easy. You have merely to make an opening into the part where it is lodged, and to take it out. The operation itself is perfectly simple, and nothing can be more easy. The hard body serves as your point, and you have only to cut down upon it, and take it away, and the opening usually heals up very readily.

Symptoms of Stone in the Bladder.—Pain along the course of the urethra, extending from the neck of the bladder forwards, and this is not always present; but opposite to the frænum, about an inch from the extremity of the penis, there is always considerable pain, and the patient walks with difficulty, very little urine can be voided from the bladder, and the patient feels a frequent disposition to urinate. Pain opposite the frænum, and a frequent disposition

to void the urine, are invariable symptoms attending stone, and if there is much irritation bloody urine will be voided. The urine is not changed unless there is much irritation in the bladder; but if the stone has been of long standing, and there is disease of the bladder, there will be clots of blood in the urine. When the mucous membrane of the bladder is affected, the urine will be white, which will show that the bladder is diseased; there will also be flakes of matter in it, and when this is the case, the patient is in a state that would be improper for an operation. There may be a sudden arrest of urine during the flow of a full stream, in consequence either of a valve formed in the urethra, or the stone resting against the neck of the bladder.

The diagnostic symptoms of stone in the bladder are pain towards the extremity of the penis, opposite to the frænum, discharge of bloody urine, sudden arrest of the water during a full stream, frequent disposition to void the urine, and pain in doing it, particularly in the erect position. In some cases the abdominal muscles are affected with violent spasms. In some subjects, particularly boys, there is elongation of the prepuce.

OBS.—Calculi are formed in the bladder around some extraneous body, which gets into it, and which constitute the nucleus about clots of blood; or the stones pass from the kidneys through the ureters, and enter the bladder. Some stones are composed of concentric lamellæ, whilst others are not; in those which are concentric, layer after layer is deposited and adheres; but the lamellæ are composed of much firmer materials than the bone of adhesion which unites them*. The usual weight of calculi in the bladder

* There are four different kinds of calculi, when chemically examined. The first is the uric acid, which is a common, but not the most common form of calculus. The second is the triple phosphate, or ammoniaco-magnesian phosphate. The third species is the mulberry, or oxalate of lime. The other species was lately discovered by Dr. Wollaston, to which he has given the name of cystic oxide. As regards the uric acid, it is distinguished by its concentric lamellæ, and when cut has the colour and appearance of wood. It is soluble in alkalies; and consequently alkaline medicines are recommended for this kind of stone. The second species is composed of triple phosphate, or ammoniaco-magnesian phosphate. It is of a greyish white colour.

from half an ounce to two ounces—most frequently under two ounces; though instances of considerably larger are recorded. “I do not think,” says Sir Astley Cooper, “that the patient is in greater danger in an operation, from a larger number of stones lying in the bladder, or even so much, as when there is only one large or moderate-sized stone. The introduction of a pair of forceps into the bladder for the removal of one or more stones is not dangerous; the greatest danger is, if the parts be bruised and cause irritation be produced.”—*Surg. Lect.*

so distinctly laminated as the uric acid. It is not soluble in alkalis, but it is acted upon by the acids, though not in any considerable degree; and on the application of the blow-pipe, it becomes vitrified. A quantity of water resembling mortar, which is, in fact, the ammoniaco-magnesian phosphate, is generally passed from the bladder, and the urine is highly viscid.

When the appearance of this substance resembles mortar, which is of a bluish white colour, and not so distinctly laminated as the uric acid, “I usually,” observes Sir A. Cooper, “dissuade the patient from submitting to an operation.” The triple phosphate reproduces itself very rapidly. A stone from the kidneys has been analyzed by Dr. Marcet, and found to be of the mulberry species, but the opinion once entertained, that it is formed in the bladder itself, is not correct.

Brande has analyzed 150 calculi, in order to ascertain the relative proportion of materials in each species. The result of this analysis was as follows:—of the 150 calculi, sixteen were uric acid. This led to the remark, that uric acid were not the most common; they occur in the proportion of sixteen in 150. Forty-five were composed of uric acid in considerable quantity with triple phosphate in a smaller proportion; uric acid *plus*, and triple phosphate *minus*. Sixty-three were composed of triple phosphate in a larger, uric acid in a smaller proportion; triple phosphate *plus*, and uric acid *minus*. Twelve were entirely triple phosphates; five were composed of uric acid with a nucleus of the phosphate of lime, and six were mulberry calculi. The analysis stands thus:—

Of 150 calculi,

- . . . — were uric acid.
- . . . — uric acid *plus*, triple phosphate *minus*.
- . . . — triple phosphate *plus*, uric acid *minus*.
- . . . — triple phosphate.
- . . . — uric acid with a nucleus of phosphate of lime.
- . . . — mulberry calculi.

PRELIMINARY CONSIDERATIONS.—The first circumstance to be considered before the operation for lithotomy be performed is whether the constitution of the patient is in a sound state, or his general health good; for unless this be the case, there will be little chance of success. Great advantage will be derived from putting a patient who is to be operated upon for stone, on vegetable food, a short time beforehand; it is not right that he should be on full diet, or animal food. "It is also improper to operate on a patient so soon as he is admitted into the hospital; the surgeon should wait and have the patient prepared by giving him vegetable food, and also sounding him frequently; the introduction of the sound accustoms the bladder to irritation, and when it is done pretty often before the operation is performed, the patient bears it infinitely better than when he has been operated on without it. You should also inquire whether there be any local disease of any organ. The kidneys become sometimes altered when there is a stone in the bladder."—*Sir A. Cooper's Surg. Lect.*

"The time of life which is best fitted for this operation is about sixty-one or two, and at this period a great number of cases occur. After the age of twenty the danger increases, but between sixty and sixty-three more cases recover than at any other period; at least this is what I have seen. If a patient is loaded with fat, there is always danger from peritoneal inflammation. As to advanced age, Mr. Cline, sen., has operated on a patient eighty-two years of age; Mr. Attenburrow, of Nottingham, has operated on a person of eighty-six. I have operated on a patient of seventy, but never on one older; this patient lived twelve years afterwards, and died at the age of eighty-eight; therefore, old age is not an objection to the operation, unless there is an enlargement of the prostate, when you must not operate. With respect to very young, they are in considerable danger from the operation. I mean children before they are four years of age. After that they acquire strength, and the irritability of the constitution is much lessened; under this age convulsions frequently come on after the operation, and in three days the children often die, more especially if they have lost much blood at the time of the operation. I have operated on a child of one year and nine months.

and it has recovered; but very often indeed do convulsions come after the operation for stone in the very young, which in most cases terminate existence. With regard to the success of the operation, it is quite certain, if the accounts published be correct, that the success lately has not been so great as it used to

Of Cheselden's operations, if I recollect aright, only four in six failed. Mr. Martineau, of Norwich, has operated for stone with most extraordinary success. He has published a paper in the *Medico-Chirurgical Transactions*, which is well deserving mention; no surgeon in London, I am certain, can boast of similar success. The degree of success which is considered the most correct, is that taken from the result of the cases at the Norfolk and Norwich hospital. When I was there, there were between two and three hundred cases registered; all the calculi preserved, together with an account of the different operations performed for the removal of each, and I then took an opportunity of ascertaining what was the result of these cases. At that time a more detailed account has been given by the Dr. Marcet, in his work on calculi, from which it appears that two in fifteen died. This is the result of the practice at the Norwich and Norfolk hospital."—*Ibid.*

A table is required for the operation, about two feet six inches long and bandages to fasten the hands to the feet, and to draw the feet towards the body; the patient should have an injection the day before the operation, and the rectum should be completely emptied otherwise it will be in danger of being opened in the operation.

INSTRUMENTS USED IN LITHOTOMY.—The first instrument that will be necessary to consider is the sound; this should be of a large size. The sound, however, should be fitted to the size of the urethra; for if a small sound be used in a large urethra, or a large sound in a small one, the stone will very possibly escape being felt. You should sound the bladder, both when it is full and when empty. "When a person comes to me," says Sir A. Cooper, "with symptoms of stone, I order him to lie on his side, on some chairs, and sound him; but if I cannot discover a stone, I ask him how long it is since he had made water; if he says four or five or two, I direct him to void his urine; and it has fre-

quently happened that I have felt a stone as the water was discharging, when I had not been able to do it before. In these cases I used a catheter, putting my finger over the orifice, and moving the instrument across the bladder; if the stone is not to be felt, I take away my finger, and then it frequently happens, that as the urine escapes, the stone strikes against it. Now, if a person says that a stone may be readily felt when it is in the bladder, I would ask any surgeon, who has had the least experience, to confess honestly whether he has not sounded a patient for stone, and has been unable to find one, when another surgeon has detected it in a moment? It happened to myself—it happens to all. If there is an enlargement of the prostate, the point of the sound frequently strikes against it, or passes over it, and in those cases the stone commonly escapes being felt."

The next instrument required is the staff, and this should be as large as the patient can admit; let the groove be large and deep, which will lessen the danger of the knife or gorget slipping in its passage to the bladder: the larger the groove the safer it will be. The staff should be a little more curved than the sound, and it will then serve as a director for the knife; for if it is not, you will be obliged to lower the instrument you are going to introduce, in order that it may reach the bladder. When you are about to cut a patient for stone, let the staff rest on the stone, and the reason is, there have been too many instances where the gorget has not entered the bladder, and this has arisen from the staff being in the bladder, but resting on the prostate, by which means the gorget has slipped, and passed between the bladder and rectum. The staff should be held perpendicularly, and should rest on the stone; then, when the gorget is introduced into the groove, it goes to the stone, and the forceps may be passed directly to the spot where it is. Never then let the staff rest on the prostate gland, but on the stone.—*Surg. Lect.*

The following preliminary advice is laid down by Sir Astley Cooper, which cannot be too highly appreciated. "When you sound a man for stone, I would advise you to be on your guard as to any queries respecting what you have discovered. Let your answers be rather equivocal and evasive than otherwise, for

precise answer either in the affirmative or negative, your reputation may receive unmerited injury. The reason why you should be thus cautious, after what I stated to you in my last, must be sufficiently obvious, viz. from the well-known fact, that a calculus may be detected by the sound at one time and not at another ; that if, after an examination, you were positively to tell a person that he had not a stone in his bladder, and upon being sounded the following day by another surgeon, he was as positively assured to the contrary, if it should prove in the sequel that you were wrong, the patient would lose all confidence in you, entertain opinions unfavourable to your professional talents, and report you to his friends accordingly. Be, therefore, on your guard."

In the lateral operation of lithotomy,—The incision is to be begun a little on the left side of the raphe, immediately below the symphysis pubis, and carried obliquely downwards and outwards to halfway between the anus and tuberosity of the ischium, and terminate opposite the centre of the anus. Before you commence this incision, the raphe should draw aside towards the ramus of the ischium on the right side. Never begin an operation without having first reflected well on what you are going to do ; and in making incisions through the skin, you should, before the knife is applied, mark out with your eye, the course which such incisions should take, and the precise point where they should terminate.

The first cut then through the skin, made in the direction just mentioned, penetrates the skin and cellular substance, and lays open the accelerator urinæ ; you then with the fingers of your left hand push or draw the bulb of the penis under the ramus of the ischium on the right side, so that the next incision will pass between the bulb and crus penis of the left side ; and, as there is no necessity in reality for cutting the bulb, it should be divided ; carrying the knife forward between the bulb and crus, and divide the accelerator urinæ, and this should be done completely, for if you permit any portion of its fibres to remain undivided, particularly at the upper part, if the stone should be at all loose, you would find that their contractions would very much increase the difficulty of withdrawing the stone. As soon as the accelerator urinæ has been cut through, you expose the transverse

perinei; you are then to feel for the groove of the staff with the nail of the index finger of the left hand, and having fully satisfied yourself of its situation, you are to cut into it through the membranous part of the urethra by means of the same scalpel with which the other incisions were made, and then, fixing the beak of the gorget in the groove of the staff, you are to bring down towards you the handle of the latter instrument, while at the same moment you push the gorget into the bladder, with its point directed upwards, and its handle of course somewhat depressed. This last direction is given for the purpose of preventing the dreadful accident of the gorget slipping and passing between the bladder and rectum, instead of its entering the former viscus.

Gorget.—The gorget, which was first employed in the operation of lithotomy, had no cutting edge, and this instrument has one very great advantage over the cutting gorget, viz. its use does not endanger the life of the patient from hemorrhage, which, certainly, is a most important consideration. When the cutting gorget, as it sometimes does, divides the internal pudendal artery, if that misfortune be not attended to, the life of the patient becomes endangered from the chance of excessive hemorrhage. The blunt gorget had, however, a counteracting disadvantage of much consequence that its employment has been long since relinquished; it was the impossibility of making an opening sufficient large for the removal of a stone of even inconsiderable magnitude. Cheselden, whose success was so great, was in the habit of cutting into the bladder with a knife. And, notwithstanding the very great reputation which Mr. Martineau, of Norwich, has acquired for his lithotomy operations, it does not appear that the instruments he uses differ from those in common practice. The success in fine, of surgical operations arises rather from the manner in which these operations are conducted, than from any insignificant peculiarity which the instrument may possess.

Sir Cæsar Hawkins added to the blunt gorget its cutting edge; this was certainly an improvement; but if the instrument be too wide at the part where the prostate and bladder are divided, the internal pudendal artery will be in great danger of being divided, and this is an accident which you cannot too sedulously avoid.

If I were to be asked," observes Sir A. Cooper, "how many times I had known the accident of the gorget's slipping and passing between the bladder and rectum happen, I should say at least a dozen, and in each case the most lamentable and fatal consequences ensued; for the operator lays hold of the stone, bladder, &c. all; the forceps slip, he lays hold of the stone again enclosed in the bladder, in the same manner, and thus continues to pull, &c. &c. and draw the bladder, till at length the patient is carried back to his bed without the extraction of the stone. Violent inflammation supervenes from the violent bruising which the bladder receives, and in a few days the person is no more."

This untoward circumstance may be easily avoided, if the operator will be always sufficiently guarded to cut with his knife into the groove of the staff, then to put his index finger nail into the groove, and keep it there until he feels its situation occupied by the beak of the gorget; the finger ought not to be withdrawn until he is satisfied of this fact. Having now placed the beak of the gorget in the groove, the surgeon takes hold of the handle of the gorget with his left hand, and brings it towards him; at the same time he passes the staff so as to keep it decidedly within the bladder. When you bring forward and depress the handle of the staff, that is the moment for thrusting in the gorget, and this should be done in a direction upwards. Having been satisfied that the gorget is in the bladder, the staff is withdrawn, and then along the hollow of the gorget the forceps is introduced. Particular caution is requisite when introducing the forceps not to let the gorget recede, and get out of the bladder; this frequently happens, and it is a very awkward accident, often leading to a great deal of difficulty in completing the latter part of the operation. The mode in which it takes place is as follows: when the gorget is in the bladder, and you attempt to pass the forceps along its concave surface, their point becomes opposed by the prostate gland, and in using a little more force to get them into the bladder, if you are not very careful, the gorget will be withdrawn; the forceps, consequently, will not enter the bladder, and the stone, together with the bladder, will be embraced by the blades of the forceps in the distressing manner just now explained.

If, upon introducing the gorget, considerable hemorrhage should arise, after the stone has been extracted, it may be checked, and entirely stopped, by keeping the patient cool, and by plugging the wound with sponge or lint; while there is any bleeding it would be highly impolitic to place the person in a warm bed, as the increased temperature would necessarily augment the disposition to hemorrhage. Ligatures to the vessels are not to be applied on account of these bleedings, as they often, under such circumstances, give rise to sloughings; the patient should not be left until the flow of blood has ceased. If, therefore, these bleedings be treated properly in the manner now described, they will not be attended with danger to life from loss of blood, as the hemorrhage can be easily checked by keeping the body cool, and by introducing into the wound a quantity of lint or sponge.

The gorget having been pushed into the bladder, the next step will be to pass in the forceps: in doing this remember what has been said respecting the resistance of the prostate and the occasional escape of the gorget from the bladder before the forceps are introduced into its cavity. Before withdrawing the gorget the stone should be struck with the forceps, which act will dispel all doubt as to the stone not having entered the bladder.

Forceps.—The ordinary lithotomy forceps have their bend, or joint, two-thirds of their way forward. If the stone should break, you are then to use flat forceps. If it be a soft stone, or a number of small ones, you may employ the scoop or crotchet. Having passed in this last instrument, and carried its point a little beyond the stone, you then pass in your finger to the farthest extremity of the instrument; the stone is then lodged between the point of the crotchet and your finger in the same way as it would have been between the blades of the forceps, had they been used.

Another instrument for dividing the prostate and bladder, of late been used with success, in the lateral operation of lithotomy,—it is called the *bistourie cachée*; it was invented by Coste, a French surgeon, about one hundred years since; it consists of a knife, enclosed in a sheath, which, after being introduced into the bladder, and turned, with its edge downwards and outwards, is drawn its way out when withdrawn.

Young people may be readily and successfully cut with a knife. The knife," says Sir A. Cooper, "may be advantageously employed in children—in fact, you may cut a child with any thing, in not so old persons, in whom the prostate and bladder are often diseased, and all the parts extremely rigid: thus, upon such a prostate and bladder the knife makes scarcely any impression, and the opening through the prostate is exceedingly small; while, on the contrary, the external wound will be of considerable size, which may be accounted for from the obvious fact, that the force is rather near to the hand than at the point of the instrument, which is much farther from the moving power: you will consequently find, when you are performing the operation of lithotomy with the knife on old persons having diseased prostate and rigid bladder, that you will not be enabled to make an opening sufficient to admit of the calculus being extracted with that freedom which every scientific surgeon knows to be prudent. The danger of the operation consists in bruising the parts, and not in cutting them. Again, in deep perinei, when operating with the knife, we often think that the instrument has completely entered the bladder, when, probably, its point has scarcely reached the verumontanum: you are at a loss—are quite at sea—and cannot tell whether it has entered the bladder or not. The result, therefore, of my experience has convinced me, that, in old persons, the knife is not so good an instrument as either the gorget or the *bistourie*; but in young people it may be used with perfect safety. I speak from what I have observed, and therefore speak confidently. I relinquished the use of the knife in the adult and old persons, because it did not succeed."—*Surg. Lect. in MS.*

Difficulties in the operation.—A large calculus is a most serious obstacle to both the performance and success of lithotomy; it is a quality of a horrible nature; and in consequence of the bruise which the neck of the bladder receives from the force necessary to be employed in its removal, generally proves mortal. There is no comparison in the danger arising from a number of small stones, compared with one large one: the small stones, if you are careful, will all be removed without doing any violence to the parts; with a large one this is impossible. Large stones when con-

nected with enlarged prostates, present difficulties much greater than when the gland is in a healthy condition. Operations on such patients are dangerous to the last degree; it is scarcely possible that they can recover from them; and the surgeon often falls into disrepute, most undeservedly, who happens to have the misfortune to meet with such cases.

OBS.—Calculi in the prostate gland differ in complexion from those in the bladder—they consist of phosphate of lime. There are two species of calculi in the prostate; those which pass from the bladder in consequence of ulceration, and those which are found in the cyst, formed in the prostate gland itself. Calculi in the prostate gland may readily be detected by the introduction of the finger into the rectum.

AFTER TREATMENT.—As regards the treatment after the operation of lithotomy has been performed, some surgeons inject the bladder, with a view of removing every remaining fragment of stone—this practice, however, is by no means general. The after-treatment consists in giving the patient opium as soon as the operation is over; and in some cases, where the patient is exceedingly irritable, opium is given two or three hours before the operation is performed, for the purpose of deadening the sensations of the patient, by which he suffers much less pain from the operation, and because it likewise renders him much less irritable as the operation is performed. It will be proper to administer diluents very freely. A small quantity of soda or potass should be put in his drink; gum also may be added, as it is considered to have the power of soothing the parts, and diminishing the irritating quality of the urine.

The principal danger to be apprehended after the operation is stone is peritoneal inflammation. On the day after the operation, therefore, the surgeon should place his hand on the lower part of the patient's abdomen, and inquire whether he feels any pain. If any tenderness of the peritoneum be present, leeches and fomentations should be applied to the abdomen; and if the symptoms be urgent, it will frequently be necessary to take blood generally as well as locally, and to put the patient in the warm bath. Vomiting is a frequent symptom when the abdomen is in a state

ate. The subsequent treatment will consist in giving considerable doses of the submuriate of mercury. Calomel is a very useful medicine in this case, not only as a purgative, but combined with opium, it diminishes irritability, and lessens the disposition to inflammation in the abdomen. Purgatives and anodyne injections should also be administered.

OOBS.—The time in which a patient usually recovers after the operation of lithotomy is, under favourable circumstances, generally from seventeen to twenty-one days. It is sometimes longer when the perineum is deep; and, on the other hand, a patient has been known to get well in a fortnight. The urine frequently resumes in the right course in about twenty-four hours after the operation—sometimes, however, not till after three or four days; this will depend in a great measure on the size of the stone. In general the patient has a rigor or cold fit, when the urine returns to its natural course, this symptom, therefore, need not occasion alarm.

LITHOTOMY IN THE FEMALE.

Calculi form as readily in the female as in the male: though the female is much less frequently the subject of the operation of lithotomy, in consequence of the shortness of the meatus urinarius, and the ease with which stones pass away from it.

SYMPTOMS OF STONE IN THE FEMALE.—The symptoms of stone in the female are considered as being more urgent in the female than in the male. She experiences dreadful pain at the extremity of the meatus urinarius; in addition to which there is a swelling down of all the lower parts of the pelvis, as if they were about to protrude; a frequent disposition to make water; and all remains suffered during delivery. There is generally a prolapsus of the vagina, and a discharge of bloody urine, with an almost constant retention of urine; a great urgency to discharge it, and an inability to retain it. The constant excoriation of the parts from the discharge keeps the patient in a most offensive state.

There is some variety as to the situation in which stones are lodged in the female; they are sometimes lodged in the urethra or vagina. The practitioner is advised to be upon his guard against imposition in the female; for extraneous bodies often find

their way into the meatus urinarius of the female in a very extraordinary manner. Stones of very considerable size will pass by the meatus urinarius of the female, without the necessity of an operation. Calculi may be removed from the female either by dilating the meatus urinarius or by the operation of lithotomy. The former method, however, is greatly to be preferred, not only because there is much less danger in it, but because it does not leave behind the melancholy consequence which the operation does—namely, of never after having the power to retain her urine. Her condition, therefore, is most deplorable. The continual discharge of urine, and constant excoriation of the parts, render her offensive to all around her—her health is broken, and she is completely cut off from all society.

LITHOTRITY.

Of late years a plan has been devised, and brought to a considerable degree of perfection, by the French surgeons, for breaking down stones in the bladder, and reducing them into fragments of a size capable of passing out of the bladder with the stream of urine through the urethra; and this plan has been denominated lithotritic or lithontriptic method, a compound word from Greek, meaning the *crushing* of stones.

In this plan, instruments have been introduced into the bladder of a cylindrical form, like a catheter, though composed of a complicated assemblage of pieces, and admitting of certain parts being protruded from the interior of the tube, expanded and retracted so as to grasp the stone, and by the combination of these, with other contrivances for boring or scooping out holes, the interior of the stone is reduced to powder; other instruments are then employed, by which the thin shell of the stone which remains is broken up into small pieces. Inasmuch as the instruments employed for this purpose are of considerable size, they require the urethra should be of very full dimensions, in order to admit of the possibility of their application; they also require a considerable space in the bladder for the expansion of the parts which they consist, and the performance of those manœuvres by which the stone is to be ground or broken into fragments. 1

is necessary that the patient should have an ample urethra, and so that he should have an ample bladder, that is, a bladder free from disease, in which there may be room not only for the instruments and the stone, but also in which the latter may be seized and acted upon. The bladder must also be healthy in its state, in order that it may be able, when the stone is broken down, to expel, by its contractile power, the fragments with the urine. Under these circumstances, the plan of breaking the stone in the bladder is performed by those who have acquired a dexterity in the use of the instruments with tolerable facility; the stone can be readily reduced to such a state in the bladder, as to admit of its being expelled through the urethra, and thus the patient gets completely of his sufferings, without undergoing the pain and risk that attend the operation of lithotomy. Great merit is due to the French surgeons for the invention, and for bringing to use the mechanical means necessary to accomplish this purpose to a degree of perfection. It should, however, be observed that the instruments employed under various circumstances for the accomplishing of this object, are complicated in their construction; that they require a considerable degree of mechanical dexterity, and that their safe employment on the living subject can only be undertaken by those who have had great opportunities of using them under a variety of circumstances. For these reasons, it is apprehended that the practice of breaking the stone in the bladder will never become a general one; it will only be used by those who possess considerable dexterity, and those who have had great opportunities of trying it. One circumstance of great importance in the operation of lithotrity is in the size of the stone; stones beyond a certain magnitude cannot be grasped and reduced in size by those instruments; that is, the size of the urethra and of the bladder is not large enough to allow of the introduction of instruments sufficiently large to grasp a stone beyond certain dimensions; the operation of lithotrity, therefore, is confined to those cases where the stone is of a certain size, *per- about an inch and a half in diameter.*

I cannot pretend," observes Mr. Lawrence, "to give you data of the comparative risk of this operation, and that which

attends the operation of lithotomy, not having had experience in both. I do not suppose that the operation of lithotrity is free from all risk. Under many circumstances, it is necessary to introduce the instruments several times, to make repeated operations on the stone in order to reduce it to fragments, so that I conceive this plan of proceeding, although it may be less dangerous than lithotomy, is not altogether free from risk. The comparison, however, between lithotrity and lithotomy would not be fair, unless we compared the results of the two where they were put in practice in cases of the same description. Lithotomy is employed in all cases indifferently, favourable and unfavourable for the operation; but the cases to which lithotrity is applicable, come under the description which are called favourable; that is, where the stone is small, where the bladder is perfectly healthy, and where therefore, there would be very little risk of an unfavourable result after the operation of lithotomy. In the other cases we are compelled to have recourse to the old method of removing the stone by the operation of lithotomy."—*Surg. Lect.*

LOTIONS, OR WASHES.

Lotions or washes are fluid external applications, usually applied by wetting linen in them, and keeping it on the part affected: *e. g.*

NITRIC ACID LOTION.

Take Nitric acid 3j.
Distilled water Oj. Mix.

USE.—Much used as an application to spongy granulations though somewhat too strong, and to ill-conditioned ulcers. It is also employed to correct the fetor, and promote the exfoliation of diseased bone.

LOTION OF THE ACETATE OF AMMONIA.

Take Solution of the acetate of ammonia .. ʒiv.
Rectified spirit ʒij.

USE.—In mammary inflammations, previous to suppuration and at the commencement of all glandular swellings, more particularly after local bleeding. It has been found extremely useful.

discussing whitlow or paronychia, after the application of leeches. It should be applied by means of three or four folds of linen, which are to be constantly kept wet with it.

LOTION OF THE MURIATE OF AMMONIA.

Take Muriate of ammonia ℥j.
 Vinegar Oss.
 Distilled water..... Oj. Mix.
 USE.—Discutient in a powerful degree.

SPIRITUOUS LOTION OF MURIATE OF AMMONIA.

Take Muriate of ammonia ℥j.
 Rectified spirit ℥iv.
 Vinegar Oss. Mix.

USE.—For discussing some kinds of slow chronic inflammation about the ligaments, or for removing any thickening or indurations consequent upon an injury to such parts; it will frequently be found to afford more essential service than any other of lotion for the same purpose.

The two last lotions are from the Pharmacopœia of Guy's Hospital.

LOTION OF LIME.

Take Lime water ℥vj.
 Proof spirit..... ℥iij. Mix.

USE.—In burns and scalds where the cuticle remains entire. It should be used cold, and the part kept constantly covered with it means of fine linen cloths.

LOTION OF THE OXYMURIATE OF MERCURY.

Take Oxymuriate of mercury..... gr. iv.
 Distilled water Oj.

USE.—In many cutaneous affections of an herpetic nature. In Psoriasis it will frequently succeed without the least danger or inconvenience, used night and morning externally. In Psorophthalmia it is said to be almost a specific.

A few drops of spir. vini, or one or two drops of muriatic acid will greatly accelerate the solution of the oxymuriate of mercury.

YELLOW LOTION OF OXYMURIATE OF MERCURY.

Take Muriate of quicksilver..... ʒij.
 Lime water Oij.

Rub the oxymuriate of mercury with the lime water until it become a yellow oxyde of mercury.

USE.—Employed extensively against syphilitic eruptions; also in scabies and desquamation of the cuticle; and sometimes with good effect to those destructive ulcers of the nose and face, denominated *noli me tangere*.

BLACK (wash) LOTION.

Take Submuriate of mercury..... ʒij.
 Lime water Oj.

Rub the calomel with the lime water till it become a black oxyde of mercury, which will be suspended in the fluid by brisk agitation.

USE.—The black mercurial lotion is extensively used both in hospital and private practice, as one of the best applications to syphilitic sores. To cancers, when not disposed to slough, the wash will oftentimes heal like a charm, if applied warm in form of a poultice in linseed meal. Ulcers too of the extremities, attended with sloughing cellular membrane, often succeed better under the employment of this poultice than by any other application. The black wash is frequently very beneficial in removing fungous excrescences situated about the roots of the nails. It should be poured on lint, over a shallow vessel, to separate the black oxyde from the clear liquor, in which manner it should be applied.

LOTION OF MYRRH.

Take Tincture of myrrh..... } of each, ʒj. Mix.
 Lime water }

KIRKLAND

USE.—To take down fungus flesh. In cases of fungus of the brain, Dr. Kirkland found it extremely proper and serviceable by dipping into it dossils of lint, and applying them to the excrescence.

LOTION OF OPIUM.

Take Soft extract of opium ʒj.
 Distilled water ʒviij.

to dissolve the opium by trituration, adding the water gradually. To facilitate the solution the water may be added in a boiling state.

USE.—Where opium is indicated as an external application, this lotion will be found a convenient form for use.

LOTION OF PITCH.

Rectified acid of pitch..... 3j.
Distilled water..... Oj. Mix.

USE.—In curing certain eruptions about the head and necks of children, attended with desquamation of the cuticle, and frequently accompanied with ichorous discharge, though different from tinea capitis.

LOTION OF ACETATE OF LEAD.

Solution of the acetate of lead..... 3j.
Proof spirit 3j.
Distilled water Oj. Mix.

This is the common white wash. Employed in cases where a preparation of lead is wanted, and another of the solution of lead.

The addition of ʒiij-3j. of acetic acid to the above will constitute the compound lotion of the acetate of lead; a very dis-
tinct and sedative application;—the lead is also in a state of
more complete solution by the addition of the distilled vinegar.

LOTION, COMPOUND SULPHURET OF POTASS.

Sulphuret of potass..... ʒss.
Venice, soap 3j.
Rectified spirit ʒiv.
Tinct. myrrh ʒss.
Lime water Oj.

Traverse together the soap and sulphuret of potass; after which
gradually the lime water, and lastly, the spirit of wine and
the oil of myrrh.

USE.—In tinea capitis; the head previously shaved, to be
washed with it night and morning;—and in order to retain to the
place as long as possible, pieces of lint are to be dipped in the
lotion with which the entire head should be covered; and which
may be confined there by means of a bladder or oil-skin cap.

LOTION OF THE ACETATE OF ZINC.

Take Acetate of Zinc 3j.
 Distilled water Oj.

or,

Take Sulphate of zinc 3ss.
 Distilled water Oj.

USE.—One or other of these lotions will frequently be found extremely serviceable in slight excoriations of the cuticle, chronic ophthalmia, and in general for removing any small fungus excrescence, as well as for checking such a disposition.

MESENTERY.

A membrane in the cavity of the abdomen attached to the vertebræ of the loins, and to which the intestines adhere. It is formed of a duplicature of the peritoneum, and contains within it an adipose membrane, lacteals, lymphatics, lacteal glands, mesenteric arteries, veins and nerves. Its use is to sustain the intestines in such a manner that they possess both mobility and firmness; to support and conduct with safety the blood-vessels, lacteals and nerves; to fix the glands, and give an external coat to the intestines. It consists of three parts,—one uniting the small intestine, which is the proper mesentery; another connecting the colon, termed mesocolon; and a third, attached to the rectum, termed mesorectum.

MESENTERIC GLANDS, AFFECTION OF.

The glands which are affected with scrofulous disease next in frequency to those of the neck, are the mesenteric glands. In young persons they are most commonly affected at the age of five or eight months.

CAUSES.—The causes which produce enlargement of the mesenteric glands arise in consequence of disease of the secretory glands of the intestinal canal, such as irritating food, which irritates the mouths of the absorbent vessels of the intestines leading to the mesentery. As regards the effect of mesenteric disease they consist at first, in an interruption of the process of absorption. The chyle travels through the absorbents to the mesenteric glands, and when some of these are enlarged, the chyle is in-

ated in its course. Although the child generally eats voraciously, it is wonderful there should be such emaciation independent of the irritation produced, by the system being deprived of nourishment.

SYMPTOMS.—Tumid belly, with tenderness on pressure; attenuation of the skin; voracious appetite; wasting of the limbs. The intestines are equally irregular, being sometimes purged, at others costive. In the motions are occasionally observed earthy matter composed of carbonate of lime.

TREATMENT.—Diet of easily digestible animal food; vegetable diet is highly improper. A little arrow root may be ordered, and nutritious broths. It is important that nothing but highly nutritious food should be allowed, because absorption being in a great degree prevented, a greater quantity of nourishment may be forced into the system. To assist digestion, it is desirable to give some wine and water, to stimulate the stomach, to secrete gastric juice, and to excite the action of the intestines.

"The best medicine in this disease," says Sir A. Cooper, "with which I am acquainted, is the oxymuriate of mercury, given in small doses, and in combination with the tincture of bark—one drachm of the oxymuriate to two ounces of the tincture; or should the bowels be costive, in the same quantity of the tincture of rhubarb. The hydrargyrus c. creta and rhubarb given so as to produce an aperient effect, are good medicines. The oxymuriate of mercury should be given with no other view than to improve the secretion of the liver and intestines, and thus produce one stool a day. The abdomen should be covered with a stimulating plaster, or frequently rubbed with the hand, in order to produce the same action in the part, and excite the absorbents.—*See* NECK, SCAPULA, &c.

Q.—Dropsy is sometimes connected with diseased mesenteric glands; in this case, paracentesis should be performed, when the patient generally recovers. Now and then a mesenteric gland degenerates, opens at the navel, and frequently communicates with the intestines, and thus an artificial anus is produced. In these cases where there is an artificial anus, a large proportion recover. Poultices should be applied over the opening; and when

the inflammation is subdued, strips of adhesive plaister should be applied over the opening, so as to bring the edges of the wound together, but not until all the matter from the wound shall have been thoroughly discharged.—See PARACENTESIS.

MORTIFICATION.

DEFINITIONS.—Mortification is the death of a part, that is, of a *part* only, accompanied by a peculiar change of structure, the result of a previous peculiar vital action. By this latter circumstance mortification is distinguished from simple death, as in the case of an amputated limb; or from temporary suspension of vital action, as when parts are frost-bitten; or from putrefaction, which frequently takes place after mortification has occurred. This, however, is by no means essential to the process; and, indeed, some kinds of mortification are to be considered as complete preservatives against putrefaction. Mortification is also distinguished, by the same circumstance, from chemical decomposition, such as is produced by the application of heat, or any other powerful agency, to a portion of the body. *Mortification*, *gangrene*, and *sphacelus*, are terms that are used almost indiscriminately; yet, perhaps, there are shades of difference between them. *Mortification* is the most general term; *gangrene*, perhaps, is more particularly employed to denote external superficial mortification; and the word *sphacelus* is employed in the case of an entire limb, or a considerable portion of a limb mortifying.—*Lawrence's Lect. see Lancet, Vol. II., p. 397, 1830.*

"Mortification," says Mr. Abernethy, "is the want of life in a part. But, mark you, how differently this state may be induced. Parts may die from exhaustion produced by inflammation; parts may die from mere weakness, mere want of circulation; they may die from a great variety of causes." Mr. Hunter said, that mortification is not simply the death of a part, for parts may die to a certain extent, and yet not mortify. Parts which have lost the power of life mortify; it is a vital process; it is the last act of life; it is the conversion of a part into a slough,* the part

* To slough means to perish, and a slough denotes that portion of

ed. It is not only deprived of life, but it is changed in appearance; it is a black, fibrous, homogeneous mass; you cannot dissect it; you find that its original structure is altered—this is mortification.”—*Abernethy*.

Gangrene has been called by different names, *e. g.* gangrena, gangrena humida, &c. It is sometimes attended by vesication, but vesication is not unfrequently the result of phlegmonous inflammation.—*See GANGRENE.*

CAUSES.—The causes of mortification are very various; hence the mode of its occurrence, the seat of the affected part, and the progress of it, vary much in different instances. Under the head of causes of mortification, may be included a variety of species which are capable of suspending the circulation of a part immediately, or producing such violent disorder in that circulation as will be equal to the suspension of it, the nature of the action being essentially a cessation of vital movements of the part. The division of predisposing, or direct and exciting causes, is important in *mortification* as in inflammation. The healthy and unhealthy states of body are to be taken into the account. Among the causes, then, of mortification, may be enumerated, the application of intense cold to the body; the infliction of very severe local injury; the direct interruption of the supply of blood to a part by pressure, or by ligature, in the main artery of a limb. In the same way certain diseases of the heart, particularly those which produce a contraction of the orifice of the aorta, are capable of inducing mortification. General pressure on a part of the veins are very numerous, such as that of *stricture* of the intestine in strangulated hernia; general pressure on the whole of a limb, particularly when that limb becomes the seat of acute inflammatory action, will produce mortification; as also swelling depending on the application of bandages; pressure on a part of the body by a particular position long kept up, as when a patient

which has perished. The word *slough*, in common English, is applied to the particular covering of the snake, which is separated annually from the rest of its body; and *slough*, in technical language, denotes the portion of the body which has perished, and separated from the body.

is laid upon his back, in consequence of some serious injury. Violent inflammation, which first excites the circulation and then leads to its suspension, will produce this calamity. It appears as if, under violent inflammation, the disorder is sometimes carried to a height which the part is not capable of sustaining, so that the blood stagnates, and, in fact, the blood perishes. Generally speaking, a high degree of inflammation is necessary to produce this effect; but sometimes mortification occurs from a degree of inflammation that does not appear to be of the highest kind. In cases of this description, it is necessary to look to the state of the system. When the limb has been in a weakened state, a comparatively trifling degree of inflammation will be sufficient to produce mortification. If a part has been formerly bitten, and consequently much weakened, the inflammation that ensues, though not very violent, leads to its destruction. In the case of anasarca of limbs, when blisters have been applied, and when limbs have been scarified to let out the fluid with which they are distended, it has been by no means uncommon for mortification to be produced by those comparatively trifling local injuries; and here the occurrence is to be ascribed by no means so much to the degree of inflammation, as to its combination with a want of power in the vital functions of the part. Mortification, as already observed, is an effect of that particular change in the state of arteries, known by the term *ossification*.

Internal causes.—There are certain internal causes, the nature and operation of which are unknown to us, capable of producing mortification. Thus feeding on rye, in that particular state in which it is called, by the English, *spur*, and by the French, *ergot*, predisposes to mortification; so that in those countries where it is an article of food, there are, in bad seasons, when it gets into this state, numerous instances of this calamity.

Mortification sometimes happens from external causes, the nature of which is equally unknown to us. Thus it may be produced by some animal substances in a state of decomposition, in contact with the skin, as in the affection which is called *malignant pustules*. These various causes should be divided into two heads, the internal and external. Of the internal

but important is an unhealthy, weakened, or deranged state of the constitution, which produces a predisposition to mortification.

Prognosis.—The prognosis in mortification is generally a matter of importance. There are, however, some mortifications that in extent, and derived simply from external causes, which are unattended with any kind of danger: thus there may be mortification of a part of the skin covering the tibia, in consequence of a smart blow upon it—of course not a dangerous circumstance. The skin covering an aneurism, when rendered very thin by the approach of the tumour to the surface, that also covering an abscess, when it is pointed, may mortify. These are examples of local mortification, from causes that merely act on a small portion of the body; but in other instances, and especially in all cases where mortification is referrible to *internal* causes, and where it is chiefly explained by that unhealthy state of the constitution alluded to, the prognosis is always very serious. The extent of the disease, the depth to which it proceeds, the importance of the part attacked, the state of the constitution of the individual in which it occurs, are points which should be attentively considered before an opinion is ventured as to what may be the result of the disease.

Treatment.—In an affection like mortification, in which the symptoms and cause are so dissimilar, it will naturally be concluded that no one mode of treatment can be appropriate to all cases. The general method of treatment to be observed where mortification is threatened, or where it actually exists, is, *first*, to prevent its occurrence; *secondly*, to arrest its progress, or to combat particular symptoms; *thirdly*, to favour the separation of the dead part from the living, and under circumstances where that is necessary, to accomplish such separation by an operation. In considering the first, the nature of the particular case of mortification must be remembered. Antiphlogistic treatment will prevent the occurrence of mortification, where it is likely to come on from inflammation. When a part is under the chance of mortification from *cold*, a judicious mode of restoring the temperature is a good preventive. So in each particular case the treat-

ment calculated to prevent its occurrence is suggested from the cause that produces it, which, in fact, signifies the particular nature of the affection. To determine the means by which the second indication is to be accomplished, namely, that of preventing the progress of the affection, the class of substances called antiseptics, that is, substances principally relied on to prevent putrefaction, have generally been resorted to without much benefit. Of this class are alcohol, camphor, turpentine, bark, which are very well known to have the power of preventing that spontaneous decay in dead animal substances that would otherwise take place. Now the change which occurs in mortification is no means to be considered as identical with putrefaction; and although these substances would retard putrefaction in the dead body, it by no means follows they would prevent living parts which are seriously disordered, from going into a state of mortification. Our object, therefore, in this place, is to discover, not that which will preserve for the longest time that which is already mortified, but what will restrain that which has not lost vitality from passing into a state of mortification. Then, if we consider that the living parts are in a high state of inflammation it will be immediately perceived that alcohol, camphor, turpentine, and such medicines, cannot be well calculated for the same purpose; and, consequently, that they may be dismissed altogether from the catalogue of remedies, that is, the substances called antiseptics, so much relied on by the older writers, from an erroneous view of the case.

Certain substances, as charcoal, have the property of destroying the fœtor which attends the process of mortification. For this purpose it is very finely powdered, and mixed up with bread to form a poultice, till the poultice is entirely black, and in this state applied to the part, to correct, which it does, the offensive fœtor which is very great. Alcohol and camphor have the same property in some degree; but the most powerful agents in removing the offensive fœtor, are the chlorurets, or chlorates, of lime, which have latterly been introduced into practice, as a general disinfecting agent, by the French chemists—a property which they are said to possess in a very perfect degree; for, if cloths di-

a solution of chloruret of soda or lime, of a sufficient strength, applied to a part of the body which is undergoing mortification, the unpleasant smell will speedily be removed; and if a quantity of the same solution be sprinkled over bed-clothes, it will be of considerable service.

The French have, however, gone a step farther than this; for they say, not only are these new agents capable of destroying the effluvia arising from mortification and other diseases, but that they tend to arrest the process of mortification. If they do so, they are mainly very important remedies; but in instances where they have been recently used, it would appear that they are merely to be regarded as disinfecting agents, that is, as destroying the effluvia, and that they do not at all possess the power of checking the progress of mortification by any agency they convey to the living part over which mortification is impending.—*Lawrence*.

The internal treatment must also vary according to the condition of the general symptoms. In cases of acute inflammation, it may be necessary to employ antiphlogistic means. In a case where the symptoms have assumed the typhoid character, means of a different kind are to be employed. Bark, stimuli, wine, &c.—all means, both dietetic and medicinal, which are capable of supporting the strength of the patient, become necessary in such circumstances; however, no general plan can be laid down.

As regards the third indication, namely, the *means of favouring the separation of the dead parts from the living*. While the mortification is extending, the boundary between the dead and living parts cannot be accurately traced; they seem to be confounded. As the events, near the edge of what is conceived to be the dead part, the living parts, if not actually black or brownish, are perfectly of a dark livid tint, and seem fast passing into the more dead colour which indicates mortification. The surrounding living parts are vesicated; the cuticle is raised by serous fluid beneath it; and it is by this process the mortification creeps on, leaving fresh parts in succession. But when it is stopped, a distinct edge pointing out the part is seen, and the immediate adjoining that distinct edge is perceived assuming a

brightish red colour. The boundary, in fact, of mortification manifestly shows the occurrence of inflammation, and there the absorbents begin to perform the act of separation*. An ulcerated line occurs at this part, which gradually deepens, and thus the mortified part is by degrees separated. In order, therefore, to favour, by local application, this process, all that can be done in general, is to keep the part at rest, and preserve it covered by a soft warm poultice of bread or linseed meal. At times, it appears that the natural process by which the separation is to be effected does not go on so actively as it might be expected, the living part adjoining the dead becoming languid; and that the separation is better effected under the employment of local stimuli. An application of this kind consists in the combination of yeast, or the grounds of stale beer, with bread or linseed meal, called the effervescing cataplasm, or yeast poultice, which may

* When gangrene is the result of extreme action, or the effect of a degree of inflammation, or when it is produced by cold, the process of separation soon commences. This process is one of the most curious operations of Nature in the human body; and the most extraordinary is the power which Nature possesses of separating even large members without any danger of hemorrhage, or consequently to the life of the patient. The first appearance observed, after the destruction of the life of any part, is a white line, formed by Nature for the separation of the dead from the living part. This white line is anxiously looked for, since it is the barrier which Nature sets up between the dead and the living parts, and it forms a criterion of the cessation of the gangrenous disposition. At this white line, the cuticle is raised, vesication, forming a line of circumvallation around the gangrene. When the cuticle becomes separated, (a process which takes place in two or three days,) a chasm beneath it is perceived, produced by the absorption of the living skin in contact with the dead. The living skin is taken up by absorbent vessels into the constitution, and in this manner the living part is separated from the dead by a process of Nature. Were we to reason *à priori* on this subject, it might be expected that the absorbent vessels would rather remove the portion of dead skin in contact with the living part; but this is not the case. The absorbent vessels act on the living parts, but not on the dead; nor is the dead skin absorbed after the time when granulations have formed; but it becomes loose, and ceases to attach to the surrounding parts, the chasm formed by the absorbent vessels affording an opportunity for the separation.—*Sir A. Cooper's Lectures, MS. copy.*

more effectually employed by using oatmeal, instead of bread or rye seed meal; yeast is employed instead of water. The dilute lactic acid lotion (four, six, or ten drops, to an ounce of distilled water), may occasionally be used along the boundary between the dead and living parts. The yellow or black basilicon, or stimulant forms of ointment, are well fitted for it; and the balsam of Peru is considered a very eligible stimulus to be employed on such occasions, from its not exciting the part very considerably, and tending at the same time very much to correct the fetor connected with the process of mortification. Pulverized camphor, in some instances, may be advantageously strewed on the part in which the process is going on. Camphor is rather, indeed, a powerful stimulus, and may be applied where the parts appear to be particularly insensate. These are, in brief, the means by which the mortified part in the living parts can be favoured. A lotion much used in St. George's Hospital for the same purpose, formerly called the *Epithema margaritæ acetatis*, but now *Epithema plumbi subacetatis*, is made in the following manner:

Confection of roses	℥j.	
Pulp. of roses		} ā ā
Tinct. of opium		
Solution of sugar of lead		} 3ij. Mix.

This is an application which agrees very well with limbs in a state of mortification, when the dead parts are separating from the living. And very good effects, under similar circumstances, have been produced by an application composed of vinegar and camphor mixed, (about vinegar ℥iv. mixture of camphor ℥xij.) It has been found to be of service when no other application has been used.

Should amputation be performed during the progress of gangrene and mortification? Amputation, in general, is not necessary when the sloughing process is going on; for if the surgeon will have patience for a short time, and the patient is also disposed, the part will separate as well as with an operation. The skin separates first, the muscles next, then the tendons, together with the

bones, which are left considerably shorter than the rest. When bones ulcerate, the tendons soon separate, and the former become covered in by skin and muscle. The cases in which the surgeon is called on to amputate are, when the patient will not be able to sustain the shock given to the constitution—then, if mortification be going on in any part, as through the middle of the leg, by which the power of the constitution will be nearly destroyed, recourse may be had to an operation. In *constitutional gangrene*, the operation ought never to be performed till the sloughing process has commenced, and healthy granulations are seen on the sore; for if amputation takes place, the parts will assume exactly the same appearance after as before. The loss of a small quantity of blood in these sloughing cases will soon destroy life. But, as regards mortification from *defective action* or accident, when called to a person labouring under these circumstances, amputation may be performed without the least hesitation.

MORTIFICATION OF OLD PEOPLE.—*Gangrena senilis*.—Old people are frequently afflicted with gangrene from very slight causes, and particularly those who are tall. The heart being naturally weakened by age, the circulation becomes extremely languid in the feet; hence mortification of the toes.

CAUSES.—This type of gangrene or mortification generally arises from ossification of the arteries, not of the large vessels but of the small, which lose their elasticity, combined with debilitated action of the heart.

SYMPTOMS.—At first the part is red and painful; the person thinking little of the matter, puts upon the affected part a piece of linen. In a few days the cuticle falls off, and there issues from the surface a sanious discharge; red streaks are afterwards seen passing from different parts of the foot up the leg; and the glands in the groin often undergo considerable inflammation and enlargement; all the absorbent vessels of the foot become inflamed and produce universal redness of the diseased member. The gangrene soon after begins to extend, destroys the whole of

not, and passes to the upper part of the leg, where it usually stops, as it seldom reaches the thigh; the constitution becomes considerably influenced; there is some degree of fever, and the cheeks assume a florid red colour.

This gangrene will not commonly destroy life, if attention be paid to the patient.

TREATMENT.—Sometimes gangrene of the toes of old persons attended with very considerable pain; and it is this form of affection in which Mr. Pott very warmly recommended the administration of opium in large doses, on account of the pain. As regards the local treatment, nothing better can be done than to keep the part at rest, and covered by a soft poultice, assisting separation by some of the means previously mentioned. These cases generally terminate fatally. When once that livid necrosis and separation of the skin, which are seen in individuals in whom the disease occurs, takes place, however trifling it may appear at the time, the patient seldom escapes.—*Lawrence.*

Poultice composed of port wine and linseed meal will generally be found the best *local* application; and the *internal* remedy should consist of opium, combined with ammonia.—(See GANGRENE.) You must not expect that these cases will always recover. I have known, however, a single toe, a whole set, and the entire foot, to slough, and yet the patient do well. In these cases you must never amputate, whether there be healthy pulsations or not; for, as surely as you do, mortification of the stump will supervene.”—*Sir A. Cooper's Lect.*

NÆVI.

Macula maternus, a mother's mark, so called. A mark on the face of children, which is born with them, and which is said to be produced by the longing of the mother for particular things, or diversion to them; because these marks resemble mulberries, strawberries, grapes, pines, currants, &c.

CAUSES.—It has been supposed, for instance, that if a pregnant woman is terribly frightened by any strange sight, there is a great probability that the child will bear some mark on its body more or less allied to the object that occasioned the fright; or, again, if

the pregnant woman should have a great desire, or, as the gossips call it, a *longing* for any thing, and especially if that desire cannot be gratified, it is a vulgar belief that the child will be marked.

These *nævi* are various in form and texture; but those which most frequently come under surgical treatment consist of peculiar vascular groups, seated either in the skin itself, or in the adipose tissue immediately under it. The cutaneous *nævi* are those which are seated in the skin, and consist of a soft, bright, scarlet elevation, the surface of which is finely granulated. These are generally a little irregular, not rising high above the surface of the skin. The subcutaneous *nævi* consist of a soft swelling under the skin, embedded in the adipose tissue; the skin itself may be completely sound, &c.

TREATMENT.—Excision, ligature, if the base of the tumour be sufficiently circumscribed and elevated to admit of one; Mr. Wardrop recommends the application, to the centre of the tumour of a portion of potass, or rubbing it over with the nitrate of silver, but potass is the most effectual: and Mr. Wardrop says, that you produce a certain degree of inflammation in one point of the structure, the same process will naturally diffuse itself throughout the whole, and thus that you may get an obliteration of a *nævus*, which is too large to be taken away with a knife. Another method has been proposed, namely, that of vaccinating the *nævus* in children who have not been inoculated for the cow-pox. The vaccine virus is to be introduced all around and about the part, and the object is to produce considerable inflammation in the substance of it. Mr. Fawdington, of Manchester has published a variety of cases of the cure of subcutaneous *nævi* by means of seton.—See *Lancet*, Vol. II. p. 729, 1829-30.

NEBULA.

A disease of the eye, so called from the nebulous or cloudy appearance of the transparent cornea, which is produced by deposit of lymph into the conjunctiva covering the cornea. The veins belonging to the nebulous parts become turgid and prominent.

TREATMENT.—The inflammation of the conjunctiva in this kind of disease is usually of the chronic kind, arising from a

axed state of the vessels, which require stimulating applications, in order that they may recover their tone, and convey the blood without interruption. By stimulating applications, the cornea will frequently be restored to its natural transparency; the abscesses will be excited, and the effused lymph removed. No undue degree of stimulus must be used; for if there should be inflammation, it will be increased. The following collyrium is recommended, viz.: sulphate of zinc, about gr. j.; to water, ℥j.; gradually increasing it in strength. Another is that of corrosive sublimate, in the same proportions. Calomel or levigated sugar has been used with good effects, blown into the eye. If there be considerable inflammation, it must be subdued by active means.—
PUSTULES, &c.

NECROSIS.

Necrosis, which means simply death of a part—mortification, is now usually applied technically, to denote death, or mortification of a bone. It has been confounded with other affections of bony structure, under the term *caries*; and sometimes under the name of *dry caries*. From what, however, has been said of the two conditions, it will readily be understood that there is an essential distinction between them, *e. g.*: Caries being, in fine, ulceration of bone; necrosis, a gangrene or mortification. Neither are necrosis and exfoliation synonymous terms. When, for instance, a portion of bone has perished, has become mortified or gangrenous, and it is separated by a natural process from the healthy portion of bone; and that separation, under certain circumstances, is called exfoliation, so that exfoliation is consequent on the necrosis; that is, the necrosed, or mortified, or dead portion of bone exfoliates or separates. Exfoliation, therefore, is a subsequent process, consequent on the previous death or necrosis of bone.

CAUSES.—The causes of necrosis are either external or internal. Externally from direct violence; such as blows or bruises, particularly such as are attended with a slight detachment of the periosteum. For instance, we not uncommonly see in compound fractures, that the extremities of the fractured bone perish, and are separated before union takes place. In the same way, when

portions of the bone are considerably injured by comminuted fractures, they are separated. Fractures produced by gun-shot wounds are very liable to be followed by mortification of the injured parts of the bone, and subsequently by separation. The manner in which the internal causes of necrosis are said to depend, or in which they operate, are not very apparent. They consist of those circumstances which are said to create a predisposition to the disease where external agencies are applied. The scrofulous habit, and that state of the constitution which is produced by the introduction of the syphilitic virus, occasion predisposition, although the mode in which the immediate causes act cannot be pointed out distinctly.

SYMPTOMS.—High state of inflammation proceeding in the centre of a limb; considerable local disturbance and general fever, tumefaction, general, of the limb, of an inflammable character, diminished appetite, white tongue, thirst, want of sleep, and very commonly delirium. Generally, after a time, redness shows itself in one, two, or more situations. All the symptoms increase in intensity, matter forms, and, if the thing be left to itself, the matter escapes by a spontaneous opening, which affords considerable relief.

TREATMENT.—Local applications, alteratives, &c. See Bone. **EXFOLIATION, &c.**

ŒSOPHAGUS.

The membranous and muscular tube that descends in the neck from the pharynx to the stomach. The œsophagus is subject to stricture; the tube becomes narrow, particularly about the termination of the pharynx, where the œsophagus begins, and an impediment to the passage of food into the stomach is thus produced. There is also what, for the want of a better term, is called spastic difficulty of swallowing. Sometimes this affection is of a schirrous nature: it proceeds to ulceration. The cellular tissue that connects its coats may be the seat of inflammation, which, like phlegmonous inflammation in any other part, may be resolved or end in suppuration. The surface of the membrane lining the œsophagus may be inflamed, and extend more or less through its whole length. As an idiopathic disease, œsophagus is

is, although it is much exposed to many of the causes of inflammation. In stricture, small-pox, measles, and tumours in the neighbourhood, the disease often is symptomatic; and dissections have found inflammation here in fatal cases of hydrophobia.

TREATMENT.—The cure of inflammation of the œsophagus is to be effected by the usual means—bleeding, saline purgatives, blustering; and if the accompanying fever be of the inflammatory type, and urgent, by diligence in their use, and the exhibition of antiphlogistics.

ŒSOPHAGOTOMY.

The operation for the removal of foreign bodies lodged in the œsophagus when it can be neither removed upwards nor downwards. When a substance above a certain size lodges in the upper part of the tube, it not only impedes deglutition, but its pressure against the trachea is productive of the most alarming symptoms of suffocation; and if relief cannot be promptly afforded in any other manner, and the situation of the foreign substance is pointed out by its prominence in the neck, the operation of œsophagotomy should be performed without delay.

The parts covering the œsophagus, from the middle and external part of the neck to the upper part of the sternum, are the skin, cellular substance, muscles proceeding from the sternum to the larynx, the thyroid gland, the thyroid arteries and veins, the trachea, recurrent nerves, &c. Although the deep situation of the œsophagus, and lying amongst the most important parts of the neck, makes this operation one of considerable delicacy even in the hands of a skilful surgeon, and one of considerable danger to one deficient in anatomical knowledge, and ignorant of the proper means of proceeding, the propriety nevertheless of performing it, under the circumstances above specified, is universally admitted.

OPERATION.—The patient is placed in a chair, with his head raised backwards, and steadily supported by assistants. The skin having been pinched up into a transverse fold, an incision is to be made in the integuments on the left side, from the upper part of the sternum; then the cellular substance between the sterno-hyoideus and sterno-thyroideus muscles and trachea is next

to be divided. The lips of the wound are to be kept open with two blunt hooks; and in separating the cellular substance at the side of the trachea with the aid of the finger, and a few strokes of the scalpel, the œsophagus will be seen. The interior part of this tube is then to be opened, and the wound made in it enlarged with a pair of curved blunt-pointed scissors, guided, if any difficulty arise, upon a director. The foreign body may now be removed by means of a small pair of curved forceps similar to those used for the extraction of polypi.

According to Guattini, an Italian surgeon, whose method is here laid down, the wound made in the above manner will serve for the extraction of the foreign body, whether the latter be situated above or below it; and he asserts that the same opening will even be useful when the extraneous substance has descended so far that it cannot be taken out, as it can now be easily pushed into the stomach. He also lays considerable stress on the utility of endeavouring to unite the wound, and adverts to his own experiments, proving that, in animals, wounds of the œsophagus heal very favourably. And although his directions for finding the œsophagus are very good, his principal defect is in representing the place for incision as being always the same, whereas it ought to be partly regulated by the situation of the foreign substance. Boyer, as well as Guattini, cautions the operator to make his incisions always in such a manner as to leave the trachea unharmed, as also the recurrent nerve at the inner edge of the wound, the carotid and internal jugular vein at its outer edge, the superior thyroidal vessels above, and the inferior ones below. With this intention, the cellular substance is to be slowly and cautiously divided layer by layer, and the blood repeatedly absorbed with a sponge; and if any vessel should bleed too freely it is to be immediately tied.

After the operation, an elastic gum catheter is directed to be passed from one of the nostrils down to the œsophagus and pharynx, by which means the requisite food and medicines may be carried into the stomach, without any risk of their passing through the incision, and retarding the cure. Though a still stronger motive for this practice is to avoid bringing the muscles in the

deglutition into convulsive action.—*See Hennen's Military Surgery. Mém. De l'Acad. Chir. Tom. III. 4to. Boyer, Traité des Malad. Chir. Tom. VII. p. 192, et seq.*

OPHTHALMIA.

A term universally applied to an inflammation of the membranes of the eye, or of the whole bulb of the eye; but which, according to the modern nomenclature of the disease, should be called *ophthalmitis*.—*See EYE, DISEASES OF.*

There are various forms of this disease,—

1. *Purulent Ophthalmia*.—Suppurative inflammation of the conjunctiva is the most severe form of inflammation in that membrane, and has a great tendency to terminate in sloughing, which Travers thinks is produced by a constriction of the small vessels distributed to the part of the cornea, in the same way as sloughing of the glands is produced in paraphimosis by the cutoff of such vessels. The acute state of purulent ophthalmia is of very short duration; it has a tendency to pass rapidly into the atonic stage, in which there is action without power, and consumption of the vessels of the part. At this time the violence of the symptoms is mitigated, but the patient labours under considerable prostration of strength.

SYMPTOMS.—Formation of a considerable quantity of purulent matter, with the symptoms, which do not materially differ from inflammation generally. The patient at first feels an uneasy sensation about the eyes—next some degree of pain on the admission of light, which increases to a considerable degree of intolerance.

Redness of the vessels is observed, with a greater degree of swelling than usually attends simple inflammation of the eyes. The eye-lids soon become much swollen; the conjunctiva, where it covers the fore-part of the globe of the eye, is tumid; there is considerable chemosis, and often such turgescence of the upper lid as to prevent the patient from raising it. These are the symptoms which precede the discharge of matter. A fluid next issues which is not opaque, which has the character of tenacious mucus; and which in the course of twenty-four hours assumes the appearance of pus. It is thick, yellow, sometimes green, and is shed out in considerable quantity.

TREATMENT.—Early and bold use of the lancet, in order to make some decided impression on the constitution. The application of leeches unless in children is never thought of in this disease. Blood should be taken in large quantities from the arm. The army surgeons, who have the most opportunity of witnessing this form of the disease, all concur in the use of copious bleeding with all the other antiphlogistic remedies. Purgatives should be administered so as to produce a sufficient number of watery stools. diaphoretic medicines, and especially the tartrate of antimony, in doses from one-quarter to half a grain, should be given at such intervals as to keep the patient in a state of nausea, and topical applications should be applied very much in the same manner as in simple inflammation.—*See CONJUNCTIVA, INFLAMMATION OF*

The extent to which the antiphlogistic plan should be carried must vary according to the violence of the complaint, and the constitution of the patient. The surgeon, however, must not be deterred from adopting and pursuing an active plan of treatment until he has produced a manifest effect upon the patient's system; namely, until the pulse becomes soft—the skin moist—the pain, swelling, tension and throbbing of the eyes considerably abated; the chemosis diminished; with, in fact, all the acute symptoms more or less subdued. But should the surgeon not be called until the disorder reaches the chronic stage when the conjunctiva is feebly discharging pus, the pulse depressed, the skin cold and clammy, the countenance sallow, and the constitution has suffered materially from the progress of the disease, he will be obliged to pursue an entirely different plan of treatment. Gently stimulating applications should be employed by means of a syringe, so as to cleanse the conjunctiva, and free from the pus which has collected on its surface, and at the same time stimulate the relaxed vessels. Tonic remedies, such as bark and wine, paying at the same time proper attention to the action of the bowels. To children bark may be given in the form of extract, to the extent of from two to five grains, two or three times a day. The eyes should not be bandaged, nor should any matter be allowed to collect, cleanliness being of the greatest importance in the treatment of this (the chronic) form of the disease.

The commencement of the sloughing process may be recognised by a haziness of the cornea, which soon amounts to considerable opacity. A dark appearance beyond the ulcerating parts, running from the deposit of lymph so as to form a surface from which the chasm is to be filled up, may be regarded as a favourable sign that sloughing has here found its limit. The case is not to be regarded as hopeless when sloughing of the cornea has commenced; for if the opening be only small, the common effect is that the aqueous humour will escape—the iris will become prolapsed into the aperture of the cornea, but the patient may afterwards recover, and though the shape of the pupil will be altered, a considerable degree of vision may remain.

PROGNOSIS.—Having ascertained that the sloughing has commenced at the opaque appearance of the cornea, the antiphlogistic plan must be changed for one of a gently stimulating and tonic nature. Weak astringent collyria to favour the throwing off of the sloughs. There be a firm layer beneath the sloughs, the patient is going well; but if the sloughing has a soft, flacculent, and ash-coloured appearance, in addition to mild stimulants to the part, the remedies, as the bark, should be employed. The treatment, however, ought to be regulated by the violence of the symptoms, and by the changes which take place as the disease passes from the acute to the chronic form. If the antiphlogistic plan of treatment be not adopted at the very commencement of the disease, the treatment will afterwards be of no avail; and, on the other hand, if the depleting plan be delayed too long, the restorative process will be checked as well as the beneficial effects which it would otherwise assist in producing.—*See CONJUNCTIVA*, &c.

II. OPHTHALMIA, STRUMOUS.

This species of ophthalmia is met with in those persons who are of a scrofulous disposition. Children, for the most part, and not infrequently adults, are its subjects. The inflammation is of the chronic kind, that is, chronic or weak from the beginning.

SYMPTOMS.—There is one symptom in this disease invariably present—namely, intolerance of light. The patient cannot bear the least access of light; there is difficulty of opening the lids,

the orbicularis pupilarum appear spasmodically contracted, so that the patient can seldom, unless with great difficulty, open them. The only way in which this can be effected is, when the patient is a child, by fixing its head between the examiner's knees; and raising the upper lid with the fore-finger of the one hand, depressing the lower with the other; thus a view of the eye may be obtained. Disorganization of different parts of the eye takes place, the cornea, or rather conjunctiva, becomes covered with an opaque capsule, with vessels shooting over the cornea, so as to give it an herpetic appearance—that is, there will be seen over the cornea yellow spots which are deposits of lymph. These open into small ulcers streaked with vessels carrying red blood. The eye becomes very painful and extremely irritable, and there is often, in this state, intense redness of the conjunctiva; and under these circumstances similar ulcers form on different parts of the cornea, producing all the symptoms of acute inflammation of the eye, so that the organ not unfrequently becomes slowly and gradually disorganised. As long, however, as the cornea, which should be narrowly watched, continues bright, and of its natural colour, there will be no danger to be feared from ulceration.

TREATMENT.—Blood-letting to a moderate extent—application of leeches, keeping the nature of the constitution veno-scorfulous subjects also in view (*see* SCROFULA); remove the symptoms of irritation; open the bowels freely by calomel purgative more or less frequently repeated as they improve the secretion after which mercurial alteratives; and, if necessary, they may be combined with rhubarb and magnesia, but not so as to produce watery stools. When the fever is diminished, the bowels perform their natural functions, the tongue looks clean, and the skin assumes a healthy hue, tonic remedies may be exhibited. Aromatic bitters, combined with alkalies, will be found beneficial; attention at the same time must be paid to regimen and diet, air, exercise, and clothing. Sea-bathing, or sponging the body with tepid water, in which a proportion of salt has been dissolved, where the former cannot be conveniently resorted to, gradually accustoming himself to use the bath cold, will much improve the general health.

As regards the further treatment of the affected part after leeching, it will be proper to apply blisters behind the ears, or to the nape of the neck; and, as relates to this as a curative agent, A. Cooper remarks—"You will be surprised to find, after the application of a blister, how soon the intolerance of light will diminish, even in children; their disposition will rapidly alter, and the inflammation be so slight that you can actually open their eyes without any trouble." Warm and moist applications; the fomentum of warm water containing opium (opium ʒj. dissolved in sweet water Oj.) directed over the eye will relieve to a considerable degree the irritation. But if any of these applications be used at the commencement, they must not be long continued before recourse be had to mild astringent collyria. It will be necessary sometimes to give mercury so as slightly to affect the system, bearing in mind the constitution of scrofulous habits, and guarding against carrying it so far as to affect the general health.

Another form of inflammation, nearly allied to strumous ophthalmia, because it is in general a consequence of it, is

OPOROPHTHALMIA.—This complaint is often obstinate and extremely difficult of cure; it extends over the cornea, conjunctival membrane of the palpebræ, the cheek and nose; ulcers form; and there is a great difficulty in separating the lids from one another; in consequence of which matter lodges on the lids and tends to keep up irritation on the whole part. The redness not unfrequently spreads down the whole of the cheek, and excoriation takes place on the cuticle. If the inflammation spreads over the whole of the face, the lacrymal sac becomes irritated, and effusion of tears takes place over the surface of the cheek. The inflammation is of an atonic kind, accompanied with that symptom distinguishing strumous ophthalmia, intolerance of light, and the gritty feel, as if extraneous bodies were in the eye. There is occasionally eversion of the lower lid, which becomes everted—incrustation, &c.

This disease of the eye is difficult to manage, and is frequently met with in persons of a scrofulous disposition, in the green of large towns who are ill fed and worse clothed, with

little attention paid to cleanliness. It will also be found in schools. It frequently arises from irritating matter applied to the lid, which may be conveyed from one to another by using the same towel, or some such like cause.

The treatment does not essentially differ from that of the preceding affection. Depletion must not be carried to any extent. Drastric purgatives must not be exhibited; mild aperients, combined with mercurial medicines, as calomel, hydrargyrus c. creta, or the blue pill, in quantities calculated to give tone to the system. When the febrile excitement is removed, that is, when the skin has its natural feel, and the tongue, and the secretions from the bowels are regular, give tonics. Mild stimulants, as the unguentum hydrarg. nitrat., called the citrine ointment, diluted with one-half or one-third more of the spermaceti ointment, (OINTMENTS,) is one of the best local applications, applied with camel's hair pencil twice a-day. The unguentum nitrico-oxy is used for the same purpose—or, in fact, any of the other more stimulating ointments will do. These resolve the briny incrustations on the edges of the lid, and which are secreted from Meibomian follicles, confining the lids so close together in morning when the patient awakes, as to give them the appearance of being glued together. These applications will require to be varied as well as regulated in strength according to their effect on the eye. The use of the vinum opii will have the best result, and the application of blisters, repeated, if necessary, after the part has been healed, will have an universally good effect. other diseases of the eye requiring distinct notice.—See CORNEA, CONJUNCTIVA, and EYE, &c.

PARACENTESIS ABDOMINIS.

Tapping. The operation of evacuating the water in ascites or dropsy of the ovarian, &c.

The operation of tapping the abdomen (*paracentesis abdominalis*) becomes necessary in certain cases—namely, *ascites*, and in a disease called ovarian dropsy.

SYMPTOMS OF FLUID IN THE ABDOMEN.—The presence of fluid in the abdomen, which ought to be clearly ascertained before

tion of tapping is attempted, is known by the particular sensation which is communicated to the hand by the fluid within, when the belly is struck on the opposite side with the other hand. Placing the hand on the abdomen, and gently tapping or striking the belly on the other side with the fingers of the other hand, a decided motion of the fluid against the opposite hand will be detected; a sudden stroke being communicated by the fluid, affording an infallible indication of its existence within the cavity. This sign is equally applicable to the case of fluid effused in the cavity of the abdomen, and to fluids contained in the cystiformed in the ovary. Having satisfied yourself of the particular spot where the operation is to be performed, and that there is sufficient accumulation extended to that place as will enable you to plunge the trocar into the abdomen, without risk of wounding the contents, you will proceed in the following manner:—

OPERATION OF TAPPING THE ABDOMEN.—The patient may either be placed in a chair, or may remain in the recumbent position in bed, during the operation, while the water is drawn off. The latter position is preferable, because it prevents fainting and spasms, which often arise when the stomach and diaphragm suddenly lose the support of the water. The patient having turned on his side, the operation is performed very easily in the following manner: the skin is to be opened a little with a lancet, that the trocar (*see* TROCAR) may enter with more facility. Suppose the patient placed in a high chair, the usual mode of performing the operation, with a pail or tub between his knees, the surgeon sitting in a chair still higher, a sheet is passed round the patient's abdomen, the ends of which are held by an assistant who presses the sheet tightly on the abdomen. If the patient is in the recumbent posture no sheet is necessary, pressure with the hands being sufficient; the surgeon makes a small incision with a lancet and introduces the trocar through the linea alba, into a part of the cyst or peritoneum only, according as it is ascitic or ovarian dropsy. The trocar is introduced by holding it in the right hand, and, placing the finger at about an inch from its extremity, carrying it through the integuments—through the parietal layer of the abdomen as far as possible; you then draw the stylet

of the trocar back, and push the canula with the other hand in the abdomen, drawing back the stylet with the hand by which it was introduced. The water should be completely evacuated, after which a piece of sticking plaster may be applied over the wound and the usual bandage to the abdomen, or a broad flannel roll with sufficient tightness to keep up the necessary degree of pressure. This mode of proceeding is exactly the same in ovarian dropsy as well as the situation at which the tapping is performed.

OBS.—The fluid which constitutes the swelling in ascites is generally of nearly an aqueous consistence, and therefore escapes very easily through the ordinary canula of a trocar. It is expedient however to use a pretty large instrument, about the size of a large swan's quill, for the fluid takes a considerable time to flow out, even through a canula of that size. But in ovarian dropsy the fluid is often much thicker; it is viscid, sometimes ropy, mucilaginous. In the thin fluids there are sometimes flakes of a substance of which is thicker, occasioning great difficulty in drawing it away without the aid of an instrument sufficiently large in the calibre.

PARACENTESIS THORACIS.—An operation thus characterised is occasionally, but very rarely, performed for an accumulation of fluid in the cavity of the chest. These cases are usually fatal. It is not however unsuccessful when matter has accumulated in the thorax, as in cases of adhesion, producing empyema, where it is effused through the whole cavity of the pleura on one side.

SYMPTOMS OF ACCUMULATION OF MATTER IN THE CHEST.—Considerable pain in the side; severe fever; and constitutional irritation; cough, with difficulty of breathing; inability to lie, except on the side on which the matter is accumulating; and lastly, considerable enlargement of the affected side.

OPERATION.—When matter has accumulated in the chest the patient may be relieved by the operation (*paracentesis thoracis*) which is performed in the following manner: draw the skin up as much as possible upwards, and cut down with a scalpel on the upper edge of the eighth or ninth rib. Having cut through the intercostal muscles by this incision, without carrying the

ough the pleura, you pass the canula through it, and it enters the chest. The matter escapes as soon as the trocar is withdrawn, and the skin is afterwards to be drawn down: the wound closes without danger of any further inflammation beyond the adhesive.

PARACENTESIS VESICÆ, or tapping the bladder. This operation may be performed in three different ways: 1. by puncturing the bladder above the pubes; 2. by the rectum; 3. through the perinæum.

OPERATION ABOVE THE PUBES.—This operation becomes necessary in consequence of retention of urine; and the principal consideration in performing it is to avoid wounding the peritonæum, which is in the highest degree dangerous. The operation above the pubes is both simple and easy, requiring very little anatomical knowledge, and little adroitness on the part of the operator; all that is required is to make the incision through the abdominal wall to the extent of an inch above the pubes. The incision should be carried as far as the linea alba; and the direction in which the trocar is to be introduced is obliquely from the front to the back of the pelvis, just towards the basis of the sigmoid. The trocar and canula being introduced, the water escapes through the latter. An elastic gum catheter should afterwards be introduced through the canula, and left in the bladder.

Remarks.—Sharpe objected to the operation above the pubes in consequence of being obliged to leave a silver canula in the bladder some time after the operation, from its liability to ulcerate the anterior part of that viscus; but this objection is removed by the substitution of an elastic gum catheter. There was another objection taken by Sharpe—viz. he found that the urine was excreted between the bladder and the posterior surface of the abdominal muscles, and accumulating in the cellular tissue, produced large abscesses, occasioning a high degree of irritation, and destruction of life. This danger may be prevented by using an elastic gum catheter with a plug, by which the urine may occasionally be withdrawn, or a bladder attached to its extremity, into which the urine may fall. The gum elastic catheter may be left in the bladder for a length of time without being productive of any serious consequences.

OPERATION BY THE RECTUM.—In this operation the surgeon introduces his finger about an inch behind the prostate gland, and then upon the upper part of the finger introduces the trocar, which may be either curved or straight, to the posterior part of the bladder. When the point of the instrument rests upon the upper part of the rectum and the posterior part of the bladder, the trocar is pushed into the bladder by a slight and sudden motion of the hand. The direction in which the trocar is to be carried is obliquely upward and forward. The place at which the point of the instrument should penetrate, supposing it to be carried through the bladder, is half way between the umbilicus and symphysis pubes. In this direction it will readily enter the bladder.

OBS.—The objections to this operation are, that although you introduce an elastic gum catheter for the purpose of allowing urine to distil through it, some of it will trickle by the side of the instrument into the rectum, and produce a high degree of irritation, and sinuses; though this is not the case in every instance. Sir Astley Cooper, in allusion to this objection against puncturing the bladder by the rectum, observes that “though the operation sometimes succeeds, it is upon the whole one which ought not to be resorted to.”—*See PROSTATE GLAND.*

OPERATION THROUGH THE PERINEUM.—This operation much resembling the one for stone, consists in puncturing the bladder by the side of the prostate gland. There is no danger here of wounding the perineum, because it does not reach the anterior part of the bladder. The incision is made in the perineum as in the stone operation, cutting down on the bulb of the penis and drawing it to the patient's right side. You then carry the knife within the ramus of the ischium till it reaches the prostate gland, which you push to the patient's right side. You then carry the instrument obliquely upwards into the bladder, the finger resting on the prostate gland.

OBS.—This operation requires greater anatomical skill than either of the others. The objection to it is that it generally produces a deal of constitutional irritation, which ought always to be avoided. “I hold,” says Sir A. Cooper, “that we ought to avoid all these operations; and that puncturing

adder at all for stricture in the urethra, or enlargement of the prostate gland, is perfectly unnecessary."— *MS. Lect.*

PARAPHIMOSIS.

A disorder in which the prepuce or foreskin, being retracted towards the root of the penis, cannot be returned again over the glands, but makes a sort of ligature over the corona.

CAUSES.—Imprudence in young people, and sometimes also of grown persons, who having the end of their prepuce too strait, cannot uncover these glands without pain, and when they have free it, neglect returning it as soon as they ought; and thus the retracted part of the prepuce forms a constriction behind the glands. The glands and penis afterwards swell, and the prepuce being consequently much distended, is affected in the same manner.

It may arise from common inflammation, especially if there be phimosis, in which state, if the foreskin be accidentally retracted, the glans penis swells, and cannot be drawn back, and a paraphimosis is the consequence. It is often the result of the venereal virus. In adults whose glans is uncovered, there frequently arise venereal chancres in the prepuce after impure coitus, which are attended with inflammation more or less considerable, which of itself alone is sufficient to render the prepuce too strait for the size of the penis, in consequence of which a swelling or inosculation may ensue like that before mentioned.

SYMPTOMS.—It is easily known: the glans is uncovered, the prepuce is tumefied on the corona, and above it forms a circular collar or stricture, which, from the skin being unequally extended, becomes indented, and makes several rings round the part.

TREATMENT.—Cold lotions and leeches generally reduce the inflammation, and remove the constriction. The proper plan, however, to be pursued is, when the penis is greatly distended with blood, to take hold of the glans between the fingers, and endeavour to empty the vessels by means of gentle pressure. Having done this for a few minutes, you must endeavour to reduce it, pushing the glans back, and drawing it forwards. By this you will generally succeed, if you see the case shortly after its occurrence; but if the paraphimosis has existed for some

days, it will be wrong to attempt reduction by pressure on the glans. The strictured part should then be divided by a bistoury which may be done by separating the skin on each side as much as possible from the stricture, and then inserting a director under it, and with a sharp-pointed bistoury divide the stricture, which will allow the skin readily to be drawn over the penis. After the paraphimosis has been reduced, poultices must be applied to the part. It is sometimes necessary to remove a portion of the prepuce by circumcision in cases of phimosis, where the prepuce is naturally long, and only a small division of the skin is required to allow it being drawn back: this operation is preferable to the one before described.—See PHIMOSIS, SYPHILIS, &c.

PARONYCHIA.

A whitlow, or whitloe. Any collection of pus formed in the fingers is termed by authors *panaris*, or whitloe, and is an abscess of the same nature with those arising in other parts of the body. These abscesses are seated more or less deep; they have accordingly been ranged under four heads agreeably to the places where they are formed. The first is formed under the cuticle, on one side of the nail, and sometimes all round it. The second is seated in the fat lying under the skin, between that and the sheath which involves the flexor tendons. The third is described by authors to be formed within the sheath; and they still add a fourth species arising between the peritoneum and the bone, which is called *feron*. There is no great difference between *panaris*, *paronychia*, *panaritium*, and whitlow—they all merely signify matter formed about the nail.

TREATMENT.—Poultices are particularly useful in these several kinds of whitlow, for their moisture is imbibed by the cuticle which it softens, as also the skin, and even the nail, and thus draws out the pus from under the nail. When this is not the result, and in all cases where the pus is deep-seated, and can be detected, the abscess must be opened with a lancet, poulticed and healed.

PHIMOSIS.

A constriction or straitness of the extremity of the prepuce, which, preventing the glands from being uncovered, is often the occasion of many troublesome complaints.

CAUSES.—It may arise from different causes, both in children and grown persons. Children have naturally the prepuce very large; and as it exceeds the extremity of the glans, and is not apt to be distended, it is apt to contract its orifice—a circumstance which often occasions a lodgment of a small quantity of mucus between that and the glans, which if it becomes corrosive, will irritate the parts so as to produce inflammation. In this case the extremity of the prepuce becomes more contracted, and consequently the urine more confined. Hence the whole inside of the prepuce excoriates and suppurates, the end of it grows hard and swells, and in some months becomes callous. In some cases, owing to gonorrhœa, where the matter lodged between the prepuce and the glans, or the frænum; which, producing an inflammation either on the prepuce or glans, or both, the extremity of the foreskin contracts, and prevents the discharge of the matter. The parts, in a very little time, are greatly tumefied, and sometimes gangrene takes place in less than two days. Lastly, it is occasionally produced by common inflammation, which causes a swelling and an imprisonment of the glands.

TREATMENT.—The cure of the primary disease requires leeches, blisters, and cataplasms. If the prepuce continues contracted after the inflammation is subdued, it should be slit open with a sharp or sharp-pointed bistoury. And equally so, if after the removal of the disease which may have given rise to phimosis, it remains, recourse must be had to the same operation. The great secret in the treatment of this disease is knowing when to continue the use of mercury; it should always be suspended when the inflammation is increased during its employment, for if it is continued, it will only add to the irrita-

tion, which will end in the sloughing process, and destruction of the part.

"If I were," says Sir A. Cooper, "to give to a patient mercury for chancre on the Saturday, and on the Monday following I perceived swelling and inflammation round the sore, I should immediately lay aside the mercury, give active purges, order poppy fomentations, and the parts to be suspended. The black wash should be applied to the sore, injecting it under the skin, unless it should increase the irritability of the part. After the purges administer opium in considerable quantities, and when you have reduced the inflammation have recourse to the mercury again; but if you had gone on with this medicine in the irritable state of the part, the result would be sloughing of the penis." When there is phimosis, together with sloughing of the penis, stop the mercury, order the patient the recumbent posture, and the part to be well supported; use fomentations and poultices of a slightly stimulating kind; support a gently stimulating action in order to produce a secretion sufficient to support the powers of the part; if you stimulate it too much, the part will be destroyed, and if you omit to do it in a slight degree, there will be no separation of the slough. The poultices generally employed are made with stale beer-grounds; carrot poultice is stimulating to the part; this poultice stimulates rather too much, unless the carrots have been boiled for a long time. The medicines given are musk and ammonia, five grains of the ammonia with ten of musk, two three times a-day. The nitric acid lotion is a common application used in Guy's and St. Thomas's hospitals, and none are found to produce so much good; the proportions are about forty drops of undiluted acid to a quart of water. When, as already observed, phimosis remains after the inflammatory state has passed away, it will be necessary to perform an operation for its cure.

OPERATION.—The operation is exceedingly simple, it consists in introducing a director beneath the skin, along the glans, till it reaches the corona glandis; this is the extent to which it should be introduced, so that the point should rest against the inside of the prepuce; this being done, a sharp-pointed bistoury is to

passed along the director to its extremity, then pushed through the skin opposite to the corona glandis, and drawn out. But when you have done this, you will find that the internal part of the prepuce is not divided as much as the external, when it becomes necessary to divide it a second time. The next thing to be done is to apply a piece of lint round the prepuce, which is to be supported on the penis by tape; the roller should be applied, so as to make a gentle pressure, for the purpose of preventing a secretion from the blood vessels. The patient is to retain his water as long as he possibly can, in order not to disturb the dressings. On the following day the penis is to be soaked in warm water, the roller removed, and the prepuce drawn gently over the glands. This is to be done daily, taking care that the edges of the divided surfaces do not unite. When the part is quite healed, a small aperture only is left in the upper part of the prepuce, which is of trifling importance.—See PARAPHIMOSIS, SYPHILIS.

POLYPI.

Tumours most commonly met with in the nose, uterus, and vagina; and have received their name from the erroneous idea, that such tumours had usually several roots or feet, like Zoophyte polypi. There are four different species of nasal polypi, the first most common is,

1. Gelatinous polypi.
2. Hydatid polypi.
3. Carcinomatous polypi.
4. Fungoid polypi.

1. Polypi of the gelatinous description grow from a narrow stalk, are composed of a very soft substance, resembling jelly, (hence their name) and are very slightly vascular, yellow, and semi-transparent.

2. Hydatid polypi are formed by a collection of hydatids*, and have the appearance of bags or bladders of water; with these there is generally a copious serous discharge.

3. Carcinomatous polypi have similar symptoms and appear-

* A tumour or vesicle consisting of a membrane distended with a watery fluid.

ances to schirrous tumours in other parts of the body, are painful at intervals, ulcerate, and, during this stage, occasionally bleed.

d. Fungoid polypi of the nose have numerous attachments, consequently ought not to be extracted by the forceps: and whether they be excised with scissors, or destroyed by ligature, their extensive adhesions, in either case, render the operation ineffectual; and, what is still worse, will do injury by exciting irritation, by which the disease will become aggravated. In such cases it is proposed to try what the muriate of antimony will do. But the disease may extend so far up the nose as to affect some other part of still greater importance than the place where it originated; thus the cribriform plate of the ethmoid bone may become destroyed, and afterwards the brain itself partake of the malignant influence.

Carcinomatous polypi are usually met with in old people; and are generally attended with severe pain across the forehead, in the situation of the frontal sinuses,—the passage of air through the nose becomes obstructed from the size of the swelling; the tumour also presses upon and obliterates the lacrymal sac, preventing the natural course of the tears, giving rise to the inconvenience and symptoms of fistula lacrymalis.

TREATMENT.—The principal treatment in these cases, and all that can be done, is to tranquillize the system. Belladonna and opium may be exhibited; also conium, with a view of affording ease, and if the inflammation be severe, leeches may be applied in the vicinity of the nose, together with evaporating lotions.

OPERATION FOR THE EXTRACTION OF POLYPI.—Gelatinous nasal polypi often acquire a very considerable magnitude. When this is the case, they extend into the posterior nares, and often hang over the edge of the velum pendulum palati, so that they can be frequently seen at the back of the mouth; and if not quite so large as to allow of this, they may be distinctly felt on passing back the finger. The remedy for these polypi is extraction by means of forceps. Those generally employed are long, and have small points, the insides of these points or blades are made rough, to prevent their slipping from the peduncle, and thereby losing their hold; the manner of using them is as follows:—Having passed

a probe in the direction of the superior turbinated bones, and set for and ascertained the precise situation of the peduncle, the probe is left to remain as a director for the forceps, which are introduced, the peduncle seized and torn off by a sudden jerk, by which means you are enabled to tear away a portion of the pituitary membrane, and even bone itself, to which the polypus is attached; which at once destroys the source from whence it sprung. If the patient be very young, and the nose small, the polypus may be removed with a pair of forceps similar to such as are obtained in the common pocket instrument case; if, however, they grow far back, the forceps above mentioned will be the best. Polypi are sometimes taken away merely with a pair of probe-pointed scissors. After cutting through the peduncle, if the patient be desired to blow his nose, the air will force it out of the nostril.

When the polypus extends into the posterior nares, it requires to be removed with a pair of curved forceps. Another way when the polypus is large, and when the peduncle grows from the side of the antrum, is to divide it by means of a pair of curved scissors, and then with your finger hook down the polypus at the back of the mouth, from over the velum pendulum palati. In this way it falls into the throat, and produces a sensation of choking—suffocation is the consequence, and the polypus will be thrown up. When the operation has been performed, you think any of the polypus remains, a piece of lint dipped in a solution of alum should be passed up by means of a probe, to prevent any inconvenience from hemorrhage. When an objection has been made to the removal of polypi by means of the forceps or scissors, it has been recommended to use injections of the solution of alum, or the oxymuriate of quicksilver.

The best plan of treatment that can be pursued for the cure of hydatid polypi, is to touch them daily with the muriate of antimony by means of a camel-hair pencil. A very few times will suffice; it acts chemically, and quickly destroys them. The peduncle of the hydatid polypus resembles the cord termed the placenta; it is composed of three fibres or films, which form the covering of the polypus, and these converge to complete the peduncle.

PRESBYOPIA.

A state or change of vision consequent in old age, occurring sometimes about the middle period of life, but generally after, as old age advances. The remedy consists in the employment of convex glasses, the use of spectacles; and the individual must select glasses of such power, as will enable him to read, or see objects at the ordinary distance with facility. This optical aid is merely wanted for close objects, remote ones are discernible perfectly well without glasses. But as this is a change of the eye which is progressive, the individual finds a certain time after he has selected the spectacles, that they do not answer the purpose, and he is obliged to use more powerful ones. *Myopia* is an opposite state to presbyopia, and is a condition of the eyes found incidental to young persons. It seems to be a natural defect of the condition of the eye, by which its refractive powers are too considerable; the rays of light being brought to a focus sooner than they ought to be, so that they diverge and are scattered again before they strike upon the retina, and hence inefficiency of vision arises; which requires optical aid of a different kind, in fine, just the reverse of those required in presbyopia. The near-sighted individual requires concave glasses to assist him in viewing remote objects; he cannot see the countenances of persons in a large room; he cannot distinguish the features of players on stage, nor describe pictures in a room; for all these purposes requires concave glasses. This is a defect of vision found in young persons; perhaps at from fourteen to eighteen years of age they begin to detect it.

OBS.—It is better that persons so circumstanced should use such glasses as will enable him to see objects without any unpleasant effort of the eye; he will do better with such assistance than by attempting to strain the eye without it. He ought to use a glass that will enable him to see easily and clearly, and not employ one that will occasion any fatigue to the eye; but if a kind of glass produce any uneasiness about the eye, it is a clear proof that the instrument is too powerful, and would certainly injure the sight if its use were persevered in.

PTERYGIUM.

This term is applied to that preternatural reddish, ash-coloured, irregular little membrane, growing most frequently from the internal angle of the eye, near the caruncula lacrymalis, and gradually extending over the cornea, so as to occasion a considerable impediment in vision. The disease, however, shows itself in the form of a semi-transparent, thin, greyish membrane, not furnished with very visible vessels; and sometimes as a thick, red, fibrous mass, resembling muscle, being remarkably prominent in the cornea, where it appears to terminate in a tendon-like substance, and is observed to be pervaded by numerous blood-vessels. The first is, the *Pterygium tenue* of Beer; the second, the *Pterygium durum* of other writers. (*Lehre von den Augenkrankheiten*, B. 2. p. 63.) According to Scarpa, whose observations chiefly apply to the membranous form of the disease, chronic, varicous ophthalmia with relaxation, and thickening of the conjunctiva, opacity of the cornea, and the pterygium, only differ in the degree of the disease; all the three complaints, in reality, consisting of a more or less extensive varicous state of the vessels of the conjunctiva, attended with a degree of preternatural relaxation, and thickening of that membrane. Mr. Guthrie does not agree with Scarpa; on the contrary, he asserts that a true pterygium is very rarely the consequence of chronic inflammation. (See *Operative Surgery of the Eye*, p. 128.) Sir A. Cooper remarks, that "ptergia do not long exist before they produce a nebulous state of the transparent part of the eye by deposits of lymph, and then of fluid. The conjunctiva and sclerotic coat become loaded with vessels, and if this affection is not remedied, vision becomes impaired and ultimately lost."

TREATMENT.—When the disease has proceeded far on the transparent part of the eye, the only plan to adopt will be the removal of a part of the pterygium. This consists simply in raising the membrane as near as you can to the cornea, and cutting it off while suspended. When the ptergia are fleshy, more care must be taken in dividing them. They must be divided near to the margin of the cornea, and turned back from the apex near to the base.

PUSTULES.

A disease of the eye seated at the junction of the transparent with the opaque cornea, or the cornea itself, or the conjunctiva covering it on the ball. The appearances these pustules present at first are red or yellowish spots, arising from slightly elevated deposits of lymph; there is considerable turgescence of the vessels around them. If they occur on the cornea it will be nebulous and opaque; the vessels round the cornea will be seen distended carrying red blood, and having a radiated disposition. If the lymph be not removed by absorption, the pustules break, matter escapes, and ulcers form in their place. These pustules vary in number from one to two, one on each side of the cornea, and occasionally the cornea is encircled by them.—*See CORNEA.*

SYMPTOMS.—Chronic inflammation, frequently, nevertheless with more or less pain on moving the eye—intolerance of light and effusion of tears. They are difficult to manage, and often occur in scrofulous habits of body and broken-up constitution. They are apt to become chronic. Even when these ulcers are healed, and the same state of body continues, they are soon reproduced, and the disease is greatly aggravated.

TREATMENT.—Depletion, if considerable inflammation exist. First apply leeches, but not in large numbers; evacuate the bowels with mild aperients, and attend to the secretions. If the sight is affected, apply blisters. When the bowels are regulated, begin with tonic remedies, and as early as possible with mild astringent collyria, the best of which is the *vinum opii*.

OBS.—Depletion in this disease must not be carried too far; this is the only point of consideration. The system must be invigorated, and tone given to the vessels of the part.

RANULA.

An inflammatory or indolent tumour under the tongue. This tumour is sometimes seen in the interior of the mouth, to which the name of ranula is given. It is usually formed between the under surface of the tongue and jaw, and is said to arise from obstruction of the excretory ducts of the submaxillary and sublingual glands.

salivary glands. A tumour is found in the situation mentioned with a semi-transparent appearance, and which varies in size from an inconsiderable magnitude to a capacity of many ounces. If this tumour be punctured, there escapes from it a thick, transparent, viscid fluid, sometimes nearly as thin as the white of an egg, but in general much thicker, more gelatinous, and more viscid.

TREATMENT.—An incision is to be made the whole length of the tumour, and either to dissect away the external surface, (that surface which is towards the mouth,) or to rub it over with the caustic. This is the only treatment to prevent its reproduction, which, were the tumour merely punctured, would be the case.

As these tumours are not usually attended with much pain, they are sometimes neglected till they burst of themselves, and they commonly do when they have attained the magnitude of a large nut. As they were produced originally from an obstruction in the salivary duct, and this obstruction cannot be removed by the bursting of the tumour, it thence happens that they leave an ulcer extremely difficult to heal, which cannot, in fact, be healed at all until the cause be removed.

PROGNOSIS.—Children, as well as adults, are sometimes affected with tumours of this kind: in the former they impede the action of the tongue, in the latter of mastication, and even of speech. The cause of such tumour is universally to be traced to obstruction of the salivary ducts.

SCROFULA.

What is scrofula?

“In its character and origin it is debility; the disease, as it proceeds, becomes inflammatory; but it is connected with original weakness, and derives a peculiar character on account of its origin from this source. You will find that scrofulous diseases are inflammatory, that they undergo all the different processes of inflammation, the adhesive and suppurative processes, ulceration and gangrene; but gangrene less frequently than any of the others.”—*Sir A. Cooper.*

Q.—The four processes above named are the effect of scro-

fulous diseases, though they are all but imperfectly performed. The adhesive matter secreted in scrofulous affections, instead of being firm, consists of a curd-like matter, easily broken, and very soft, owing to the blood-vessels not entering it. The suppurative process of scrofula is not of the common kind; it contains curd-like matter, and is not truly purulent; ulceration is slow in its progress; granulations are unequal, and slow in forming. These processes are the effect of inflammation, but they are also connected with debility; each is imperfectly formed.

Q. How do scrofulous and common inflammation differ?

Ans. In common inflammation there is debility, but it is the result of intemperance, or change of constitution; but, in scrofula, the weakness exists from birth, it is congenital or original debility.

OBS.—The age at which scrofula manifests itself is during growth; it is extremely rare for it to occur after. But common chronic inflammation arising from a change of constitution, produced by intemperance, or any other cause, occurs after growth has stopped, and is much more easy of cure than scrofulous inflammation. The one is original, the other is produced after-life.

Q. Is scrofula hereditary?

Ans. Sir Astley Cooper on this subject observes, "that scrofula is an hereditary disease appears as clear to me as the sun at noon-day; and those who deny it, deny the evidence of the senses. But when speaking of hereditary disease, I do not mean to say that children are born with an enlargement of an absorbent gland, or a disease of the joints; but what I state is, that a child will be born with an hereditary disposition to the complaint. Does a child resemble its father, or its mother? And do we see parents predisposed to scrofulous disease, having children of constitutions, complexions, &c. similar to them, &c."

CAUSE.—The predisposing cause of scrofula is congenital, and consists in an original fault of constitution. The exciting causes are what tend to produce, or rather increase that debility—as the fever from diseases of a specific kind,—for instance, measles, scarlet fever, and small-pox.

OBS.—Scrofulous affections occurring after small-pox used to be much more frequent before the introduction of vaccination than since; and if there were no other advantage attending it than this, it ought to be regarded as a boon to society.

SYMPTOMS CHARACTERISTIC OF SCROFULA.—If the skin be touched it will be found quite different from the skin of children who are not scrofulous—in the latter, the skin is solid and dense, and the fibres strong; but in the former, the skin is thin, and the vessels may be seen dispersed under it—hence persons with this disease frequently have a rosy colour, the consequence of the thinness of the skin which allows the vessels to be seen under it. The hair is also light coloured, and extremely fine; the eye-lashes are the pupils dilated, and the fingers are what is called clubbed, as near to the fingers in phthisical persons,—the fingers moreover are extremely long and thin, but at the extremities are broad and flattened. The upper lip is of considerable thickness, and this symptom is a mark of debility. Those who are the subjects of scrofulous diseases often have follicles on different parts of the body, filled with inspissated matter. The absorbent glands and joints of scrofulous persons are most frequently attacked. Various other parts of the body are also liable to it, the lungs, the brain and frequently, the eyes now and then, the heart never. The secreting glands are rarely affected by scrofula, at least the liver and kidneys, for the testicle and breast are exceptions. The testicles now and then liable to a scrofulous affection, and a scrofulous tumour in the breast is occasionally seen. The secreting glands, however, are very rarely subject to this complaint.

DIFFERENCES.—Scrofula differs in different constitutions; it may be of an indolent or irritable kind, but more frequently of the first than the second. Of this circumstance the young surgeon may not be aware but in the course of practice he will find that an absorbent gland will enlarge, and continue so for weeks, and often for months, before it suppurates; and on the contrary, that an enlarged gland will be in a most irritable state, and rapidly proceed to a state of suppuration. This last is by far the worst disease of the kind; for joint after joint, and various parts of the body become inflamed, whilst, in indolent habits, the complaint is some-

times confined to a particular class of parts, and the rest are excluded. This, however, is a variety.

INFLUENCE OF CLIMATE AND SEASONS ON SCROFULA.—Scrofula is considerably influenced by climate, particularly those climates in which the changes from cold to heat, and heat to moisture, are most frequent; and, on this account, the island of Great Britain is favourable to the production of scrofulous disease. The vicissitudes of temperature are so frequent, that a man is never clothed so as to meet them, and the body is consequently exposed to these sudden and various changes. We find cold and moist climates giving rise to the difference of scrofulous affections, although it is found that those who live in countries where they are exposed to the extremes of heat or cold, are not the subjects of scrofula. But this disease is arrested by cold and heat, uncombined with a moist state of the atmosphere, although it previously existed; and persons predisposed to scrofula may prevent it from occurring, by a change to a warm and dry climate. But people from the East or West Indies, who come over to this country, not unfrequently fall a prey to scrofulous disease. Many children born in the East and West Indies, are sent to this country to be educated, and therefore we have an opportunity of seeing the effect of climates on their constitutions; and I can assure you, that it frequently requires the greatest possible care to save them from the danger of scrofulous disease of the joints and absorbent glands; and very often, with all your care and attention, they will die of scrofulous disease. Those from the West Indies less frequently die of scrofula than persons from the East Indies; but I have seen some from the South Sea Islands, and most of them have died from scrofulous complaints."—*Sir A. Cooper's Lect.*

From this statement then, it will be perceived, that children born in warm climates, and subsequently brought to this country to be educated, frequently perish. Although we have proof that some climates predisposing to this complaint, and favouring its production more than others, yet the most striking effects are manifested by the changes of the seasons, after scrofula has commenced. Thus, for instance, if a child with scrofulous disease is examined in the spring, and it has a gland that is inflamed,

complaint will go on during the spring till the summer months, when it will be arrested, and the health of the child improved. In this state it will remain till October and November, and then the child will become worse. By the alteration of scrofulous complaints, from the changes of the seasons, a surgeon often loses credit, though he more frequently gains it. He will lose it if called to the child in winter, because then the state of the child's health will be in an improved state, compared to what it has been, which state, however, continues only for a short time, and becomes worse with the return of spring: the surgeon will lose credit, if called to a child in the spring, because, being at that time very unwell, it continues so only till summer, when it suddenly recovers. In summer the symptoms disappear, in autumn they return, and continue till the winter, when they again become increased.

The way also to try the value of nostrums, blazoned forth as specifics for the cure of scrofula, is to watch their effects during the whole year, for else you may be deceived; they may occasionally afford benefit (which I do not mean to deny), but as to specifics for the cure of the complaint, I need not tell you such do not exist. Such are the effects of climate and the changes of the seasons, on persons born with a debility of constitution, giving rise to inflammation of the scrofulous kind.

Post Mortem Examination.—As regards the state of the brain scrofulous children, the blood is less firm, the crassamentum loosely formed, and coagulates weakly; the quantity of fibre and the solids are feebly formed. On dissecting a serous scrofulous person, extreme attenuation of the muscles is met with, owing to the fibres being delicately formed, the cellular membrane thin, the heart weak, not at all having the appearance of the healthy organ; the arteries are found with loose coats, and in dissecting them, the injection would scarcely reach the extremities; nor is this surprising, since it happens that the vessels do not expand and give way, and also that there is blood at the extremities of the arteries, owing to the great weakness of the vessels; that they had not the power of propelling it into the vessels as they usually do. The stomach and intestinal canal are

thin and pellucid; the absorbent glands are enlarged; the secretory glands are flaccid, but not diseased; the nervous system sometimes exhibits marks of irritation having existed in it.

TREATMENT OF SCROFULA.—The principles on which the treatment of scrofula should be founded are three:—

1st. To make better blood.

2d. To strengthen the solids.

3d. To give vigorous action to the circulation.

To one or all of these principles, every mode of treatment should be referred. The action of the heart and arteries is naturally feeble, the serum of the blood preponderates, whilst the fibrous portion is deficient in quantity; therefore, you must make better blood, strengthen the solids, or give a vigorous action to the system.

The first object is to make better blood, and without this nothing else will be of avail. "I cannot," remarks Sir A. Cooper, "sufficiently deprecate the system of ordering vegetable food in scrofulous diseases, and proscribing animal food, which is more nutritious and easy of digestion. Vegetable food is more difficult of digestion than animal food, and many animals who live on it have more than one stomach to perform the different processes of digestion; some have only one, but then they are abundantly supplied with gastric juice, which is secreted in greater quantities than in men; and nature adds to the digestive powers by setting up another process in the intestines below, when animals have only one stomach. Vegetable food should not be given to children labouring under scrofula, as it leads to an aggravation of the complaint; but meat should be allowed, prepared so that the stimulus of the gastric juice, which is weak, may be able to act on it. The stomach should never be overloaded, or the powers of digestion will be impaired. Meat should be taken in small quantities and often, rather than in large quantities and less frequently; for, when the stomach is less loaded, digestion goes on much better. Therefore, I advise that they should breakfast between eight and nine, and take an egg or a little meat at this meal. They should have a sandwich about twelve or one o'clock, and meat with their dinner at three. It is right that they should

drink with their dinner, although water is a bad beverage; some good beer, or a glass of wine, should be allowed. This will stimulate the secretion of the gastric juice, and digestion will be more completely performed than if no stimulus at all had been used. It is well known that in these complaints the stomach is not supplied with a sufficient quantity of juice to dissolve the food; therefore you must give some slight stimulus to excite the gastric secretion. If you observe the animals around us, which live on animal and vegetable food, you find that after meals they lap some water, and rest. Rest appears to be conducive to the performance of the digestive process. An experiment has been made which confirms this opinion. Two pointers were fed, each with the same quantity of food; the one was immediately put out to trot, and the other conducted to the kennel, and in two or three hours afterwards both were killed. The first had not digested the food he had taken, whilst the other had. Animal food should be given in larger quantities to persons with scrofulous disease than those in a state of health, although the latter do not require the same aid to assist digestion. In scrofulous children I do not let the stomach to be loaded with milk for breakfast, which considerably impairs the powers of digestion, and therefore I generally order a little meat or an egg as a substitute."—*Lect.*

Next in importance to nourishment is exercise. Children with scrofulous affections, or even those predisposed to them, should take a great deal of exercise in the open air; more, however, in the way of play than as a task. Exercise should not be so arduous as to fatigue the body; when children feel themselves weary, they should rest a little till they recover. When the state of the weather prevents them from taking exercise in the open air, they should play in a large airy chamber, and be allowed to do so in the evenings, taking care that the perspiration excited should not be checked by any improper means, as is too often done with thoughtless and giddy children; and by this means, they will be brought up with constitutions invigorated, so as to ward off the attacks of a disease to which they were predisposed.

The third circumstance to be attended to is air; without good air all other means are of no use. Moist and cold weather

is the worst. Those who live in marshy climates are subject to the worst form of scrofulous complaints. The state of the atmosphere you should choose is that in which the air is dry and warm; a very bleak wind is not desirable. The sea air is generally preferred; and when the children are near the sea-side, they should be allowed to play on the beach the greater part of the day. It is a mistake to suppose that the air of the coast in the wet and cold seasons is of any advantage to scrofulous children; it is only in warm and dry weather that any benefit will be obtained. Extreme cold suppresses the progress of scrofulous complaints, but, in moist weather, the symptoms return. The bleakness of the air of the sea-shore is unfavourable to the constitutions of children tainted with scrofulous complaints. Air, exercise, and nourishment are the three great points to be kept in view in the treatment of scrofulous affections.

As regards medicine, it is laid down as an axiom, that there is no specific for the cure of scrofula; and he who says that there is attempts to gull mankind by the assertion of what is not true (*Sir A. Cooper.*) Medicines, occasionally given with a view to improve the digestive powers, and regulate the secretions, are good, but attention to the three points just mentioned, are of primary importance. The best medicines are, once a week, or even ten days, two grains of calomel and eight of rhubarb, in order to restore the secretions. This relieves scrofulous inflammation, on the same principle as all other inflammations are relieved. A good medicine to be given daily, for a short time, is the rhubarb and steel; two grains of rhubarb, and from three to five of the carbonate of iron. This is a very good tonic. Another good tonic consists of two grains of rhubarb, and from four to six grains of dried subcarbonate of soda, with ten grains of calumba, which may be taken mixed with sugar, a form that seldom disagrees with the patient. These means will greatly assist the powers of digestion. One of the remedies used in Guy's hospital is infusion of chamomile flowers, with a few grains of hydrargyrus cum creta at bed time; or the oxymurias hydrargyri, in the proportion of one grain to two ounces of the tincture of bark; a tea spoonful which should be taken twice a-day in a glass of the chamomile

sion. If the bowels are costive, tincture of rhubarb should be substituted for the tincture of bark. The liquor potassæ is a medicine also used. These different medicines medical men use in different ways; those Sir A. Cooper employs, are the steel, with rhubarb and calomel, or the subcarbonate of soda with rhubarb and calumba.

A great deal of care should be taken of children originally formed weakly; you should excite no feverish action on the one hand, nor do any thing to debilitate the constitution. And recollect, above all, the three principles of treatment here laid down. Children should be well clothed, and never exposed to changes of temperature. For this purpose they should wear flannel close to the skin; and, in this case, it should be worn also during the night. If the weather be very warm, calico may be substituted for flannel. The great object is to preserve an equal temperature of the skin, and not to produce perspiration, because that would debilitate. It is right to recommend sea-bathing; the bath should be taken about three times a week, at eleven in the morning. The temperature of the bath should be at ninety-degrees; the person should remain from sixteen to twenty minutes in it, and walk afterwards. Some children are exceedingly frightened at the sight of the water at the commencement, in those cases it will be advantageous to sprinkle the body at first with tepid salt water. This will gradually remove the child's fear of the water, and prepare the way for the sea-bathing.

SCROFULOUS GLANDS OF THE NECK.

Of the different absorbent glands, those of the neck are most frequently affected with scrofulous disease.

SYMPTOMS.—When a surgeon is consulted in a case of this kind the symptoms he finds are as follow:—In the first place, you learn from the child's mother, that she at first observed a swelling in the neck, which was small, hard, not painful, nor in any way discoloured, but tender to the touch. Thus the inflammatory process does not go on to the rapid destruction of the part, for the swelling will frequently remain in this state of indolence during weeks, months, and sometimes years. Sometimes, however, ow-

ing to accidental circumstances, or changes in the weather, or the state of the child's constitution, the complaint proceeds with greater rapidity. If the complaint occurs in a person of an irritable habit, it will advance with rapidity; if, on the contrary, the person be of an indolent habit, it will be slow in its progress.

Post Mortem Appearance.—When the state of the part affected with scrofulous disease is examined by dissection, there is found extravasated into the gland a great quantity of blood, and the blood-vessels enlarged. The interior of the gland is composed of rather a firm substance, which is of a yellowish-white colour. If the subject is first injected, it will be seen that the blood-vessels do not pass into the substance effused; in fact, the adhesive matter is not organised. As the vessels do not shoot into this substance, it does not undergo the same changes as the adhesive matter thrown out in common chronic disease.

OBS.—In common chronic inflammation, the adhesive matter effused may be injected, which shows that it is in some degree organised. Remember, then, that during the adhesive stage, the inflammation may be increased from change of season, climate, or any peculiarity of constitution, and proceed to the suppurative. The disease produces little pus. These are the common symptoms of suppuration, but in a much milder degree than are usually met with. The suppurative process is weak and languid, and it is a long time before matter forms. The suppuration is very imperfect; the pus has not the true character of purulent secretion; it is composed of a curd-like matter, and resembles pus mixed with serum. These, then, are the appearances of the suppurative stage. Suppuration proceeds very slowly. The skin, at first, has a blush of inflammation on it; then becomes of a livid purple hue. It frequently happens that, when the skin is in this state, a long time elapses before it gives way. When the skin, however, breaks, it generally separates to a considerable extent. The reason why scars in the neck are so large is, that the vitality of a large portion of the skin has been destroyed from the pressure of the pus; it then assumes a livid appearance, and, when it gives way, sloughs to a considerable extent. The ulcerative process proceeds slowly, compared with ulceration in other conditions.

ants. The interior of a suppurative gland very rarely sloughs; the matter that is effused separates with the pus. Such is the history of an enlarged absorbent gland, affected with scrofulous disease, the various changes which it undergoes, and the appearances which those changes present in their different stages. Death is sometimes produced by the enlargement of the absorbent glands of the neck. But it generally happens that when these cases terminate fatally, there is also present considerable disease of the lungs and bronchial glands.

Q. Why are the absorbent glands of the neck more frequently affected with scrofulous disease than the other glands?

A. Because of their being more exposed, and consequently so much influenced by the changes of weather and seasons.

Case.—A child exposed to the cold, with the ears half frozen, cheeks and head also cold, is suddenly brought into a place of excessive heat, which produces a slight degree of inflammation of the parts; that irritation also produces inflammation of the absorbents; and thus the reason why the glands of the neck are so frequently enlarged. Scrofulous enlargements of the glands of the neck are more frequent than those of the axilla; and enlargement of those in the axilla more common than of the glands of the groin; because the lower parts are better protected from atmospheric changes. But it sometimes happens that a peculiar secretion takes place in the gland, and that earthy matter is deposited in it. It is not at all an uncommon occurrence for a substance like chalk, and composed of carbonate of lime, to be deposited in an enlarged gland.

TREATMENT OF ENLARGED ABSORBENT GLANDS OF THE NECK.

Q.—When a child, with a scrofulous enlargement of an absorbent gland of the neck, is brought for advice, you will treat it, if the complaint be of recent occurrence, like a case of common inflammation. Give rhubarb and calomel internally, and recommend evaporating lotions as local applications. The best lotion you can use is the liquor plumbi superacetatis, with spirits of wine and water. In this way the inflammation will be gradually subdued. But these glands are apt sometimes, notwithstanding all the means you employ, and all the care that may be taken of the

child, to go into the suppurative stage. In this case you must give the rhubarb and carbonate of soda twice a-day, together with small quantity of the hydrargyrus cum creta (one grain) three or four times in the twenty-four hours. You must next consider what local treatment to employ if the gland suppurates. When there is a disposition to suppurate, evaporating lotions will not succeed, and therefore must be discontinued. You should feel for there be any fluctuation: for the moment that there is the slightest blush on the part and sense of fluctuation, indicating the presence of pus, you should make a small opening with a lancet, as in common abscess; you should not wait for the skin to assume a livid hue, for then you will never be able to prevent scars. A scar in the neck of a boy is not of much consequence, but in the neck of a female it is quite a different case. The reason why scars on the neck are so frequently met with is,—the surgeon waits, too often, till the skin has become livid, and then makes a puncture. But in this case he gains nothing by making an opening into the gland; in fact, if the skin be of a livid colour, do not make an opening. Apply poultices, and let nature effect the opening; for the scar will not be so great then as if you were to make it; but make a puncture before the skin assumes the appearance I have just been describing to you. The instrument best adapted to open these abscesses is a cataract knife, making the incision transversely, and just in the direction of the creases of the neck, that when the wound heals, no scar is to be perceived. When the matter is discharged by the puncture, apply your finger to the side of the swelling, and squeeze out all the solid matter that may be contained in the gland. If the sac be not carefully emptied of all the solid matter, this substance will keep up considerable irritation, and prevent the healing of the wound. If the wound be indolent afterwards, you had better inject into it a solution of sulphate of zinc, containing about a scruple of the zinc to a pint of water. Throw a small quantity of this into the wound; it will soon produce healthy granulations, and lessen the discharge if it be copious. At this time you should give rhubarb and carbonate of iron, about two grains of the former, and five of the latter, twice a-day. The diet should be nutritious, but not in the slightest

be stimulating. With respect to the ulcerative process, there is nothing particular to remark: fomentations, poultices, and the ordinary means, must be had recourse to. Your object, however, should be to prevent ulceration by the mode of treatment I have laid down; and it is only when it cannot be prevented that the latter means are to be employed.

SCROFULOUS AFFECTION OF THE MESENTERIC GLANDS.—The glands which are affected with scrofulous disease, next in frequency to those of the neck, are the mesenteric glands. In young persons they are most commonly affected at the age of six or seven months.

CAUSES.—The causes which produce enlargement of the mesenteric glands arise from disease of the secreting glands of the intestinal canal; such as irritating food, which irritates the mouths of the absorbent vessels of the intestines leading to the mesentery. With respect to the effect of mesenteric diseases, they consist, at first, in an interruption of the process of absorption. The chyle passes through the absorbents to the mesenteric glands, and, when some of these are enlarged, the chyle is interrupted in its course. Although the child generally eats voraciously, it is wonderful that there should be such emaciation, independent of the irritation produced by the system being deprived of nourishment?

Symptoms.—This complaint is known by the belly being tumid, and by the tenderness on pressure; attenuation of the skin, voraciousness of appetite; the limbs of the child, at the same time, wasting. The intestines are equally irregular, being sometimes purgative, at others costive. In the motions are occasionally observed earthy matter, composed of carbonate of lime.

Treatment of Diseased Mesenteric Glands.—Directly the child should take animal food, prepared so that it may be easily digested. Vegetable food is very improper. A little arrowroot may be taken, and nutritious broths. Animal food will generally best agree with the child, if it be prepared in the manner by which it may be most easily digested. The principle on which you act is, that the child may take the most nutritious food, and why? Because, absorption being to a great degree prevented, it is important that nothing but highly nutritious food

should be taken, so that nutriment may be conveyed to the system. Animal food is more nutritious than vegetable food; therefore you give it in preference to the last. To assist the digestive process, it is desirable to give some wine and water, to stimulate the stomach, to secrete the gastric juice, and to excite the action of the intestines. In exciting the intestines, you have a two-fold object in view: stimulating the absorbents, and producing the peristaltic motion of the intestines. The best medicine in this disease is the oxymuriate of mercury, given in small doses, and in combination with the tincture of bark; one grain of the oxymuriate, and two ounces of tincture of bark, as before observed; or should the bowels be costive, in the same quantity of the tincture of rhubarb. The hydrargyrus cum cretâ and rhubarb, given so as to produce a aperient effect, are good medicines. The oxymuriate of mercury should be given with no other view than to improve the secretion from the liver and intestines, and thus produce one stool a-day. The abdomen should be covered with a stimulating plaster, or frequently rubbed with the hand, in order to produce a gentle action in the part, and excite the absorbents.

OBS.—Dropsy is sometimes connected with this disease. The paracentesis should be performed, when the patient generally recovers. Now and then a mesenteric gland suppurates, opens at the navel, and frequently communicates with the intestine, and thus an artificial anus is produced. In these cases, where there is an artificial anus, a large proportion recovers. Poultice should be applied over the opening; and when the inflammation is subdued, strips of adhesive plaster should be applied, so as to bring the edges of the wound together, but not until you think that all the matter has been discharged from the gland.—

JOINTS, DISEASES OF.

SPLINTS.

A splint is a long piece of wood, tin, or strong pasteboard, employed for preventing the ends of broken bones from moving, as to interfere with the process by which fractures unite. The apparatus is also used in other cases, in order to keep limbs from moving when it is requisite they should be motionless, particularly in some description of wounds and dislocations. They

add in simple fractures of the arm and lower limbs. They are of different magnitudes, scooped out and shaped to the part to which they are to be applied, and furnished with apertures for the protrances of bones. Very good splints are made for the legs of young children out of strong pasteboard, accommodated in shape to the outline of the limb. All splints, whether for upper or lower extremities, and of whatever material they are fabricated, ought invariably to be concave on the side to be applied to the broken limb; and made as light and thin as is convenient with the requisite degree of strength which they have to encounter; and, in fine, whatever may be the substance of which they are made, they should always at least be as long as the fractured limb; and, if the situation of the limb will allow, ought to extend the whole length. "For instance," says Barr, (*Traité des Maladies Chirurgicales, Tome III. p. 50.*) "for the fractures of the thighs of very young children, the pasteboard splints which I employ, reach from the upper part of the thigh, to the lower part of the leg. Generally speaking, the longer they are, the better they fix the limb, and keep the fracture steady." The number of splints are regulated by the breadth and thickness of the fractured limb. For the fore-arm two are enough; in the upper arm and thigh four are often employed, and for a leg, two, and sometimes three. In fractures of the thigh when the straight position is adopted, the external splint should reach from the centre of the ilium a little way beyond the malle of the foot; and the inner one, from the upper and inner part of the thigh, also beyond the sole of the foot. As respects the anterior splint, it is immaterial whether it only reach from the groin to the knee, or as far as the lower part of the leg. Lateral splints, for broken legs, should be long enough to embrace the knee, and confine the motions both of the foot and ankle. If the straight position be adopted, a splint is often placed along the front of the leg, from the patella to the lower part of the tibia. None are requisite under the limb, the bedding more conveniently affording the necessary degree of support. The utility of splints in fractures is so apparent that on no account can they be dispensed with; and, as they are generally

made of hard materials, the injurious effect of pressure upon the skin is invariably counteracted by placing a sufficient quantity of tow, lint, wool, or other soft substance, between the limb and them.

STAPHYLOMA.

A disease of the eye, in which the transparent cornea becomes opaque, considerably elevated, and altered in texture. The eyelids are prevented from being closed; perpetual irritation is produced by the friction of the palpebræ on the ball, and other means, keeping up a state of chronic ophthalmia; and the iris often protrudes; the vitreous humour is altered in texture, and the crystalline lens is projected forwards, and both often escape. This disease frequently comes on after small-pox, and is one of the sequelæ of that once formidable malady. The sound eye becomes sympathetically affected; the cornea sometimes becomes conical, and loses its natural lustre; the sight becomes impaired; glasses afford no relief in this altered state, nor is there any remedy with which we are acquainted.

After the escape of the vitreous humour, and a portion of the vitreous humour, and the eye collapses, an artificial eye, after the part is healed, may be worn.

TREATMENT.—Nothing can be done for the restoration of sight, and the only plan of treatment will be to remove the staphylomatous part, so as to return the eye within the orbit, and permit the use of an artificial one. The operation is simple enough. The surgeon first passes a needle with a ligature through the staphylomatous part, to steady the eye, and removes as much as may be necessary of the projecting part. The operation gives little pain. It generally happens that the iris adheres to the cornea, and that portion of it is removed.

STRICTURES.

By stricture, in common chirurgical parlance, is understood a diminution or contracted state of some tube or duct of the body, as the œsophagus, intestines, urethra, vagina, &c. They may be either organic or spasmodic.

VARIETIES.—Strictures of the urethra are of three kinds, namely, the *permanent*, the *spasmodic*, and *inflammatory*.

I. PERMANENT STRICTURE.

CAUSES.—It is the result of a thickening of the urethra from chronic inflammation; the *spasmodic* arises either from a contraction of the muscles surrounding the urethra, or from the urethra itself; the *inflammatory* in consequence of inflammation of the acute kind, which generally succeeds the acute gonorrhœa. This inflammation occasions an extravasation of adhesive matter between the corpus spongiosum and surface of the urethra.

SYMPTOMS.—At the commencement of the formation of every permanent stricture, the surgeon is made acquainted with the nature of the complaint by the following symptoms:—The first is, the retention of a few drops of urine in the urethra, after the whole appears to have been discharged; so that when the penis has been returned into the smallclothes, the linen becomes slightly wetted, and if the under side of the urethra be pressed, a few drops more will be voided, which had collected between the neck of the bladder and that part of the urethra where the stricture is situated. The next circumstance noticed is an irritable state of the bladder; this is evinced by the person not being enabled to sleep so long as usual without discharging his urine. A man in health will sleep for seven, eight, or nine hours, without being obliged to empty his bladder; but when he has stricture, he cannot continue for a longer period than four or five hours, and frequently much less even than this. The next circumstance observable is the division of the stream, the reason of which is that the urethra is in an uneven state from the irregular swelling which surrounds it, and consequently the urine is thrown with an inequality of force against its different sides; sometimes the stream splits into two, becoming forked; sometimes it is spiral; at other times it forms, as it were, a thin sheath. Occasionally the stream rises perpendicularly, its long axis being at right angles to the long axis of the penis; thus, then, the retention of a few drops of urine after the whole appears to have been discharged, a more frequent propensity to make water than when in health, and the peculiar characters of the stream, as just described, will be conclusive evidence of the existence of stricture.

In addition, there will sometimes be a discharge from the urethra, which renders the linen of a bluish-white, similar to the appearances produced by nocturnal emissions: if the individual rides much on horseback the urine will be high-coloured, depending upon the degree of excitement existing in the urethra. The next thing which the patient notices is, that he discharges his urine by drops; and, from the irritable state of the bladder, the water is constantly dropping or distilling away from the orifice of the urethra. "An individual, then, having permanent stricture, first observes a few drops of water remain after the whole seems to have been discharged, then notices a fine spiral or divided stream, and lastly, discharges his water by drops only: in this last state, for the purpose of facilitating the escape of the urine, and preventing its being retained by the lacunæ of the urethra, he draws out the penis with considerable force; and thus, to express it in the clearest way, milks himself."—*Sir A. Cooper's Surg. Lect.*

The next circumstance you observe is the discharge of a considerable quantity of mucus along with the urine; this is owing to the inflammation having extended to the mucous membrane of the bladder; the urine, when discharged, is as transparent as usual; but when it has cooled, the mucous descends to the bottom, where it appears ropy, and adheres to the vessel. As the inflammation of the membrane increases, the urine becomes yellow; but, if heated, the yellowness is not seen; and, when allowed to stand, as I before stated, the mucous will sink to the bottom. These facts will explain whether the urine contains mucus or pus. When the disease is of a very aggravated nature the urine will become quite white; but, in all the stages of the complaint, the colour of the water will be according to the degree of inflammatory excitement; and, when very severe, it will be charged with a considerable quantity of pus. When the urine is bloody, it is a proof that the ulcerative process has commenced; and, if there be no blood, it is a proof that there are ulcers.

In that state of stricture, when the urine is loaded with pus, the patient has frequent and severe rigors, or even below that state of inflammation, the person will have frequent shivering fits.

add upon going to his room, you would suppose that he had an intermittent, and would order him bark. In these cases, however, this medicine has no effect, and you will find opium the remedy. "I mention this," observes Sir. A. Cooper, "that you may be upon your guard in those cases, as they are manifest errors succeeded by severe heat, although they do not come on with that regularity that they do in intermittents, nor at the same time of the day. In addition to these symptoms, piles will be sometimes produced, and occasionally direct inguinal hernia: this last complaint is the consequence of the extreme force that is employed to evacuate the urine."—*Surg. Lect.*

Post Mortem Appearances.—Upon the dissection of those who die of stricture, the following circumstances are observed: the seat of the stricture anterior to the bulb, just where it joins the corpus spongiosum—this part is naturally contracted and small, and it is here that you will be obstructed, if you attempt to pass a straight bougie. The next situation in which we find stricture, is in the membranous portion of the urethra, or that part between the bulb and prostate gland: the next situation is in the prostate gland itself. There is no part of the urethra which is not liable to stricture, but most frequently it is found in the situations described. First, just at the beginning of the urethra; second, at the membranous (or as it ought more properly speaking to be called, the muscular) part; and, thirdly, in the prostate gland itself. Proceeding in our dissection, what is found to result from stricture of the urethra is extraordinary dilatation of the urethra itself behind the stricture. The next circumstance observed upon dissection, is an enormous thickening of the coats of the bladder; this arises from the increased action which the muscular fibres have to undergo; for, the urine being frequently discharged, the muscular fibres contract to produce the expulsion, and thus increase in size, in consequence of their increased action. Thus, then, recollect that in strictures the bladder is thickened and irritable. The next thing observed is enlargement of the urethra; and this is owing to the urine collected in these parts from its not finding a ready passage into the bladder; therefore the ureters themselves become bladders.

Proceeding in our dissection, the kidneys are often found in a diseased state, and their glandular structure entirely absorbed; and it not unfrequently happens, that strictures will produce disease in the kidneys, which disease will prove destructive to life. In stricture, diseased kidneys prove advantageous, in one point of view, which is the diminution of the secretion of the urine: if this, however, continues for any length of time, the constitution will sink from the non-excretion of that fluid: one kidney is generally more affected than the other. The glandular structure, as just stated, is sometimes entirely absorbed, and the kidney is occasionally, in cases of stricture, so distended with urine, as almost to answer the purpose of a bladder. Such are the appearances found upon dissection of those who die of stricture.

"I have always denominated that stricture of the urethra which is produced, as it were, by a piece of cord tied round it, the corded stricture. Another, that is produced as if by the tying of a broad band, the ribbon stricture; for it frequently extends a considerable distance, even the entire way from the bulb to the prostate. There is another species of stricture, occasioned by a membranous band running across the urethra."—*Sir A. Cooper.*

CAUSES OF PERMANENT STRICTURE OF THE URETHRA.—Inflammation of the chronic kind: this occasions a greater determination of blood to the part, and produces a deposition of adhesive matter on the outer side of the urethra; the urethra itself becomes thickened, which, together with being pressed upon by the adhesive matter collected in the intestinal spaces surrounding the urethra, produces the stricture in question. "As to the manner in which stricture is produced," Sir A. Cooper says, "I am opposed, on this point, to Mr. Hunter, one of the greatest surgical authorities that ever lived; and, if asked what was the cause of stricture, I should say, in ninety-nine cases out of every hundred, it was the result of gonorrhœa. It is quite true, that children, on whom not the slightest suspicion of their having gonorrhœa could fall, occasionally have stricture. I have lately met with a case of this description, and it was caused by the child having received an injury when on horseback; but still I would say, that in ninety-nine cases out of every hundred, stricture

the result of neglected gonorrhœa, riding or drinking hard, or any excess when the patient is labouring under that complaint."

TREATMENT OF PERMANENT STRICTURE.—There are three principal objects to be attended to: the first of which is, to cure the complaint by dilatation; the second, by absorption; and the third, to destroy it altogether. The first is effected by mechanical means; the second, by the influence of medicines; and the third, burning it away by means of caustic. The first, or cure by dilatation, is accomplished by means of bougies (*see* BOUGIES); these are of various sizes, and made of either wax, elastic gum, gutta, or silver; catheters are also sometimes employed, and answer the purpose tolerably well.

With respect to wax bougies, before introducing them into the urethra, they should always be warmed by the fire, for the purpose of rendering them soft, when, if they are introduced into the urethra, and pass through the stricture, you will ascertain the distance at which it is situated from the orifice, and the form and extent of the stricture will be modelled on the bougie. Another bougie, a little larger than the first, is then passed; and, directly this is withdrawn, another size, still larger. On the following day two bougies are again introduced, that is, if there should be any existing inflammation to prevent it; the first bougie then to be of the same size as the one with which you concluded the previous day; after this has been withdrawn, pass another, a little larger than the first; thus using on every occasion two bougies, always beginning with one of the same size as that with which you had concluded on each preceding occasion. By adopting this plan, strictures may be cured in a quarter of the time they usually are, and the strictured part of the urethra speedily made to regain its natural size. Bougies have been numbered from one to sixteen, so that surgeons may on each occasion know the size they are using, and the size they last used. "Number sixteen is large enough for a walking stick, and evidently too big to be safely passed into any urethra; and number fourteen is of sufficient magnitude to establish the natural passage of any urine. It is not necessary to leave in the bougie any length of time; for when the bougie has passed the stricture, the effect of

dilatation has been produced.”—(*Sir A. Cooper.*) Never attempt to pass a bougie in its straight state; for, if you do, it will be obstructed in its passage, whether there be stricture or not; you should invariably give it, before its introduction, the curve of the catheter: with regard to elastic gum bougies, they are not employed.

Every surgeon has a mode of practice peculiar to himself; the bougie Sir A. Cooper uses is made of silver; it is of the form of the catheter, but at the point, and running back for some distance towards the handle, it is conical; and the way he uses it is as follows: “I first pass down, in the manner described to you, the wax bougie, for the purpose of ascertaining the form, size, and distance of the stricture. Having obtained a knowledge of these, I then introduce my conical silver bougie, the point of which having entered the stricture, the further it passes the greater is the dilatation produced, in consequence of the form of the instrument. This bougie I have found extremely serviceable, and it is the best with which I am acquainted; when it is not at hand, I use the common silver catheter instead.”—(*Lect.*) As to cat-gut bougies, they are now very rarely employed, except when the stricture is particularly small, and then they are sometimes required. There is another kind of bougie, made of horse-skin, after it has been submitted to the action of lime, to prepare it for tanning.

OBS.—Sir Astley Cooper condemns the use of caustic, (originally adopted by Mr. J. Hunter, afterwards improved upon by S. E. Home, subsequently altered, and since falling into disrepute, which has certainly been very much abused, and, in many instances, has produced the very worst consequences, and says that it never ought to be employed, except where the stricture is accompanied with fistula in perinæo, and that fistula behind the stricture; then there can be no apprehension of the caustic occasioning retention of urine, which it has done in many instances when judiciously employed. Caustic is necessary in the use of nitrate of silver, to prevent its getting in contact with any other part than where its presence is absolutely necessary. Sir Astley mentions over cautions us against the use of the caustic alkali, as a substitute for lunar caustic; it being much too soluble, and running

on an extended surface, is calculated to promote a great degree of inflammation. "I have known," says Sir Astley, "eight applications of the lunar caustic completely succeed in curing stricture, when every other means had failed; in this case there was a fistula in perinæo behind the stricture."

II. SPASMODIC STRICTURE.

This variety of stricture is usually supposed to be more or less connected with permanent stricture, and that the spasms commonly attack the muscular part of the urethra.

CAUSES.—It may arise from various causes, and attacks individuals of all ages. Common accidents, as fracture and dislocation, will sometimes give rise to it; even an operation for hemorrhism will generate such a degree of irritation as to produce either an irritated state of mind, or a mind deeply engaged in study; will occasionally influence the nervous system to such a degree as to produce spasmodic symptoms of the urethra.

SYMPTOMS.—Spasmodic stricture is generally accompanied with pain, and hence it is distinguishable from inflammatory stricture with which it has been confounded: the latter is, in fine, attended with distressingly severe pain, and the other, with this symptom, is sufficient to mark these diseases as decidedly distinct.

TREATMENT.—Introducing a bougie gradually and gently along the urinary passage; and when it reaches the strictured part, let it remain awhile; after this, gradually urge it forward again, using only a very slight degree of force, and thus continuing until you have succeeded in passing the stricture. Let the bougie rest a minute or two in the strictured part, and then, directly it is withdrawn, the person will be enabled freely to pass his urine. If there be not a bougie at hand, a catheter may be employed, which will answer equally as well, taking care, however, to use it gently, and in the manner above described. Other means are adopted to relieve spasmodic stricture, as the exhibition of calomel and opium; antimony has also been given, with the view of producing sickness and general relaxation; the warm, and even the cold bath have been employed with the same intention, as well as the

tobacco clyster. Mr. Cline employed the muriated tincture of iron with decided advantage, in doses of five, and from that to ten drops, every two or three hours.

OBS.—Owing to constitutional peculiarities, medicines that will be successful with one patient, will fail in another; recourse, therefore, must be had to them all. The cold bath, apparently so contradictory, has been known to succeed; and lime-water to relieve the patient almost immediately.—*Sir A. Cooper's Lect. M.S.*

III. INFLAMMATORY STRICTURE.

This form of stricture is equally sudden in its approach with the common spasmodic. A surgeon will be consulted for this stricture by a patient who will describe himself as having, without the possibility of effecting it, the most inordinate desire to make water; after he has been prescribed for and left, he will return in a few minutes, and say that he is in the most excruciating pain, and cannot bear it any longer. This kind of stricture is generally produced by the inflammation of gonorrhœa, though there is another cause, namely, the injudicious or negligent manner in which a bougie has been introduced.

TREATMENT.—Under the above symptoms, (retention of urine with dreadful pain in the urethra,) bleeding from the arm, even to syncope, administer purgatives, apply leeches to the perinæum, and put the patient into a warm bath; the exhibition of antimony, combined, will also be found particularly serviceable. It is highly improper either to introduce a bougie or a catheter while the urethra is in the inflamed state just described.

There sometimes exists an irritable state of the urethra, attended with inflammation, it is of the chronic kind. Persons having this complaint, have a frequent desire to make water. This disorder may be cured by giving, three times a day, a eighth of a grain of the oxymuriate of mercury, and a drachm of the nitrous spirit of æther, in any convenient vehicle; and, continued for a short time, the complaint will disappear.

SUGILLATION.

A bruise. A spot or mark made by a leech or cupping-glass.

Sugillation is also an effusion of blood into the cellular membrane, resembling, at first view, an echymosis, but it originates from internal causes, such as the commencement of the putrefactive process, and hence often occurs in the living body. The livid or blackish coloured spots come under this head, and they must be familiar to those who view the bodies of persons dying from malignant fevers, scurvy, &c. In matters of medical jurisprudence, an accurate distinction is necessary between sugillation and Ecchymosis.—*See BLEEDING. THROMBUS, &c.*

SUPPURATION.

DEFINITION.—The formation of purulent matter from the seeping orifices of the blood-vessels, known by the name of pus, termed suppuration.—*See Pus.*

Suppuration varies much in its symptoms, according to the degree of the parts involved. In general it is accompanied with subsidence of acute pain and fever; but in unyielding textures, the increase of swelling, by the formation of purulent matter, is often attended with an aggravation of the symptoms, and with an increase of danger to the structure affected. It is formed in cavities produced in the body by a process of absorption, as in abscesses; it is found also as a secreted fluid on the surface of membranes, or upon granulating surfaces; occurs much more rarely in some constitutions than in others; and is one of the usual terminations of inflammation.

SYMPTOMS—The formation of matter is often attended with severe constitutional irritation; rigors succeeded by heat. A cold shivering is generally the precursor of the purulent secretion. If the inflammation be extensive, or seated in any vital organ, the constitutional disturbance will be very great, and the shivering which indicates the formation of matter, will be very severe, and followed by a powerful re-action. Whilst the rigor continues, the blood collects about the larger vessels in the neighbourhood of the part, and in the heart itself; at length this organ becomes stimulated to action, and sends the blood with considerable force to all parts of the body, but more particularly to that part where pus is about to be secreted. A rigor is merely, therefore, a con-

stitutional effort towards accomplishing the object that nature has in view. When pus is easily produced, as upon a mucous membrane, there is no rigor whatever. When there is an attempt to produce matter, there is an unusual sensation of uneasiness in the part, together with a blush on the skin, easily recognized by those acquainted with the skin, as a sure indication that pus either has or is about to be formed. In the adhesive inflammation, the pain is an acute thrilling one; but here it is more dull, and is likewise pulsatory or throbbing. As this continues, the tumour becomes soft in the middle, but remains hard at the sides; the centre of the swelling points, as it is termed; and upon pressing the part at this period, fluctuation will be evident. The next thing to be observed, is an effusion of serum beneath the cuticle, which separates it from the cutis; it becomes gradually distended, and then bursts, leaving the cutis exposed. Ulceration sometimes takes place on the surface of the skin, whilst the same process is going on internally, so as to facilitate the discharge of matter; generally speaking, however, the ulcerative process is continued entirely from within. These are the common appearances produced by the process of the suppurative inflammation.—See ABSCESS, *FURUNCULUS* and *ANTHRAX*.

REMARKS.—Some parts of the body run more readily into the adhesive, others into the suppurating inflammation. The pleura, pericardium, peritoneum, &c. are subject to the former, while the urethra, vagina, lachrymal duct, trachea, bronchi, nasal passages, are liable to the latter. Serous surfaces, therefore, are affected by the adhesive inflammation, and mucous surfaces by the suppurative. The membrane covering the internal surface of the trachea is mucous, and, therefore, when inflamed, usually suppurates; but in croup large quantities of adhesive matter are thrown out, so as very frequently to occasion death. The coagulable matter adheres so firmly, that it cannot be disengaged by the ordinary efforts of expectoration; at last, from its increase, it fills the trachea, and suffocation is of course the result. Wise indeed, has nature ordained that the various outlets of the body should commonly be liable to the suppurative inflammation, since were this not actually the case, life would not only be very much

edged, but be constantly in danger. Arteries and veins when lamed generally pass into the adhesive inflammation. It occasionally happens, however, that their inner coats suppurate. It was formerly the opinion that matter was formed by a dissolution of the solids; but this opinion is now justly exploded; and we have numerous facts to prove that it is not true. In the urethra, for instance, it is well known that matter will be formed on its surface for months, yet the urethra is not destroyed by it; on the contrary, it becomes thicker than before the discharge existed; and upon an examination of the part after death, no ulcers have been discovered even where the matter had been flowing for several months.

ADVANTAGES OF SUPPURATION.—In two points of view, suppuration possesses two very important advantages. 1. By forming a covering to granulating surfaces, and thus protecting the new formed granulations from becoming dry through the influence of the air; for if they were not kept moist they could not push forward. 2. The suppurative process is the means resorted to by nature for effecting the escape of extraneous bodies: e. g. a ball, by pressure, gives rise to suppuration, and ultimately is dislodged, excepting in such cases where the adhesive inflammation forms, and where it remains imbedded by the adhesive matter. In some wounds are very troublesome, and do all that is possible, they do not heal. It now and then, however, happens that if the dressings be discontinued, and the surface of the sore be exposed to the influence of the air, incrustations or scabs will form, under which pus will be secreted, which, by keeping the granulations constantly moist, will frequently promote the healing of ulcers of this description when all artificial attempts have failed. When the suppuration has been long accustomed to a discharge from an ulcer some caution is requisite when healing it; for if too suddenly done, hectic or apoplectic symptoms are apt to supervene. When long continued and extensive, suppuration is attended with a peculiar species of fever termed hectic. (*see* HECTIC.) A long continued discharge from a blister has upon being too suddenly checked, produced oppression of the brain. Suppuration is best promoted by the application of heat and moisture.

SUPPURATION IN BONE.

When an abscess forms between the periosteum and surface of the bone,* it possesses the common characters of the formation of matter; there is severe pain of the obtuse kind; extending along the surface of the bone; it becomes worse at night, and produces an inequality on the surface of the bone. It is a long time, however, before the periosteum ulcerates; the skin presents a circumscribed blush, and a fluctuation may be felt for a long period before the abscess breaks.

TREATMENT.—Evacuate the matter as soon as the redness and fluctuation are distinct; then place the periosteum as closely on the bone as you can, leaving a small opening for the discharge of the matter, and apply at the same time straps of adhesive plaster round the opening, to keep the periosteum in contact with the bone, and the probability is the parts will unite by adhesion. But if the openings made by nature or by the surgeon be large, the bone is deprived of its supply of blood, the part exfoliates, and granulations afterwards shoot out. If the bone be much exposed and die, touch it with an acid that will decompose the phosphate of lime, and the cartilaginous part also, and for this purpose the *lotion of muriatic acid*, commencing with two drops of the acid to an ounce of the water, will be found the most useful. The diluted nitric acid is, however, thought preferable; as it induces a healthy state of the bone and other parts. Sometimes acetic acid is used for the purpose.

Abscesses in the cancellated structure and shell of the bone require to be treated in the same manner as the preceding. The separation of the dead from the living portion of matter is a tedious process, and is effected by the action of the absorbents on the surfaces of the living bone, removing that part which is in absolute contact with the dead bone; a space is thus formed in which granulations can rise. When these granulations reach the

* Abscesses are sometimes found between the periosteum and surface of the bone, at other times within its cancellated structure, and occasionally, very rarely, between the lamina forming the shell of the bone.

head bone, they also act on it, and therefore the surface is found rough and uneven that is in contact with them, whereas the external surface remains perfectly smooth.

The principles which are to guide the surgeon in the treatment of these:—to quicken the progress of the granulations a little, to act chemically on the parts by the acids. Exfoliation of the bone has been known to take place in three months; most generally, however, twelve months are necessary for this purpose, and will often require two years. But this depends very much on the sluggishness or activity of the constitution.—See EXFOLIATION, BONE, &c.

SUTURE.

In surgery this term signifies the uniting the lips of a wound by suture.* A variety of different sutures have been recommended by surgical writers, but all of them are now reduced to two; namely, the twisted and the interrupted suture. The twisted suture is made in the following manner:—the divided parts being brought nearly into contact, a pin is to be introduced from the inside inwards, and carried out through the opposite side to the same distance from the edge that it entered at on the former side; and a wax ligature is then to be passed around it, describing a figure of 8, by which the wounded parts are drawn gently into contact. The number of pins is to be determined by the extent of the wound:—half an inch, or at most three quarters, is the proper distance between two pins. The interrupted suture is used where a number of stitches are required, and the interval is only the distance between the stitches.

SYPHILIS. (*Lues Venerea*.)

In common language an individual is always said to have syphilis, when the venereal poison has been received into, or is diffused through, the system, and there produces its peculiar effects, as ulcers of the mouth or fauces, spots, tetters, or ulcers of the

* In anatomy, the word suture is applied to the union of bones by means of their margins, as in the bones of the cranium, &c.

skin, penis swelling, and caries of the bones, &c. But as long as the effects of the poison are local, and confined to or near the genitals, the disorder is not called syphilis, lues venerea, nor pox; but distinguished by some particular name, according to its different seat or appearance, such as gonorrhœa venerea, chancre or bubo, which *see*.

SYMPTOMS.—The symptoms of syphilis are divided into primary and secondary; chancre and bubo come under the former denomination, and under the latter, sore throat, eruptions, nodes, and diseases of the nose: these secondary symptoms are the consequences of the absorption of the venereal poison into the system, and its circulation in the blood.

OBS.—Some parts of the body are incapable of being acted upon by the venereal poison, as the brain, heart, and abdominal viscera; in fine, the syphilitic poison does not appear to be capable of exercising its destructive influence on the vital organs, or those parts most essential to the support and continuance of life; but the bones, muscles, tendons, and skin, readily partake of its malignant nature. And, as some parts of the body take on the venereal action more than others, so some individuals are sooner infected by the venereal poison.

CAUSES.—As already observed, the venereal disease is always produced by a poison, concerning the nature of which as little is known as of that of the small-pox or any other contagion: all that is known is that it produces peculiar effects,—the smallest particle of it being sufficient to induce the most violent disorder over the whole body.

The different ways by which the venereal poison may be communicated from an unhealthy to a healthy person, are reduced to the following heads. 1. By the coition of a healthy person with another who is infected with venereal disease of the genitals. 2. By the copulation of a healthy person with another, apparently healthy, in whose genitals the poison lies concealed, without having yet produced any bad symptoms. 3. By suckling. In this case, the nipples of the wet nurse may be infected by venereal ulcers in the mouth of the child, or *vice versa*, the nipples of the nurse being infected, will occasion venereal ulcers in the child.

nose, mouth, or lips. 4. By exposing any part of the surface of the body, as by kissing, touching, &c. to the contact of venereal matter, especially if the parts so exposed, have been previously scoriated, wounded, or ulcerated, by any cause whatever. 5. By wounding any part of the body with a lancet or knife infected with the venereal poison.

REMARKS.—The venereal poison applied to the urethra and vagina, produces clap (see GONORRHOEA); coming into contact with other parts, it produces a chancre or bubo, and subsequent constitutional symptoms if not arrested in time.—See CHANCRE; PHIMOSIS and PARAPHIMOSIS.

There is an intermediate state of the venereal disease between a local and constitutional affection, which arises from the absorption of venereal matter from some surface to which it has been applied.—See BUBO. A constitutional taint, is the third form under which it has been mentioned that the venereal poison is apt to show itself; and which always arises in consequence of the matter being absorbed and carried into the circulating mass of fluids. The general way, however, in which a constitutional taint is produced, is by an absorption of the matter, either from a chancre or bubo.—When venereal matter gets into the system, some symptoms of it may be often observed in the course of six or eight weeks, or probably sooner; but in some cases it will continue in the circulatory mass of fluids for many months before any visible signs of its effects are produced. The system being thus completely contaminated, it occasions many local effects in different parts of the body, and shows itself under a variety of forms many of which put on the appearance of a distinct disease; and it is presumed, wholly depends on the difference of constitution, the different kinds of parts affected, and the different state the parts were in at the time the matter or poison was applied. The matter sometimes falls on deep-seated parts, such as the tendons, ligaments, and periosteum, and occasions hard painful swellings to arise, known by the name of nodes.

When the disease is suffered to take its own course, and not counteracted by proper remedies, the patient will eventually be afflicted with severe pains, but more particularly in the night; his

countenance will become sallow, the hair will fall off, he will lose his appetite, strength, and flesh, his rest will be much disturbed, and a small fever of the hectic kind will ensue. The ulcers of the mouth and throat being likewise suffered to spread, and to occasion a caries of the bones of the palate, an opening will be made from the mouth to the nose, and the cartilages of the bones of the nose being at length corroded away, this facial promontory will sink on a level with the surface of the face. Some constitutions will resist these effects for a considerable length of time, while others will soon give way, and sink under a general weakness and irritation produced by the disease. If the disorder, however, be recent, and the constitution not impaired by other diseases, a perfect cure may be easily effected; but where it is of long standing, and accompanied with the symptoms of irritation already mentioned, the cure will become tedious, and in many cases uncertain, as the constitution and strength of the patient may not admit of his going through a course of medicine sufficient to destroy the syphilitic poison, and the general health may be in such a state as that only a very small quantity of mercury can be administered even at considerable intervals.

TREATMENT.—The medicines found most serviceable in curing this disease, or arresting its progress, are narcotics, diuretics, drastic purgatives, diaphoretics, and those which introduce a large portion of oxygen into the system. Of the narcotic kind, recourse has been chiefly had to opium, conium, solanum, and belladonna. Opium, independent of its narcotic property, adds considerably to the efficacy of other means, and particularly of mercury, though of themselves, there are no known narcotics competent to use for the complaint; and, consequently, are not to be depended upon. The use of warm diaphoretics is very extensive; it is enough, however, to enumerate the following:—mezereon, guaiacum, and sarsaparilla. All of these are supposed to be serviceable by exciting a determination to the skin, and throwing off the syphilitic poison; and in very warm climates, many of them are said to effect a radical cure, though such statements are rarely to be depended upon. The mineral acids (nitric and sulphuric,) come equally under the same ambiguity. The only metal, and indeed

The only medicine on which confidence can be placed for a perfect cure of syphilis, in all its stages, in our own climate, is mercury. It operates chiefly like most other medicines, through the medium of the circulation; it becomes at once mixed with the current of the blood; it becomes equally efficient in the cure of a recent chancre and a chronic ulceration of the throat; and provided a sufficient quantity of it be introduced into the system, the particular preparation of it is of no importance. In our own country, it is now the common practice to exhibit the mercurial pill, or calomel, either alone or together, with mercurial ointment. Yet, whatever plan is preferred, much caution is necessary in carrying it into effect. If calomel be employed, about two grains a day will be sufficient, guarded, when necessary, by a grain of opium at each dose; and if the mercurial ointment be preferred, half a drachm of the strong may be rubbed in night and morning. The best mode, however, in which mercury can be given, is that of the blue pill, ten grains at night and ten in the morning; this is the utmost amount to which the dose should be carried: in ordinary cases, five grains at night and five in the morning will be found quite sufficient. Should the mercury produce diarrhœa, a quarter of a grain of opium should be added to every five grains of the blue pill. As the compound decoction of sarsaparilla assists the action of mercury, half-a-pint of it may be taken two or three times in the course of every day, while under the mercurial influence. As regards rubbing in the mercurial ointment, it is seldom done properly, and is not often adopted, except when the internal exhibition of the medicine occasions so much disorder of the stomach and bowels, that it cannot be introduced into the system any other way.

In *syphilitic sore throat*, it will be necessary to exhibit mercury, if the part is not too irritable, and the sore has no other character than in a healthy person, and does not affect the mouth more than it generally does when syphilis appears in any other part. Here the surgeon must prevent the disease from making the well-known dreadful ravages on the soft palate, and upper maxillary bone, producing an aperture which requires artificial means to close. Mercurial fumigations are found the most effi-

cient means for sores of the palate; but if the roof of the mouth itself becomes affected, a little diluted muriatic or nitric acid will assist exfoliation, and prevent the aperture from being large. When the sores are on the tonsils, local means are not necessary, for a considerable portion of the tonsils may be lost without any bad effects being produced; constitutional remedies alone are employed; though, on the recommendation of Sir Astley Cooper, a piece of lint may be put into the opening, the consequence of which will be, that the person does not speak through his nose so much, and is not exposed to the observation of his friends. As soon, however, as the exfoliation has taken place, it will be right to introduce some extraneous substance to fill up the aperture; and several articles of this kind may be met with at the instrument-makers.

OBS.—When there is disease on the soft palate, nothing can be worn, because any instrument, unless kept near the bone, would excite inflammation. M. Le Roux, of la Charité at Paris, in case of division of the soft palate, performed an operation for the purpose of closing the aperture, on the same principle as the operation for hare-lip. The operation, which is certainly a very ingenious one, was successfully performed by Mr. Brodie, of St. George's Hospital, and a Mr. Alcock.

In affections of the larynx, the system must be immediately acted upon by mercury. The oxymurias hydrargyri is the quickest in its operation. Mercurial fumigations locally, and the oxymurias hydrargyri internally. "Some," says Sir A. Cooper, "give the blue pill and opium; but I prefer the oxymuriate on account of its speedy effect."

2. *Syphilis affecting the Nose*.—The mucous membrane of the nose, as already observed, is liable to be affected by this disease. The disease of the nose, however, is not the result of syphilis, but it arises from the process of exfoliation in an exposed portion of bone; for the bones of the nose very often separate by exfoliation long after the syphilitic action has ceased. The number of bones which separate in this way, is often very considerable. What happens is this:—During the use of the mercury, the sore heals, and the nose becomes dry. There is no discharge at the period; but after a time the process of exfoliation produces in

tion and ulceration of the mucous membrane of the nose, which is generally, but erroneously, supposed to be syphilitic. If the patient, time after time, be subjected to fresh courses of mercury, it only adds to the mischief, and the most horrible deformities ensue. Mercury, instead of assisting the exfoliation, which is going on, adds to the inflammation, and produces other and most extensive exfoliations.

Under proper treatment no person, perhaps, ever lost his nose from syphilis, but the instances are very numerous in which the loss has arisen from the abuse of mercury."—*Sir Astley Cooper*. To prevent the great deformity which will arise in such a case, if an opening be formed through the skin in the upper part of the nose, a probe should be introduced, to feel for the loose cartilage, which should be removed by a pair of forceps. The nose will be somewhat altered; there will be some deformity, but not the horrible deformity which ensues, which would be the case were the skin allowed to give way in the upper part of the nose. Evaporating lotions should at the same time be employed, to prevent putrefaction taking place through the skin. The surgeon is cautioned against treating a renewed discharge from the nose as syphilitic, on the supposition that the mercury previously employed had not been sufficient to subdue the disease.

Syphilitic Eruptions.—Eruptions, the consequence of syphilis, are the mildest of the secondary symptoms of the venereal disease, and all generally admit of an easy cure. Their common character is that of a copper colour, rising a little above the surface of the skin, and, if they go on to ulceration, form thick incrustations. They are attended with very little pain—an itching rather than a prurient sensation, is felt in the part, which increases a little in the evening. There is a great variety in the character of venereal eruptions, with respect to size—in fine, the same eruptions in different individuals are rarely met with in another. In some these eruptions will be found of considerable magnitude, appearing as if a portion of skin was laid down upon the surface, but unattended with ulceration; in others a deep ulceration will be observed, with a very ragged edge; in others there will be scaly eruptions, covering very large surfaces in various parts of the body. There

is greater variety in the character of venereal eruptions than in any other symptom of the disease.

With respect to the parts in which venereal eruptions most frequently appear in the first instance, they are the head, face, and roots of the hair. Incrustations form about the hair of the head and scabs appear on the forehead, breast, the palms of the hands and sometimes the soles of the feet. The palms of the hands are more frequently attacked with venereal eruptions than other parts of the body, because there is more vigour of circulation in these parts; the parts where the circulation is more feeble, are less liable to be attacked.

The treatment of venereal eruption is of the most simple kind. You will pursue the same constitutional treatment already advised, give ten grains of the blue pill united with opium, at night, and five in the morning; or five grains at night, and five in the morning. The *pilula submuriatis hydrargyri composita*, or Plummer's pill, combined with the decoction of sarsaparilla, is sometimes employed for the cure of this venereal symptom. Five grains of Plummer's pill may be given at night, and half a pint of the decoction drunk daily. The compound decoction of sarsaparilla will remove this symptom for a time, but the disease will reappear, and you are never sure that the patient will not return with syphilitic symptoms. Even Plummer's pill, united with the compound decoction of sarsaparilla, unless it be continued for a very considerable time, cannot be depended upon. It should be given from six weeks at least to two months, to prevent a return of the disease. The eruptions will often yield in a very short time, but unless you continue the medicine till the syphilitic action is destroyed, the disease will return. "Nothing can be more absurd," observes Sir A. Cooper, "nothing can show a greater ignorance of the true principle of treatment which should be followed in this disease, than to suspend the use of the medicine, as soon as the symptoms disappear. Venereal eruptions sometimes show an irritable disposition, as well as other symptoms of the disease from which the parts will be in danger of sloughing. Whenever this irritable disposition appears, suspend the use of mercury, and give the compound decoction of sarsaparilla alone, in considerable

quantities. It will be better not to combine the decoction with mercury in any form; if you add any thing, let it be opium and nitric acid. The opium lessens irritability, and the nitric acid sometimes a specific action on sores of this kind. Irritable eruptions are very often improved by the exhibition of nitric acid, which not only has a specific effect on them, but restores the general health of the patient. If the opium disagrees with the stomach of the patient, it will defeat the object of restoring his general health, and in that case should not be combined with the nitric acid.

With respect to local treatment, the best application is mercurial ointment with opium; an ounce of the ointment, with a dram of the extract of opium. This and the nitric acid lotion, diminish irritability better than any other application. The epistemon, composed of the liquor plumbi subacetatis with the melissa and tinctura opii, is often found to be useful. Carrot poultice, the solution of the nitrate of silver, and a great variety of applications, are employed with the same view.

Syphilitic Diseases of the Periosteum and Bones.—The third effect of the syphilitic poison is on the periosteum and on the bones. It first attacks the periosteum, and the bones subsequently become affected. The cylindrical bones, which are most exposed to vicissitudes of temperature, are commonly first attacked; those which are much covered by muscle are rarely affected. The back part of the tibia, for instance, which is covered by muscles, is very rarely affected with nodes, though nothing is more common than to see venereal nodes on the shin bone, which is only covered with skin and periosteum. Sometimes they are seated on the outer side of the tibia, towards the fibula: if they are seated on the fibula it is where it is only slightly covered; and if on the ulna, it is where it is covered only by skin and periosteum. Nodes on the os humeri, except on the outer side, are of very rare occurrence.

Symptoms.—The symptoms by which this disease is characterized are as follow:—Some weeks after the chancre has healed, the patient experiences in the evening a sensation of pain in the bone which is afterwards the seat of the node. This pain does

not immediately produce a swelling; but, in the course of a few days, a swelling appears in the evening, which disappears again on the following morning. It is excessively tender and painful in the evening; but, in the morning, it is hardly perceptible; there is scarcely any swelling or tenderness. At this time the periosteum only is affected; but, when the inflammation has continued for some time longer, the bone is affected and soon becomes enlarged. The first effect is an inflammation of the periosteum; but, in a short time, a deposit takes place between it and the surface of the bone; this deposit is, in the first instance, only a serous fluid, but a cartilaginous substance is soon secreted, which is gradually converted into bone. Though, in the first instance, therefore, there is only an inflammation of the periosteum, the fluid secreted in consequence of this inflammation is soon converted into an ossific enlargement.

TREATMENT.—The treatment of this disease is not different from that which is necessary for the other symptoms of syphilis. Give the blue pill united with opium; the compound decoction of sarsaparilla is sometimes added, with a view of preventing any disposition to irritability in the diseased part. This, however, is not necessary; the blue pill with opium will be sufficient to effect the cure. As to any local treatment, no other will be necessary except the simple application of evaporating lotions, which certainly assist in getting rid of inflammation. When the inflammation has ceased, if there is any enlargement of the bone, a stimulating plaister, as the *emplastrum ammoniaci cum hydrargyro* should be employed. Though the treatment of nodes, when attended to early, is very simple, cases sometimes occur in which considerable difficulty arises. You will sometimes find a considerable quantity of serous fluid fluctuating between the periosteum and bone. When this fluctuation is unaccompanied with inflammation and redness of the skin, there will be no necessity to cut down upon the bone; if you do so, you will run the risk of producing exfoliation. Such a fluctuation as this may be removed by adding a little to the influence of mercury. Large accumulations of serum in the forehead and shin-bone have been entirely absorbed by giving an additional quantity of mercury, and assist

absorption by the application of a blister. When the fluctuation, however, is accompanied with an appearance of redness in the skin, and much pain in the part, indicating the presence of matter, it will be impossible to promote absorption by any means, and the sooner an incision down to the bone is made the better. The exfoliation which will afterwards take place, will be proportioned to the extent of surface laid bare; and if you delay making an opening till the extent of the surface affected is very considerable, it will only be adding to the evil. As soon, therefore, as a fluctuation is discovered, accompanied with redness of the skin, make an incision for the purpose of discharging the matter. Very extensive exfoliations sometimes follow the opening of nodes, and the life of the patient will be in danger. Many persons die from this cause; there is in the College of Surgeons a very fine specimen taken from a person who died in consequence of the exfoliation which followed the openings of nodes in both his tibiae.

Os frontis.—The flat bones are sometimes the subject of syphilitic symptoms; that which is more commonly affected than any other, is the os frontis. The symptoms are the same as those of nodes on the shins. The patient has pain and swelling in the evening, which lasts till two or three o'clock in the morning, when they disappear. This continues, day after day, until an enlargement of the bone is produced. Nodes now and then occur in the parietal bone, very rarely in the os occipitis, and never in the os temporis, the bone being much covered by muscles, and exposed to very little change of temperature. The os frontis, which is the most exposed of the bones of the head, is that in which the disease is most frequently seen. It sometimes happens, when this disease attacks the flat bones, that it is attended with a very considerable tumor and fluctuation. No incision should be made under such circumstances. Now and then, indeed, the suppurative process takes place, and a most serious disease is the result. When the skin is inflamed, and matter is formed beneath, it will be right to discharge it. It often happens, when matter is formed on the surface of the bone, that the suppurative process also takes place beneath the dura mater and the internal part of the skull. Death sometimes ensues from this cause; but fatal consequences may

often be prevented by trephining the patient. The old surgeons were in the habit of perforating the bone, for the purpose of discharging the matter formed beneath. The best mode of saving the life of the patient, however, is to apply the trephine: and, by taking out a portion of the exfoliating bone, give immediate relief to the brain, by removing the pressure produced by the matter formed between the dura mater and the bone. Whenever you are called to a case in which exfoliation of the bones of the skull is accompanied with symptoms of pressure on the brain, you may infer that matter has formed between the dura mater and the bone, and it will be right to apply the trephine. This observation applies not only to cases of syphilitic diseases, but to all cases of exfoliation of the bones of the skull, accompanied with coma. "It can scarcely have escaped your observation," observes S. A. Cooper, "that patients applying for admission to the hospital frequently complain of having pains all over them. They will tell you that they have pains down their arms and legs, which become worse at night when they are warm in bed, and that they have formerly had some venereal complaint, for which mercury has been given till the mouth has been rendered severely sore. If you ask them whether they were exposed to cold during the time they took the mercury, they will answer in the affirmative. Such persons, gentlemen, we do not admit into the hospitals: we only tell them to take care of themselves, and to keep themselves as warm as possible, and that, after a time, the disease will disappear. These pains are readily distinguishable from those which proceed from the syphilitic poison. Syphilitic pains commonly attack the shins, but they never put their hands to this part of the body. They complain of pains from the upper to the lower part of the arm; pains about the chest and about the hips. These are mercurial, not venereal pains. Patients suffer exceedingly from mercurial diseases of the bones, much more indeed than from syphilitic. They should be directed to pay strict attention to temperature, and give them the compound decoction of sarsaparilla. This plan of treatment will be sufficient for the cure of this disease."

OBS.—The usual time at which the secondary symptoms of syphilis make their appearance, is generally from eight to ten

eks, sometimes between those two periods; eight weeks may be taken as the earliest period, and sixteen as the most remote. In both respects, there are a large number of exceptions, for secondary symptoms are continually appearing at an earlier date than the eight weeks, and at a much later one than the sixteenth. It may, however, be observed, that the tenth week is the most usual time at which they appear; sometimes the appearance of these symptoms is protracted in consequence of the system labouring or suffering under the irritation of another disease, as, for example, diarrhœa.

The following questions on the subject of syphilis, are from the book of Sir Astley Cooper, which this distinguished surgeon informs us, he was in the habit of putting to himself:—

Q. “*Is a child liable to be affected by syphilis when in utero?*”

“Mr. Hunter,” says Sir Astley, “was, unquestionably, possessed of so much judgment in his profession, that his opinions are due to the greatest respect and attention. He is an authority to which we all feel inclined to bow with deference and submission. I must not, however, think too highly of his opinion in opposition to facts, which we have ourselves observed; and, if I know any thing of my profession, I have seen syphilis in a child immediately after birth, therefore, in this particular instance, Mr. Hunter was mistaken. Within twenty-four hours after their entrance into the world, such children have the palms of their hands, the soles of their feet, and the nates covered with copper-coloured eruption, and the nails at the same time, generally beginning to peel off, and, unless something be done for the little sufferers, they will be quickly carried off from the violence of the disease; indeed in many cases, children die from it, in consequence of the true nature of the complaint not being understood by the medical practitioner. In these cases, a quantity of mercury is given to the mother; the influence of which is communicated to the child, through the medium of the milk, and it becomes cured of the syphilitic disease.

—A most curious circumstance connected with this subject is, that a woman when pregnant, cannot be cured of syphilis; mercury administered, and causes the disappearance of the primary

symptoms ; but, after delivery, the secondary effects are very soon manifested in different parts of the body ; the primary symptoms, therefore, are relieved as quickly as usual, but it is evident that the poison is not eradicated from the constitution, by disease breaking forth immediately after the birth of the child.

CASE.—“ I once,” says Sir Astley, “ saw a lady, six months advanced in pregnancy, having an extensive syphilitic eruption, for which mercury was administered, and the eruption disappeared: after this she went her full time, but when delivered, the nates of the child, together with the palms of the hands and the soles of the feet, were covered by a genuine syphilitic eruption. I gave the child hydrarg. cum. cret. ; under this treatment it manifested little improvement. A month afterwards I saw the mother ; she had an ulcerated sore throat and syphilis, altogether as well marked as in any case I ever witnessed ; mercury was again given to her, when both parent and child perfectly recovered. Since the occurrence of the above case, I have witnessed several similar ones, in each of which the secondary symptoms could not be completely cured during the pregnant state. I think, however, that a pregnant woman may be cured of the primary syphilitic symptoms, although not of the secondary.”

2. Q. “ *Does much inflammation usually attend syphilis.*”

A. “ No direct answer can be given to this question, for the degree of inflammation which attends it is proportioned to the healthy or irritable state of the patient. In a healthy person, the venereal disease is slow in its progress, and but little inflammation accompanies it: on the other hand, in the irritable person it is rapid in its progress, and accompanied by considerable inflammatory action ; therefore, the differences which characterise the syphilitic disease in various persons do not arise from any peculiarity of the poison itself, but from the peculiar condition of the person on whom it falls: exactly similar to what often happens in small-pox: two men receiving the infection from the same individual shall have the disease, one particularly mild, while, in the other, it is of a malignant confluent kind ; therefore, the degree of inflammation, or manifestations of violence, which mark the course of the disease, are not to be attributed to any peculiarity

existing in the poison, but solely from the particular condition of the infected person. Although syphilis is not at first a malignant, yet it must always be considered a serious complaint, and should command the most decided attention. Though not at first malignant, consisting merely of chancre or bubo, it soon becomes so, and, unless its progress be checked, it will be marked by the secondary symptoms, which I have already described. Therefore, in answer to the question just now put, what I should say is this: "One constitution, upon receiving the venereal poison, will have it at a considerable degree of inflammatory action excited, quickly leading to the destruction of life, whilst another constitution will scarcely be influenced by the reception of the venereal poison."

Q. "*Is any constitutional affection produced in syphilitic disease?*"

A. "I am again compelled to say, that that great authority, Mr. Hunter, is also wrong here; for he has stated that the disease is merely local. What, gentlemen, should I say if one of you were to come to me to-morrow, stating that you had a chancre about eight, nine, or ten weeks ago, and that you had felt yourself exceedingly indisposed, having evening exacerbations, fever and sore throat, and that at length your body had become covered with a copper-coloured eruption; how can we say that there is no constitutional affection here? Do not the evening's exacerbations, which commence about five o'clock, and do not terminate till two, or later, in the morning, plainly show that the disease when so advanced, is constitutional? Most certainly it is so, and can scarcely be any longer a matter of dispute."

Q. "*Is the matter of secondary venereal ulcer infectious or not?*"

A. "Mr. Hunter said, that it was not so; however, for my own part from what I have both seen and heard, I should hesitate a considerable time before I could join in this assertion." I do not doubt, but I believe the disease may be communicated through the influence of the parent's or the nurse's milk. I believe that I have seen examples of this description."

Q. "*Is the matter of bubo infectious?*"

A. "Not so far as experiments have gone. The matter of bubo inserted in the skin has produced no appearance of chancre;

for my own part, I think there is but very little difference between the matter of bubo and that of common abscess."

6. Q. "*Are gonorrhœa and syphilis the same disease ?*"

A. "On this point there is no difficulty for any one to satisfy himself, and he will soon be convinced that there are no two diseases in the world more decidedly different. Now, gentlemen, to prove this, let a man who has had a very bad gonorrhœa apply four or half a dozen of leeches near the glans penis, and then draw over the skin, so that the sores made by the leeches may be embedded in the gonorrhœal matter; well, gentlemen, will chancres be the consequence? Will secondary symptoms ensue as consequences of the experiment? No; neither one nor the other will be seen, and one cannot well conceive a more conclusive fact than this."

EXP.—Mr. Thurston, in 1801, made the following experiment on a young Cantab, who had gonorrhœa in an excessive degree, with ardor urinæ. Mr. Thurston took some of the discharge, and introduced it into the prepuce; he inserted it in two places, thus making two sores; both wounds, however, healed kindly, without producing the slightest appearance of chancre, or the most trivial constitutional symptoms. "After such experiments as these," adds Sir Astley, "it would be madness to say the two diseases were alike; and those persons who think so, entertain wrong notions of the subject, or, unfortunately, their minds may be governed by prejudice, and consequently are incapable of receiving proper impressions. Let me urge you, therefore, not to continue to think that gonorrhœa and syphilis are the same disease."

7. Q. "*Are those parts of the body, which are liable to syphilis, subject to other diseases similar in appearance to syphilis ?*"

A. "Yes, the glans penis, for example, is subject to ulceration from various causes, and the ulcers, occasionally, very much resemble chancre: this last sore, however, often possesses a specific character, by which its true nature can, with the utmost correctness, be ascertained. Although you are frequently enabled to determine that a sore is really chancrous, and are thus capable of confidently asserting that it is syphilitic, yet, at the same time,

There is often great difficulty in saying what is not so; for example, excoriations may exist on the glans, to which syphilitic matter may have been applied, and the poison may have entered into the constitution through the medium of those broken surfaces, without having time to produce in the sores themselves the true syphilitic character; if, therefore, a patient were to come to you under such circumstances, and after having had connection with a suspicious person, if he were to inquire of you whether the sores were syphilitic or not, you had better explain to him what I have stated to you; and likewise tell him, that although the ulcers were not then the syphilitic aspect, yet that he may in reality be infected, but that there has not been sufficient time for the parts to assume their peculiarly marked syphilitic character; tell him to ease his mind easy, watch the appearance of the parts, let him see and see the result, without subjecting himself at all hazards to the course of mercury, for the cure of a disease which never required its employment. Mercury, itself, unfortunately produces effects very similar, both in appearance and effect, to syphilis. I recollect, at the commencement of my studies at these hospitals, I lay, on going round the wards with a surgeon, having been much surprised to see mercury so indiscriminately employed, that seeing every poor emaciated wretch continually rubbing in there was one individual, I remember, in a dreadful state, who had been using mercury for a great length of time, and under that treatment he continued to get rather worse than better; in the case, I took the liberty of suggesting the propriety of discontinuing the mercury, when, in a short time, the patient became completely cured. Mercury, in reality, when given injudiciously, or in excess, will sometimes produce ulcers, which a man of little experience would say were venereal. Again, in ulcerated sore throats, a careless observer might mistake common ulcers for venereal ones; the former, however, are known to be superficial, and may generally be removed by ordinary purgatives, whereas, the latter are deep, with elevated edges, having the same appearance as chancres on the penis.

—Before a course of mercury is administered, the surgeon should possess the most unequivocal evidence of its being re-

quired: and when you are in doubt as to the nature of those diseases which resemble syphilis, your best plan will be to administer five grains of the phil. dydrarg. submur. compos., omni nocte, et ℥viij. decoct. sarsaparil. compos. two or three times in the day. These medicines will be found the best for the cure of the disease upon the principle of restoring the secretions.

8. Q. "*Is Syphilis always progressive without the use of Mercury?*"

"The answer will be found in the reply to the following question: *Is Chancre curable without the use of Mercury?*—To this I reply, that mercury is by no means necessary to procure the healing of the chancres, at least not always. Some chancres certainly will not heal without mercury, and this is more especially the case when they are deep seated, or of long standing; but, on the other hand, when the sore is slight, superficial, and recent, a wash composed of brandy and water, or wine and water, will often cause them to heal without any other application; therefore, mercury is by no means always necessary to procure the healing of chancres, but chancre, as described by Mr. Hunter, according to his account, will not heal without it; it is now, however, well known that the position taken by Mr. Hunter is untenable, and that mercury is not in every instance necessary to accomplish the healing of chancres."

OBS.—Twenty years ago, it was considered a great disgrace to a surgeon to permit secondary symptoms to appear: at that time the great object was to effectually cure the primary symptoms, so as altogether to prevent the occurrence of the secondary; unfortunately, at the present time, secondary symptoms present themselves to our notice, and much more frequently than some years ago. This happens in consequence of practitioners, at that period being in the habit of giving mercury in every case of venereal disease, whether primary or secondary; and they administered the remedy with a regularity and caution which I wish were observed at the present day; they used to exhibit the mercury not only whilst the disease lasted, but for some time after it had disappeared; and their usual practice was to give it, three weeks for chancre, a month for a chancre and bubo, and, if for secondary symptoms, the remedy was continued for a still longer period.

though the disease should disappear quickly after beginning the mercury, yet remember that it is not cured, and the medicine should be continued for the above-mentioned period. If the medicine be omitted for two or three days, you should consider this as so much lost time; and it must not be forgotten in the aggregate account. Three weeks will be generally found a sufficient length of time for the cure of a chancre; a month for a chancre and bubo; and, in case of secondary symptoms, the patient will be safe until the expiration of five or six weeks. Persons often go to medical men with chancres, receive from practitioners a box or two of pills, and are then sent about their business. A man is better never visit a doctor at all than be submitted to such treatment as this: it is often calculated to throw him off his guard, may lead him to suppose that he is cured, when in reality he is not so, and may ultimately terminate in the complete destruction of his constitution. Sometimes mercury disagrees with a patient; then, of course, you must either discontinue it, or soothe it by combining it with some other medicine calculated to prevent its disturbing the constitution, if the patient be too irritable to take mercury; and, should you find this to be the case, cease for a while to administer it, improve the general health, and employment may be again resumed. I may here observe to you that, when a man is in health, mercury will generally agree with him very well; but if feeble or irritable, it then often induces sickness, and severe constitutional irritation.

Q. "*Is any other Medicine but Mercury capable of curing Syphilis?*"
A. "Remedy after remedy has been sent forth to the world, as long as the power to effect this; and now I will tell you all that I know respecting the matter. Mr. Rose, late of the Guards, an eminent surgeon at the west end of the town, about eight or ten years ago, very laudably tried numerous interesting experiments for the purpose of attempting to cure the venereal disease; also with a view to ascertain what number of persons would be affected by secondary symptoms if the mercury was not employed. Mr. Rose found that the primary symptoms of syphilis could be readily cured without the aid of mercury; and that out of every three patients so treated, one was afflicted with syphilitic secondary

symptoms. Now, gentlemen, I saw Mr. Rose upon the subject; he is a very sensible candid man, and upon whose experiments the utmost reliance may be placed; another surgeon says, that two out of every nine have secondary symptoms, making one out of every four and a half. I rely, however, upon the statement made by Mr. Rose. If secondary symptoms did present themselves, they were treated without mercury, and would disappear, would come again, and again disappear. Still, not being satisfied with this, I said to Mr. Rose, 'Now, sir, if a gentleman were to come under your care, what would you do—would you give him mercury or not?' Mr. Rose is not like some men, so wedded to his system as to have his mind fettered by prejudice, and he with much sense replied, that he should certainly give the patient mercury; and, gentlemen, I advise you to do the same."—*Surg. Lect.*

"If you should unfortunately neglect to give mercury for the removal of primary syphilitic symptoms, let me exhort you never to be guilty of a similar neglect as regards the secondary; but, the moment they are presented to your notice, that instant commence exhibiting mercury, if the state of the patient will permit. All secondary symptoms, I am positive, may be prevented by a few grains of blue pill, judiciously given. In saying this, do not let me refuse that tribute which is due to the ability and candour of Mr. Rose, whose experiments were conducted in a very judicious manner, and their results faithfully and honestly communicated to the profession. If, then, under the most favourable circumstances and under the most judicious management, secondary symptoms will appear, unless mercury be employed, is it right to withhold that remedy from those who are afflicted with the venereal disease? Recollect, gentlemen, who Mr. Rose's patients were they were soldiers under orders, at the command of their officers and, whatever reasonable thing they were ordered to do, they were obliged to comply with. You cannot expect your patient to be so circumstanced, nor will you find them subordinate. Considering all the circumstances, I strenuously and conscientiously advise you to adopt that plan which I have so often felt it my duty to point out to you in the course of this lecture. I have only one more observation to make, which is, that syphilis should be

ered by a slight, and not by a violent, mercurial action; continue to give it for the periods I have already mentioned; but do not produce what is commonly termed salivation; it would rather prove injurious than beneficial."—*Ibid.*

TESTICLE.

The testes penis or testicles are subject to several diseases. One of the most unfrequent occurrence is that in which hydatids or cysts are formed within it. It affects the young rather than those advanced in years. It begins at the extremity of the epididymis^{*}; where it passes the testicle there is an enlargement of the part which extends through the epididymis towards the vas deferens, &c. The cysts consist of cellular tissue, not of glandular structure, and the testicle is entirely obliterated, every portion of the seminiferous tubes being absorbed by pressure. A great number of the hydatids contain water only; some, water tinged with yellow serum; and others opaque mucous, which, when the cyst is opened, is found adhering to its inner side. This disease is not attended with pain unless it acquires a very considerable magnitude. The spermatic chord is a little varicose, but not hard; the spermatic veins are larger than usual. At the first glance the disease bears very much the resemblance of hydrocele. There is a little inflammatory tendency in the spermatic chord, and the patient can bear the part to be roughly handled without pain. The disease is confined to the testicle and epididymis, and there is no instance of its having extended to the spermatic chord. It

Each testicle is composed of small vessels, bent in a serpentine direction, arising from the spermatic artery, and convoluted into little heaps, separated from one another by cellular partitions. In each partition there is a duct conveying semen from the small vessels; and all the ducts constitute what is attached to the tunica albuginea a dense white coat covering the testis. From this net-work twenty or more vessels arise, all of which are very contorted, and being reflected, ascend to the posterior margin of the testis where they unite into one common duct, bent into serpentine windings, and forming a hard body called the *epididymis*. The spermatic arteries are branches of the aorta. The spermatic veins empty themselves into the vena cava or emulgent vein. The nerves of the testicle are branches of the lumbar or great intercostal nerve. The use of the testicles is to secrete semen.

generally attacks young people between the ages of seventeen and thirty.

TREATMENT.—Castration is sometimes required in this disease, on account of its magnitude, and the inconvenience it causes the patient, whose constitution is entirely unaffected by the complaint. A man, in every other respect in perfect health, will come up from the country to the hospitals in town to have the operation performed, and return immediately after to his accustomed avocations. The disease is entirely local, and unattended with danger; and there are no instances of its ever having returned after the operation either in the spermatic cord or in the other testicle.

TESTICLE, SCIRRHUS OF.—This kind of scirrhus is similar to that which attacks the breast. True scirrhus of the testicle is an extremely rare complaint. True scirrhus affection of the testicle begins in the body of it, with an extremely hard swelling which may immediately inform the surgeon of the nature of the disease. It feels like a marble lodged within the scrotum, and is tuberculated on its surface. It sometimes begins in the centre of the testicle, and gradually extends until the whole is involved in the disease. The epididymis next becomes the seat of the disease, that portion being first attacked which communicates with the vas deferens. The spermatic chord becomes enlarged, and tubercles of various sizes form upon it. After the spermatic chord has become enlarged, a hard tumour forms beneath the emulgent artery, which may be felt through the abdominal parietes. In true scirrhus, the testicle does not become enlarged to any considerable size. After the swelling in the loins, the thigh becomes enlarged, and œdematous on the side of the disease, which arises from the obstruction to absorption; and the pressure on the veins may also have influence in producing this effect. In the former disease it was observed that the general health of the patient was not affected; but this is not the case in scirrhus of the testicle. The countenance undergoes a remarkable change, it is yellow, and sunk, a fixed colour terminates abruptly in the cheek. This disease differs also very much from the last in being attended with excruciating pain, which becomes more intolerable.

the disease advances. It is generally from a year and a half to two years before the disease destroys the patient.—When you cut into a swelling, arising from this cause, you will find it composed of a considerable number of lobes; and cartilaginous substances, and earthy matter, are frequently deposited in the testicle. Such is the character of true schirrus; it attacks persons at an advanced period; in general between sixty and seventy years of age, seldom under fifty-five years.

The operation for this disease is extremely unsuccessful, for it frequently happens that the disease does not return (particularly if the spermatic chord be enlarged) after the removal of scirrhus testis. This may arise in some measure from the late period at which patients apply for relief. If the spermatic chord has not become enlarged, by giving the patient alterative medicines for a length of time, we may sometimes succeed in preventing the return of the disease after the operation: it is, however, an operation which, in general, is even less successful than that for scirrhus of the breast.

TESTICLE, FUNGOID DISEASE OF.—This disease is much more common than the one last mentioned, it begins, like true scirrhus, in the centre of the testicle; but unlike that disease, it almost immediately affects the whole body of the testicle at its first commencement. In a very short time the epididymis becomes affected next the spermatic chord, and in the course of a few weeks, a tumour forms. The disease is at first unattended with pain; but, when the spermatic chord and the tumour in the testicle become of great magnitude, the patient suffers considerably. In this respect it differs from true scirrhus, in which the swelling never attains any great size. The fungoid swelling of the testicle sometimes increases to the weight of several pounds; the appearance of the surface is somewhat livid; the spermatic chord is loaded with blood, and in some parts you may feel a fluctuation as if there were a cyst within it; it becomes covered with tubercles of considerable size. The tumour has a soft, pulpy feel, readily yielding to pressure; and on the first examination you might suppose the disease to be hydrocele.—I have known it frequently

punctured on the supposition of a fluid being contained in it, when nothing but a little blood has followed the operation.

Q. How do you distinguish a fungoid testicle from hydrocele?

A. It may be distinguished from hydrocele in the following manner:—In the first place, it is flattened on the sides, and round on the fore part, whereas in hydrocele it is pyriform; if you squeeze any part of the fungoid tumour, the patient will complain of the pain arising from the compression of the testicle, which he will not do in hydrocele, unless you squeeze the posterior part of it; the fungoid tumour rather yields to the pressure of the finger, than fluctuates from one side to the other, as in hydrocele; and, lastly, the great weight of the swelling when you lift up the sides, and the livid appearance of the scrotum, mark the malignant character of this disease.

OBS.—The disease often occurs in young people at about the age of puberty:—it has taken place in a child four years old. The period of life at which it may be said usually to occur is between the age of seventeen and thirty-five. It is not confined to the testicle, but affects other parts of the body in a great variety of situations. It differs from scirrhus chiefly in the swelling being of a soft kind: indeed it has been termed soft cancer, for it is in many respects, though not precisely, of the same nature with scirrhus. If you take blood from a person under this disease, you will find it so attenuated, that it will hardly coagulate; and if you have an opportunity of seeing the adhesive process, you will find the inflammation scarcely supporting blood-vessels; what few vessels are pushed through the part assume the appearance of fungus.

Post Mortem Appearances.—If you inject a fungoid testicle, you will find it in some parts vascular, while in others blood-vessels are not received. On dissecting it you will find a portion occupied by blood not very firmly coagulated, and a portion by adhesive matter poured out by inflammation which resembles brain in a putrid state: in part of the swelling will be found cysts containing a serous fluid. The fungoid and scirrhus tumours are the only malignant diseases to which the testicles are liable.

TREATMENT.—The operation may be performed with a hope of success if the patient be entirely free from other complaints, but in the majority of cases the disease returns. The disposition to

the disease may sometimes be prevented by giving alterative medicines, but no medicine with which we are acquainted at the present day has any influence over it when once formed.—See CANCER, SCROTI, CASTRATION.

TESTICLE, CHRONIC ENLARGEMENT OF.—There is a complaint which may be called chronic enlargement of the testicle, often mistaken for the two preceding, which also may be called chronic: so they are, but there are specific diseases over which neither medicine nor surgery have any control. The disease to which our attention is now directed, is called simple chronic enlargement of the testicle, which, however, yields to proper treatment, which consists in enjoining the recumbent posture; but without a rigid adherence to this injunction it will be impossible to effect a cure: application of leeches and lotions, as the liquor ammoniæ aceti and spirits of wine, to the part, and the exhibition of three or five grains of calomel with opium, night and morning. By adherence to this mode of treatment the enlargement of the testicle will subside in a few weeks.

Tests.—This disease is of a similar nature with that which attacks the eye, which has been called iritis, (*See* IRITIS) and requires the same mode of treatment. It occurs in constitutions which have been injured by intemperance and over excitement; and it will increase until the testicle is entirely destroyed, unless prevented by the means pointed out. The mouth of the patient should be well affected by the mercury, so as to produce a considerable discharge of saliva, showing that it has acted on the constitution. A bougie must not be introduced at first, as it would add to the irritability of the urethra, even should this channel be the source of the enlargement; wait until the constitution has been altered by the above means, and the swelling of the testicle has been considerably reduced; and then, and not till then, the bougie may be resorted to with advantage. “I have seen,” observes Sir A. Cooper, “a great number of these chronic enlargements removed, and I confess I have removed many of them myself: but if I were to do so now, I should be guilty of a greater crime, and deserve to have my own testicle removed, for it

is a disease which readily yields to the medical means I have pointed out."—(*Surg. Lect.*) There is a species of chronic enlargement of the testicle, however, which requires the operation, as large abscesses are sometimes produced by it, which occasion great pain, so that the patient himself is anxious for the removal of the testicle. Fungous granulations spring from the surface of these abscesses; they are not of the true malignant fungoid kind, but they resemble the granulations which shoot through the dura-mater, in consequence of injury to the brain. Even in this case, however, these granulations may be cut off from the surface and the integuments brought together, so as frequently to render the removal of the testicle unnecessary. Mr. Travers has cured a case or two of this kind by the pressure of adhesive plaster; and other cases have yielded to the sprinkling of powdered sulphate of copper, or nitrate of silver, in the part. The irritable testicle is a very formidable disease; and one we have not seen described in any surgical books. It generally resists all the means that may be employed to subdue it, and in these instances Sir A. Cooper was under the necessity of removing it. The pain passes up the spermatic chord to the loins, entering along the nerves of the thigh. It may be relieved for the moment by medical means, as by giving the blue pill with hyoscyamus, but it generally returns, and will continue for months, and even years. The patient lies in the recumbent posture from morning till night, quite unable to pursue his ordinary avocations; the part cannot bear the slightest handling, or the patient the least degree of motion.

TESTICLE, INFLAMED. See HERNIA HUMORALIS, p. 412.

TETANUS.

DEFINITION.—The word tetanus means tension, and is applied to what may be called a muscular affection.

DISTINCTIONS.—It begins generally in the muscles of the jaw and when it is confined to this part of the body it is called *trismus*. When the muscles at the back of the neck stretch the head backwards, it is called *opisthotonos*; when the body is bent forward it is *emprosthotonos*; and when the tension is confined to one side of the body, it is called *pleurosthotonos*. A distinction has also

been taken, according to its greater or less intensity, between acute and chronic tetanus.

CAUSES.—Exposure to cold when under profuse perspiration; sleeping in the open air on damp ground; irritation of the bowels; irritation of the nerves from local injury; injury by puncture, incision, and laceration, to which last causes our attention here is more particularly directed. It comes on sometimes very shortly after the receipt of an injury, but this happens more frequently in hot climates, and after amputation on ship-board.

SYMPTOMS.—A rigid and painful contraction of the muscles of the neck and trunk of the body, drawing back or forward, or on one side in a curve, with convulsions. Sometimes an attempt to swallow liquids produces general convulsion, as in hydrophobia, occasioning trismus or locked jaw. The sanguiferous system, nevertheless, is not particularly altered; when the patient is labouring under spasms and shaken with convulsions, a considerable acceleration of pulse is naturally expected, which is the case here; but in the intervals the pulse is regular enough, and of the common standard. De Haen has remarked the high colour of the urine, though Mr. Abernethy did not find the urine of tetanic patients either high-coloured or deficient in quantity. Patients generally perspire when they are agitated by tetanic convulsions; at other times nothing particular is observable, either in the secerning or sanguiferous system. In tetanus the vessels are generally acted upon with difficulty. As regards the nervous system, the patient is tranquil in his mind, and has his senses about him. The patient is under no particular agitation of mind, but there is undoubtedly great insensibility in the nervous system with respect to the operation of medicines. Alcohol will not inebriate a tetanic patient; opium will not make him sleep; mercury will not salivate him. He is very unsusceptible of the influence of the most powerful medicines; and that which produces in others a considerable degree of irritability, will not in the slightest degree affect him.

TREATMENT.—In the treatment of tetanus, the first inquiry presents itself, inasmuch as the tetanic symptoms are the consequence of a local cause, that is, of a wound of some part or

other, is whether the removal of the cause will put a stop to the symptoms; in other words, whether the amputation of any part, for instance, of the finger or thumb, or of an entire limb, when the wound which has produced tetanus is in a limb, will arrest tetanus—put a stop to the complaint. “I believe we may say pretty positively that it will have no such effect” (*See Lawrence's Lect. in Lancet*, Vol. i. p. 558, 1830.) Yet the removal of the limb, the amputation of the extremity in which the wound is seated, has been recommended and practised, even of late times by those who have had considerable experience, and more particularly by Larrey, who recommends it in the surgical history of his military campaigns. He, however, advises it only in cases of chronic tetanus, or at the very commencement of those symptoms which are of a more acute kind. In the treatment of tetanus very different modes have been adopted; so different and so various from each other, as to show that no clear principle of treatment has hitherto been discovered. The rigidity of the muscles has led to the employment of antispasmodics, more particularly opium, which may here be given in large doses; and in idiopathic tetanus has been considered to have cured the complaint; it should be given repeatedly, and in small doses.* Patients have also been bled largely, in the early stage of tetanus; and in certain cases the appearance of the blood drawn has seemed to justify the operation. On a reference to recorded cases, it appears that the most successful treatment of tetanus, has been from the employment of active aperients, in alternation with antispasmodics, particularly opium; that the cases have done best in which powerful opening medicines have been employed from time to time, so as to keep up a continued action on the bowels, and to prevent the recurrence of that state of costiveness in which the disease is generally found to commence; and, at the same time, that opium has been employed to mitigate the severity of

* Dr. Babington gave 180 grains of opium in eleven hours. An ounce of the tincture of opium has been given, many times, in tetanus, in the course of twenty-four hours.—*Vide Lawrence's Lect. op. et pag. ut supra citat.* And Mr. Abernethy mentions a tetanic case, where, after death, thirty drachms of opium were found undissolved in the stomach.

the spasms. In many cases, a successful result has been secured by acting steadily on this plan. "The three objects of treatment," says Mr. Lawrence, "those on which I myself should place reliance, are 1. venesection, in the early stage, until the symptoms of general fulness of the vascular system are removed; 2. the free exhibition of aperients, so as to remove costiveness; and 3. the employment of opium, for the purpose of lessening or controlling the very painful spasms."—*Vide Lancet*, Vol. i. 1830.

Hippocrates has told us almost as much about this disease, as we have known ever since. He says that in certain cases of tetanus, where the fits increase, and there are exacerbations of the symptoms, the patient generally dies on a particular day. He also states that the most effectual remedy is the cold effusion, but he limits it to particular cases, excepting traumatic tetanus, or that which is produced by wounds. After the time

Hippocrates, it was treated as a disease of tension; and strong action, warm water, warm oil, bleeding, &c. were employed, with a view of producing relaxation. De Haen, the first among the moderns who tried to investigate the nature of tetanus, tried all the various remedies which had been recommended. In one case he took one hundred and thirty ounces of blood from the patient in twenty-four hours, and the patient died; but he did not discriminate in this disease, for some of the cases which he supposes to be tetanic, are not absolutely cases of tetanus. Dr. Currie, of Liverpool, tried the cold effusion, and it certainly did good. Dr. Rush, of Philadelphia, treated tetanus as a disease of debility, and recommended tonics and stimulants. Mr. Abernethy says, that "the application of the cold effusion seems to be only administering to a symptom; it lessens muscular action, at least for a time, because whatever lessens the temperature of the body lessens muscular action."

THROMBUS.

A small tumour which sometimes arises after bleeding, from the blood escaping from the vein into the cellular structure surrounding it.—*See BLEEDING, VENESECTION.*

TONSIL.

An oblong, suboval gland, situated on each side of the fauces and opening into the cavity of the mouth by twelve or more large excretory ducts. The tonsil glands, one or both at the same time, are subject to diseased enlargement. In children this affection is most frequent, being a disease common to them, as the small-pox or measles; and the inflammation which produces it is of the scrofulous kind. Sometimes the enlarged part is attached to the part by a distant small peduncle; at the other times the base of the swelling is of considerable size.

TREATMENT OF ENLARGED TONSILS.—To prevent the growth of these enlargements, and their formation altogether, the best medicine that can be given, is the oxymuriate of mercury; and it will be found highly advantageous to combine it with the tinctures of bark and rhubarb e. g.

℞ Oxymuriat. Hydrarg. G. rj.
 Tinct. Cinchon.....
 T. Rhei..... ā ā ʒj. mix.

SIR A. COOPER.

A tea-spoonful of this mixture is to be taken in a little white wine, three times a-day. By uniting the mercury as above with bark and rhubarb, the appetite will be improved, the stomach and bowels strengthened, and the vigour of the constitution gradually restored. It is often found necessary to vary the medicine in very delicate children; a very beneficial one may be found composed of two grains of rhubarb, and five of the carbonate of iron.

The best local application to the gland itself is the nitrate of quicksilver; the tongue is to be pressed down with one finger, then holding the nitrate of silver in its ivory case, between the finger and thumb of the other hand, gently apply it to the surface of the swelling; the application may be repeated if necessary: when the caustic is applied, the part will soon become white, and scale off. A succession of these by occasional applications will often effect a cure. The sulphate of copper is sometimes used instead

the nitrate of silver, and succeeds very well. Alum is likewise a good application, but it requires to be applied a greater number of times than the lunar caustic.

REMOVAL BY LIGATURE.—When the tonsil glands are too large to admit of cure, and resist the proposed methods, they may be removed by ligature; it is easily applied, and may be done by passing it through the eye of a probe, then carrying it over the tonsil, and bringing it out below; tie it in front of the diseased part. The probe is to have the requisite curve given to it. If the finger should not be long enough to make the knot, what is called a tonsil iron should then be used, an instrument well adapted for the purpose, and would do much better for performing the operation altogether than either the probe or finger. If the tumour be not of the form to admit a ligature put on in this manner, you must then pass the ligature through the centre of the swelling by means of a needle, and tie it above and below. In some cases the ligature of necessity must be double: in this manner you will soon succeed in removing the enlarged part.

TRACHEOTOMY. *See* BRONCHOTOMY.

TREPHINE. (TREPAN.)

An instrument used by surgeons to remove a portion of bone from a man's skull.

TREPHINING.

Trephining, in the language of Mr. Abernethy, is "boring a hole in a man's skull." The cranium is of different degrees of thickness; some there are whose crania are as thick as possible, others are very thin—paper skulls. "No surgeon, therefore," observes Mr. Abernethy, "by looking at the outside of a man's skull can tell whether it is thick or thin; and if he had been trephining a thick skull, and immediately afterwards come to work on a thin skull, he certainly would have the instrument into the brain unless he took very great care. In trephining the skull you

are always to go on as if you were trephining the thinnest skull possible. They say you may go on till you come to the *diploe*;* now this *diploe* is not much to be depended upon; there are thick skulls with very little *diploe*, and there are thin ones with much; in short, the *diploe* appears to be most abundant in the middle period of life; it diminishes in old age, and there is but very little of it to be found in a child. "I therefore say (continues Mr. Abernethy) you must trephine as if you were trephining upon the thinnest skull possible, and as if that skull had pits in it, for there are pits in the skull, more especially on each side of the longitudinal sinus; and suppose a person were trephining upon a skull where there was a pit. Why, if care was not taken, the trephine would be cutting the membrane of the brain where the pit was, before it had penetrated the bones in the other parts."

In trephining the instrument must frequently be taken out, and examined with a searcher, to know whether or not the skull be penetrated; for, it may be penetrated at one part, and not at another; and the teeth of the trephine should be suffered to bite on that part which is the least likely to be penetrated—in short, it is better to break out the part, when once the slightest penetration is made, than to run the risk of going through upon the brain. "I say," observes Mr. Abernethy, "it is unpardonable to do so; it is like cutting a hole in a man's belly; if you divide the *dura mater* the blood will flow out, and you cannot sew up the wound again."—*Surg. Lect.*

There are two states of the skull to which the operator ought particularly to direct his attention—one is, the state in which it is met with in the foetus where it is made up of many pieces of bone. There is the *pericranium*, for so the periosteum of the skull is technically called externally, and the *dura mater* internally, and the bone forms between these two membranes. Points of ossification are set up with some irregularity, but they join together and make plates of bone. There are many pieces of bone in the head of the foetus, but they soon coalesce and leave only a certain number of principal distinctions. The bones are by no means in

* The spongy substance between the two tables of the skull.

contact with one another in the foetus, but they afterwards become separated. The bregma or fontanella, which is an opening or large suture between the parietal bones and the middle of the *os frontis*, is deserving attention. All teachers of midwifery call attention to this, for by it can be ascertained whether the child is dead or alive in passing through the vagina, by placing a finger on this part of its head—if it be alive the pulsation will be felt, if dead the brain will not beat. In very old age the skull consists of but one piece of bone, there is no vestige of the connexions of the bones. The sutures are formed intermediately between the two states; but the sutures may always be found beginning from the inner, and last in the outer table of the skull; they are always found first obliterating on the inside and last on the outer side. The pericranium adheres firmly to the crack of a suture, but it does not do so to that of a fracture. In old worn crania there is a great difficulty, and the parts are very frequently mistaken; but how are the sutures to be traced? About an inch behind the *angular process* of the *os frontis* lies the commencement of the *coronal* suture, which ascends upwards to the vertex of the head, touching a perpendicular plane; this is very decisive, but generally it is correct, and to be relied upon. From the middle of the coronal there proceeds the *sagittal*, which is as straight as an arrow; but where does it terminate? Upon a line drawn horizontally round the cranium from the commencement of the coronal. Then the termination of the sagittal gives the commencement of the *lamdoidal*. The *os frontis* of the foetus is always to be found in two pieces, and the sagittal suture (for that is the expression used) is sometimes continued down to the *os frontis*. The orbital plate is exceedingly thin; there is but a very slight partition in this part, separating the eye from the brain; an abscess has often been seen to begin on one side of this plate, and mark its way through to the other—the partition indeed is so thin as to admit of disease doing that, on whichever side it begins.

Where may you apply the trephine?

Draw a horizontal line three parts above the orbits of the eye, and you may trephine where you list, save and except you may do it precisely on the middle, because then you would come on the frontal spine; and were you to trephine lower down, at the

sides, you might penetrate into the orbit of the eye."—*Abernethy.*

Q. Where ought the trephine not to be applied?

A. You ought not to trephine over the *meningia arteria*, if it be possible to avoid it; neither would any one apply the trephine so as to open the longitudinal sinus, if he could help it.

OBS.—Mr. Pott speaks of this wound of the longitudinal sinus; he says he has opened it with a lancet, to take blood, as it were from the vessels of the head immediately. "All this," observes Mr. Abernethy, "where the wound is made upon the upper part of the head; but what are you to do where the sinus is wounded in the lower part, when people are delirious, and are turning and twisting about, from injuries received on the head? You must lay them on their face, and this really cannot be done. I can only tell you (continues Mr. Abernethy) that I have seen this sinus wounded two or three times in my life, and though I do not believe it killed the patients, yet there was always a dripping of blood till they died."

Q. What can be surgically done to the os occipitis?

A. "It may be trephined on either side of the perpendicular ridge; but if you have any thing to do with the under part, you must cut off a man's neck to get at it."—*Abernethy's Lect.*

"The first instrument for the removal of a piece of bone from a man's head," says Mr. Abernethy, "was called a *trepan*, then was called a trephine; but I have always been impudent enough to say, that on many occasions I would puzzle the very best surgeon in London by asking a single question—even Mr. Pott himself, whom I considered one of that character; and the question would be 'Why, sir, do you ever trephine a man?' 'Egad, I do not know; because,—because,' perhaps he would say, 'because his skull was broken.' 'Well but, sir,' I would say, 'I do not see you trephine a man who has broken his leg—trephining the leg would break it worse.' 'No; O no, but because there are symptoms.' 'What symptoms?' Now the answer to the question is as simple as the question itself: you never trephine but to take pressure off the brain in cases of injury. I have told you that there are cases requiring you to trephine from disease. You may take away the external plate of the skull, to let out matter between it and the diplo-

you may uncover the whole part of the skull, and let out matter between it and the dura mater. But in cases of accident you trephine to remove pressure; and what are the cases of pressure? Why the head may be beaten in upon the brain; blood may be shed beneath the bone, or matter may be collected under it; but does every depression of the skull warrant you in trephining? No, it does not appear that it does. And what are the symptoms of pressure, from the direct injury, which are potent enough to warrant the operation? Why, the symptoms of pressure are *torpor* of the brain, more or less, according to the degree of injury."—See IMPRESSION, CONCUSSION.

THE OPERATION OF TREPHING.—The operation being determined upon, the head is to be immediately shaved—a step frequently premised before the arrival of the surgeon, in order to afford him a better opportunity of seeing which parts of the scalp have been struck, for it is in such situations that he has the greatest reason to apprehend fractures of the bone, or extravasations of blood. The scalp having been divided, if necessary, and the cranium scraped from the surface of the bone, according to the common precepts and practice, the next thing is the application of the crown of the trephine. Previous, however, to this step, the surgeon is to make a little impression with the point of the centre pin for the purpose of marking the place, where it will work when the crown of the trephine is applied in the proper situation—for when such impression is made, the operator must make a small hole with a perforator, in order to fix the point of the centre pin, which the crown of the instrument turns backward and forward, as in an axis, during the first stage of the operation. There are, however, centre pins so constructed as to make a trepanation without any other instrument being required: the point of the centre pin having been fixed, the trephine is to be turned by regular semi-circular motions, alternately to the right and left, which is done by regular pronations and supinations of the operator's hand. When the teeth of the saw have made a tolerable circular groove to allow it to work of itself, the centre pin may be removed. It is necessary to cleanse the teeth of the saw occasionally with a little brush.

In patients of the middle age, a different feeling and sound is communicated to the operator after having cut through the outer table of the skull. Whether this change is experienced or not after getting to some depth, he ought to proceed cautiously, moving the saw lightly, quickly, and sharply, in the direction of the teeth, and using no pressure. The operator should not be hurried, for he is apt to do harm if he is—there is no inducement to make great haste, for the patient does not suffer much, if any, pain. After two or three turns of the saw, it is prudent to examine the tract with the flat end of the probe, or with a silver tooth-pick. If the perforation be completed at any point, then the instrument is to be inclined to those which are undivided; and the fluted crown allows of this being done with great facility.

The circle of bone being completed on all sides, it is to be removed by forceps, or by means of the lever; and the sharp points ought to be taken from the edge of the perforation by means of the latter instrument, otherwise the dura mater may be fretted and torn when following the natural motions of the brain. The lever must be strong, and simple in its construction. After a sufficient space of bone has been removed, its point is to be introduced cautiously under the part that requires elevation; the edge of the sound bone at various points affords a fulcrum, and by persevering and steady efforts, the object of the operation will be accomplished.

AFTER TREATMENT.—The dressing of the wound should be simple; the integuments should be made to cover the aperture, or as much of it as possible, and due support is given by compress and bandage. The after treatment must be varied, and conducted according to circumstances. It may become necessary to repress the granulations, or else to soothe the wound and abate inflammatory action in the surrounding parts. Perhaps incisions may be required to prevent the formation of matter, and destruction of the cellular tissue and of the tendinous expansion, or to evacuate fluid already secreted. The patient's strength may require support. He may stand in need of stimulants; or, on the contrary, the most active means may be required to subdue vascular action, and to prevent the evil consequences which would result to the important parts.

within the cranium from such over-action. In every system of surgery the student meets with an account of the operation of trepanning.

TRICHIASIS.

A disease of the eye-lashes, in which they are turned in towards the bulb of the eye; also a disease of the hair resembling *trichia polonica*. Scarpa says, that the disease presents itself under two distinct forms:—the first, where the cilia are turned inwards, without the natural position and direction of the tarsus being at all changed; the second, consisting of a morbid inclination of the tarsus inwards (*see ENTROPIUM*), and consequently of the eye-lash towards the ball. The first form, according to both Beer and Scarpa, is said to be uncommon, nor has it come under the observation of the latter writer more than once, and, in this instance, only some hairs had changed their direction. Mr. Francis is, however, completely at variance with both Scarpa and Beer, for he describes an inversion of the eye-lashes as frequently existing independent of entropium. The second form of this disease, or that which consists of a folding inwards of the tarsus and cilia at the same time, is that which is most commonly met with in practice; the cure of which is accomplished by artificially supporting the eye-lid, and fixing it permanently in its natural position, together with the eye-lashes, which irritate the globe of the eye. Scarpa says, this may be completely effected by the excision of a piece of the skin close to the edge of the eye-lid, of such a breadth and extent that, when the cicatrix is formed, the tarsus and margin of the eye-lid may be turned outward, and sufficiently separated from the eye-ball, the cicatrix of the integuments affording a point of support fully adequate to the retention of the cilia in their natural position and direction. (*See ENTROPIUM.*) See also the following works on diseases of the eye. *Travers's Synopsis*. G. J. Guthrie, *Operative Surgery of the Eye*. G. J. Beer, *Abhandlung von den Augenkrankheiten*, B. 2. p. iii. 117, 8vo. Wien. Crampton, *Essay on the Entropion*, Lond. 1805. Saunder's *Observations on several Practical Points relative to the Diseases of the Eye*. Richter's *Anfangsgründe der Wundartzneykunst*, &c.

TRISMUS.

Locked Jaw. Spastic rigidity of the under jaw. There are two species. 1. *Trismus Nascentium*, attacking infants during the two first weeks from their birth. 2. *Trismus Traumaticus*, attacking persons of all ages, and arising from cold or a wound. See TETANUS.

TRUSS.

AN apparatus for retaining or reducing hernia in its proper place. They are either elastic or non-elastic. The non-elastic ones are composed of leather, fustian, dimity and the like. Trusses, however, of this description, are not to be depended upon, consequently ought to be entirely banished from practice. The spring trusses, therefore, are now most in requisition and general adoption. In large old ruptures, and in persons who cannot avoid labour and exercise, the elastic spring should be made accordingly thicker and broader. It is, moreover, of the greatest importance to make the spring press equally on every point of the body which comes in contact with it. This circumstance demands the nicest attention, both of the surgeon and instrument-maker, for there is considerable variation in the pelvis of individuals, some being flat and narrow, while others are broad and prominent. To regulate this point of consideration a thick, flexible, metallic wire, accurately applied round the hips will serve to take the measure and proper shape of the spring, which may afterwards be altered a little if necessary. In this respect, we are unanimous in the opinion that Coles' trusses effect greater security to the patient, and with considerable less inconvenience, than any other truss yet invented or improved upon.—See p. 432, Art. HERNIA.

If there be a double rupture, that is a rupture on each side, the protruded viscera will admit of being very well kept up by means of a single truss with two pads, joined together at the exact distance of the rings. Some give, however, the preference to the use of two single trusses, joined together in front and behind with suitable straps. On the application and use of trusses, the following instructions deserve attention.

In the first instance, the truss should neither be applied nor changed except the patient be in the horizontal posture, and it is known, with certainty, that the whole contents of the hernia are completely reduced, and always, on the first application under the direction of a surgeon who will see the instrument placed in such a manner that the lower third of the pad sufficiently compresses the neck of the hernial sac against the pubes. The instrument should neither be too tight nor too loose. The patient should be instructed in the right method of applying the truss, and the principles taught him in which it keeps up the bowels and affords the prospect of a radical cure, with every requisite caution he will have to observe. Every patient should provide himself with two trusses; and fat persons, who perspire a good deal, should, to wear the truss, interpose a piece of soft calico between the pad and skin. Any uneasiness in the vicinity of the abdominal ring, which always affords room to suspect that a portion of omentum or intestine is protruded, renders it necessary to remove the truss, in order that the parts may be carefully examined, and their speedy reduction effected, if such be the case. Should the pressure of the truss induce swellings of the spermatic chord and testicle, the thigh strap must be relaxed, or the lower part of the pad made less prominent; and should strong pressure be necessary to retain the hernia, the pad should be convex, that is, it should have an excavation in it over the part that presses on the chord. Trusses should be worn day and night without interruption, as the frequent descent of the hernia precludes all hopes of a radical cure, and not unfrequently gives rise to strangulation, particularly if the neck of the sac be narrow. Nor should their use ever be laid aside till after many cautious attempts, beginning the experiment first in the night time, and not during the day for some length of time after the patient thinks himself cured. The longer and more attentively a truss is worn, the greater is the hope of a radical cure. Excoriations made by the truss may be relieved by sprinkling fullers' earth, lapis calaminaris, or powder of acetate of lead, upon the part, protecting the excoriated part, at the same time, by means of a piece of soft linen.—See HERNIA.

—200Bs.—Under the article Hernia, will be found some excellent

observations on the nature, structure, and application of trusses, in conformity with Sir A. Cooper's description of the situation at which the hernia first protrudes through the abdominal ring.

TUMOUR.

DEFIN.—A swelling or morbid enlargement of any part. There are some tumours pendulous from the surfaces of membranes, being attached by very narrow bases to the structures from which they hang, by what in fact is a mere peduncle. The manner in which such tumours form was first described by JOHN HUNTER. He found, on opening the abdomen, a spot of extravasated blood lying upon the surface of the peritoneum: the blood appeared recently coagulated, and was attached by a very narrow neck, of about half an inch in length, to the surface on which it had been deposited; he attempted to account for the length of this attachment by supposing that the coagulum of blood had adhered to the surface of the peritoneum, and that by the movement of the abdominal viscera, it had been elongated in the way before described. "I believe," says Mr. Abernethy, "that tumours form on all parts of the body in the same way. The jelly or the coagulable part of the blood, becomes effused either by disease or accident: vessels shoot into it; it becomes completely organized, and what was before an inorganic concrete, becomes a part of the living system. The attachment of a tumour is sometimes by a slender point, and then all the vessels supplying the tumour must pass through that point; but in other cases, the vessels shoot into the tumour irregularly at various parts. The tumour thus once organized seems to live and grow by its own powers; the future structure which it may acquire seems to depend on the operation of its own vessels."—*Surgical Lectures*.

Sometimes the structure of a tumour is like that of the parts near which it grows: fatty tumours frequently, indeed generally, are found in the adipose structure of the cellular membrane, whilst those in the joints are often of an osseous or cartilaginous consistence. This, however, is not always the case, for tumours may be found composed of very different materials from the parts by which they are surrounded. It appears that a tumour being

ance formed is a sufficient cause of its own continuance and increase; it irritates the contiguous parts, and keeps up that increased action of vessels which is necessary to its supply. A tumour once formed increases, condenses the surrounding cellular substance, and forms for itself a sort of capsule. It is connected to the surrounding parts more or less firmly, according to the degree of irritation which it may excite. Tumours may be considered as constituting an *order* in the *class* of local diseases. This order may be subdivided into genera.

II.—SARCOMATOUS TUMOUR.—This genus has been termed sarcoma from its distinguishing characteristic, having a firm and fleshy feel; of which there are several species, one of which appears composed principally of coagulable part of the blood, rendered very vascular by the growth of the vessels through it, without having any remarkable peculiarity in their distribution.

III. THE COMMON VASCULAR OR ORGANIZED SARCOMA.—This tumour, thus named by the late Mr. Abernethy, is of a firm fleshy feel; it is one of the most simple in its nature, and it is observable, that most tumours are at first, of the kind of stricture. It is met with in different parts of the body; in the testes, mammæ, and absorbent glands. After it has acquired a considerable size, the veins on its surface are remarkably large, and have rather a tumid appearance. Such tumours generally grow till the skin ruptures from the distention, and exposes the newly-formed substance, which frequently sloughs and falls off.

IV. ADIPOSE SARCOMA.—This tumour is also formed in the first instance by coagulable lymph rendered vascular; and the secretion of the fatty matter is the result of the peculiar arrangements and actions of the vessels. It is generally found in the cellular and adipose substance on the trunk, but sometimes on the extremities. They are generally contained within their cysts, which appear to be formed by a slight condensation of the surrounding cellular structure, unaffected by inflammation. They arrive to a very great size. Sir A. Cooper has removed one which weighed 40 lb; others have been removed which have weighed 22 and 16 lb. They appear to increase in a given ratio, and will go on

increasing for many years, but they are not noticed much in the early part of their career.

The vessels of adipose tumours are neither large nor numerous; they are readily torn, and the hemorrhage is very slight. There is no tumour that can be removed with so much dexterity and safety as this: 'It is such,' says Mr. Abernethy, "as young men who wish to distinguish themselves as operators should always be on the look out for. You have a patient apply to you with a swelling, you make an incision upon it, put in your finger, turn it round between the capsule and the tumour, and out it comes." This kind of tumour has sometimes a lobulated appearance; it looks as if it was made up of a great many little lobules, connected together by cellular membranes, and these give it an irregular feel on the surface. Such tumours are sometimes separated with difficulty; they form *adhesions* to the surrounding parts by their capsules, which also become thickened. Sometimes there are cross-bands of cellular structure, which give great trouble on trying to remove them from the tumour.

IV. PANCREATIC SARCOMA.—There is a species of sarcoma resembling the structure of the pancreas, which Mr. Abernethy has designated with the present appropriate appellation. It appears to be made of irregularly shaped masses, connected together by a fibrous substance, like the pancreas, which it also resembles in colour. It is found more frequently in lymphatic glands than in the cellular substance; very often in and about the female breast, particularly between it and the axilla, where there is an absorbent gland found, and sometimes it appears as if the gland was converted into this kind of structure; though Mr. Abernethy frequently met with it surrounded by a capsule, which induced him to consider it a distinct tumour. Such tumours increase very gradually, not tending to inflammation or suppuration. They are generally removed after having acquired a certain size, on account of the anxiety they occasion if allowed to remain.

V. CYSTIC OR CELLULAR SARCOMA.—A tumour made up of little cells or cysts, and may be named therefore the cystic, or cellular sarcoma, of which there are some varieties. It occurs fre

ently in the cells and ovary. In one kind of this disease the testis may be enlarged to six times its natural size; made up of a number of cells, containing a *serous fluid*, perhaps about the size of small grapes; it occurs frequently from a blow, and the sides of the cysts are occasionally very vascular, so as to admit of being resected. Sir Charles Blake removed a tumour of this kind from the scrotum of a boy; and it was found to consist of a number of cells containing a serous fluid.

TESTES.—In the testes, these cysts are found to contain occasionally a *caseous substance*, something like cheese in consistence, has aunctuous appearance, and is of a yellowish cast. The sides of the cyst are generally vascular, but the cysts vary in size. Mr. Cruikshank removed a testicle which contained the material just described.

III. MAMMARY SARCOMA.—A kind of tumour very much resembling the structure of mammary glands, or udders, when cut into, hence its name by Mr. Abernethy. Sometimes it has a bluish or red tint. On the whole, Mr. Abernethy thinks that this diseased structure is very liable to degenerate into an infectible ulcer, which will communicate the disease to the parts in its immediate neighbourhood. "This used to be of frequent occurrence," says Mr. Abernethy, "when Mr. Allanson's mode of dressing the parts by adhesion, after the removal of the tumour, was first introduced."

CLASSIFICATION.—Mr. Abernethy, whose arrangement of tumours is here followed, has placed this tumour in this part of it, because it appears to hold a middle place between such as are mild in their character, and those having a malignant tendency.

IV. PULPY, OR MEDULLARY SARCOMA.—This is a disease which has very frequently been found in the testicle, and has therefore been called the soft cancer of the testes. But Mr. Abernethy says it is not cancer, and that it is found in other parts of the body; consequently, says the same authority, it has no right to either of these terms; hence it was named *medullary sarcoma*, because the substance of which the tumour is composed, very much resembles the pulpy medullary structure of the brain.

SYMPTOMS.—The ulceration of the skin, on the bursting of the part

from over distension merely, and the subsequent healing of the ulcer, show that it is *different from cancer*, which communicates diseased action to the surrounding parts. Neither has it the hardness nor the disposition to ulcerate, which distinguish cancer. This disease is readily propagated in the course of the absorbents, and their glands readily assume this diseased action. It sometimes extends itself by the absorbents in a direction retrograde to the course of the absorbed fluids, which Mr. Abernethy thinks it must do by imparting an irritation to the vessels, as well as by furnishing a matter; it may, by being absorbed, communicate disease to the glands in the direct course of absorption; but the absorbents below may also become diseased. There are two kinds of pulpy material found in these tumours; one is whitish, of a milky, or more dusky hue; the other of a reddish colour, or rather of a brownish red. There are specimens of each to be seen in the Museum at St. Bartholomew's hospital.

VIII. TUBERCULATED SARCOMA.—This species of sarcoma is principally made up of a collection of small, fine, roundish tumours, of different colours, connected together by cellular substance. These tubercles vary in size, from a pea to a horse-bean of a brownish red or of a yellow tint. Mr. Abernethy most frequently observed these tumours in the lymphatic glands, particularly of the neck. They also occur in the axilla and groin; also in the glands above the collar-bone.

IX. CARCINOMATOUS SARCOMA.—This kind of tumour, on account of its peculiar hardness, is called scirrhus, while it remains free from ulceration. After such a tumour has ulcerated it is called cancer. Mr. Abernethy uses the word sarcoma for the first stage, and ulcerated carcinoma for the second. The boundaries of the disease cannot be clearly ascertained; it begins in a small spot, and extends in all directions, like rays from a centre, a circumstance by which it may be distinguished from other diseases, which at the commencement appear to involve the whole of the part in which they are found. It is generally slow but unremitting; and it excites the contiguous parts, whatever may be their structure, to the same diseased actions. In the medullary sarcoma, the disease is propagated along the course of the abso-

nts, but it does not excite the diseased action in the surrounding parts. In the tuberculated species, the ulceration, Mr. Abernethy observes, does not spread along the skin, but destroys only that part which covers the diseased glands.—*See BREAST, SCHIRROUS*, p. 96.

The circumstance of a disposition remaining in the surrounding parts to assume this diseased action, points out the propriety of removing a portion of those structures immediately surrounding the diseased part. Dr. Baillie, in his definition of this disease, says, the diseased part is peculiarly hard, that there are interstices, firm, whitish bands, which extend in all directions from the middle towards the circumference of a carcinomatous tumour, in rays diverging from a centre. It was this appearance, doubtless, which procured for it the name of cancer. Those diseased parts, projecting out of the surrounding structures, should be carefully dissected out in an operation for the removal of a carcinomatous tumour. There is no remedy for it but the knife; to forbear to operate is to consign the patient to misery.”—*Abernethy*.

—*See*.—“The ulceration and self-destroying process,” says Mr. Abernethy, “of cancer is so horrible, that a patient gets rid of a quantity of disease upon easy terms, by having it removed with the knife. Oh! a cancerous sore is dreadful; its edges are thickened, and the surface secretes a thin irritating ichor; the sore opens like a flower, as Mr. Hunter used to say. This ichor is so irritable, that Dr. Crawford was led to make some experiments to ascertain its nature; and he said that it contained the sulphuret of ammonia. He recommended chlorine as an application calculated to remove the fœtor of the discharge; carbonic acid gas has been used with the same intention, and various other preparations. Narcotics were found to be the best applications, and they are also the only medicines which soothe the sufferings of the patient.—*See CANCER*, p. 117.

TUMOURS, ENCYSTED.—Encysted tumours are so alike in all to some of the sarcomatous already described, that they are frequently taken for them; they nevertheless possess sufficient characteristics by which they may be distinguished if atten-

tively examined--that is, they may generally be distinguished prior to an operation. They have a much *smoother surface* than the sarcomatous; more *regular in shape*; and, if attentively examined, they will be found to possess a pulpy feel. The cysts of these tumours are composed of several lamellæ, which are sometimes very closely compacted. At other times they adhere very firmly to the surrounding parts; and at others, they are so loosely attached, that when an incision is made upon the cyst, the swelling starts out without further dissection.

From the nature of their different contents, these tumours have been called *steatomatous*, from the matter with which the cyst has been filled resembling fat; *meliceritious* from its resemblance to honey; and *atheromatous*, when the contents have been of a consistence between the two former.

Wens have sometimes burst, and a peculiar structure has sprouted from the sides of the cavity. Horny excrescences have in this way been produced, of which there is a very curious specimen in the British Museum. Cases have been described by Sir Everard Home, in which this horny material has been shown to proceed from the walls of the cyst. These excrescences frequently take place in quadrupeds, and the nature of such excrescences approaches very near to the structure of horn; but when they occur in the human species, they resemble more the structure of nail. The internal surface of the cyst secretes the substance of the different densities described. When a wen has burst, granulations have been arising from the surface; but they are generally flabby and not disposed to heal.

Sir Astley Cooper is of opinion that these tumours are formed by a distension of the sebaceous* follicles; or, as Mr. Abernethy calls them, "the *oil bags* of the skin." Sir Astley supposes that the mouth of the follicle becomes obstructed from some cause; that the secretion continues, and distends the follicle into a cyst, which eventually becomes lined with cuticle. He recommends a puncture to be made into the tumour, and the contents pressed out, and this plan to be repeated whenever the tumour distends again. I

* The word sebaceous (from *sebum*, suet,) means suety; and is applied to glands which secrete a suety humour.

very large, they require to be removed, and the way Sir Astley Cooper recommends this to be done is, to first lay open the cyst, empty it of its contents, and dissect it out. Mr. Abernethy does not think this so well as taking the cyst out entire, from the difficulty of getting out the cyst after it has been evacuated, on account of the adhesions which are occasionally met with. Cases are cited where, in dissecting out the cyst, it has been punctured, and a part of it left behind; yet, when the healthy skin has been brought in contact with the remaining portion of the cyst, adhesion took place, and there was no subsequent diseased action produced. These tumours have been supposed to be of the nature of hydatids; but it has been shown that they have secreting surfaces. There is also some difficulty, as stated, of distinguishing between encysted and sarcomatous tumours, although, as observed, it may be generally done. Wens of an irritable nature, or in irritable habits, ought not to be disturbed. Some individuals have a disposition to form wens in various parts of the body, and they sometimes appear to be hereditary. The greatest number of them do well; but there are some which, when they become open, produce great and sometimes fatal irritation. Some cysts become not only very vascular, but have a great disposition to bleed from their internal vessels. This hæmatodal disposition appears to be owing to a diseased state of the vessels, and was first very plainly and accurately described by Mr. Hey, who says it is a very rare disease; and who, in the course of a very long, extensive, and honourable practice, met with only three cases. "It was so rare," says Mr. Abernethy, "that the London surgeons had never met with it: I did not know it."—*Surg. Lect.*

There is a species of encysted tumour which contains a kind of seed and *hydatids*, like the cysts sometimes found in the liver. Sometimes they contain a number of granular substances of a white colour, and an oval figure, somewhat like pearl barley, or those of small currants. Mr. Abernethy considers these swellings as enlargements of the bursæ, having always found them in the situations where bursæ are known to be placed, especially about the top of the thigh and hip, the shoulder, elbow, and cla-

vicle. "From what I have seen of these swellings," observes Mr. Abernethy, "I should not be inclined to inject, or irritate them by the introduction of a tent; but to lay the part freely open, squeeze out the contents, put on a bread and water poultice, and attend to the state of the general health."

TREATMENT OF SARCOMATOUS AND ENCYSTED TUMOURS.—Sarcomatous tumours, in common with the encysted, may be considered as edifices built up by diseased actions, and which these actions continue afterwards to inhabit. The treatment of both may be regarded as the same—namely, that of reducing temperature of the part, and applying leeches when the inflammation is active, and the use of stimulants, before described, when the inflammation has quite subsided, and the tumour is of an indolent character. In all cases where tumours are formed, an increase, and sometimes, a disordered action, of the vessels which form them is supposed. In the growth and reproduction of destroyed parts, a gelatinous material is first effused, which afterwards becomes vascular; and this process is adduced as the simplest manner in which tumours form. It is probable that all tumours are at first formed in this way, but that the peculiarities which they afterwards exhibit depend upon some subsequent diseased peculiarity.—*Abernethy.*

OBS.—Although these swellings will frequently by surgical treatment remain stationary for years, by lessening increased action in and about the part by soothing applications and attention to the general health, yet they will often continue to increase in size they become sources of uneasiness and anxiety, and require to be removed; and they appear best removed in the manner here pointed out. That languid form of inflammation which builds up new structures and alters the functions of parts in the way here described, sometimes produces other effects.—*See ABSCESS CHRONIC.*

ULCERS.

DEFIN.—An Ulcer is a granulating surface, secreting matter. When perfectly healthy, the granulations of ulcers are florid, equal

add very much of the same size, arising a little above the edge of the surrounding surface; and the matter secreted is of a yellowish white colour. To produce this kind of sore it is best to apply a cautery, not very hot, which would render the granulations sodden. By this means warmth with moisture are combined, encouraging the secretion, and promoting the growth of healthy granulations.

There are several difficulties to be encountered in the healing of ulcers. The first is when the granulations are too prominent, forming what is commonly called proud flesh. This luxuriance may be prevented by applying lint over the centre of the sore, and some unctuous application to the edges. Nitrate of silver and sulphate of copper are also used with the same intention, as well as adhesive plaster; but the emplastrum thuris compositum, and the emplastrum saponis, equal parts, is a less stimulant: and more appropriate application than the latter, where the granulations are too prominent, as well as in healing a sore where the action is too great: also a piece of sheet lead, enveloped in a compress, and bound on the sore by means of a bandage is aptly applied.

The second obstacle is where the sore is languid. This is shown by its glassy aspect; the semi-transparent and bloodless appearance of the granulations in consequence of the want of action in the vessels to throw the blood to the extremities of the granulations; in fact, it marks a want of energy in the vascular system, arising from languor in the constitution; these granulations grow with greater rapidity than those of the healthy ulcer; they are larger, and do not possess that firmness of texture. The glassy appearance of this kind of ulcer is removed by the unguentum hydrargyri nitrico-oxydi, which rouses the action of the vessels and stimulates the edges of the skin to a more healthy action. More frequently under these circumstances, lotions are used, *e. g.* sulphas zinci, grs. ij. aquæ ʒij. or sulphas cupri, gr. j. aquæ ʒj. The oxymurias hydrargyri cum liquore calcis is also recently employed for the same purpose. In addition to these applications, the part should be bound tight with a roller; the patient should also be allowed a nutritious diet, with a deal of exer-

cise. The use of stimulants of the preceding kind, is to excite the languid parts to healthy action. The emplastrum galbani compositum is likewise a good application to a languid sore, and is preferable again to adhesive plaster, which frequently is the cause of considerable irritation.

The next state of ulcers presenting an impediment to the healing process, is that in which they are seen the day after a patient of this kind enters the hospital, *i. e.* in an inflamed state, giving out a sanious ichor, &c. Here poultices and fomentations, the recumbent posture, rest, &c. are absolutely necessary; purging, at the same time, the patient with the submuriate of mercury, combined with the cathartic extract, at night, and giving the sulphas magnesiae, with the infusum sennae the next morning, and applying leeches when the inflammation runs high.

The next state at which a sore may arrive, is that of gangrene, which is known at once by the usual appearance, viz. sudden diminution of pain in the affected part, livid discoloration, which, from being yellowish, becomes of a greenish hue, a detachment of the cuticle, under which a turbid fluid is effused, &c. The patient suffers much both constitutionally and locally. Here the recumbent posture is a *sine qua non* in the treatment. A slight stimulus must be given to the parts surrounding the sore, as well as to the sore itself. There is nothing equal to nitric acid in checking the progress of gangrene: the best mode of using it is 50 drops to a quart of distilled water; it may be increased to a drachm, or diminished, should it excite much pain or uneasiness on applying it, to 40 drops; but 50 drops with the above-mentioned quantity of distilled water agrees best. Sir Astley Cooper has seen this lotion produce a speedy good effect. It is applied by means of lint over which oil-skin is placed to prevent evaporation. This, he (Sir A.) observes, is the best application either in the sloughing condition of sores, or when the granulations are languid, &c. It also corrects the offensive smell, and destroys the sulphuretted hydrogen which is usually given out in this condition of sores. Nitre a drachm, to water a pint, is a good application in the preceding case; in short, all the salts in which nitric acid is combined. Sulphuric acid also has the same effect, but not the mu-

matic. Other stimulants, such as the dregs of port wine and porter, a table-spoonful of yeast to a pint of water, &c. In cases where gangrene has set in, it is necessary to have recourse to a great variety of applications, under some of which the sore, for a few days, will appear to be going on well, when it will as quickly change again to a different state; hence the necessity of varying them. At the same time, unless we attend to the constitution, very little is done by external applications: the best internal remedies are the tinctura opii and ammonia, in the following form: *Emmista camphorata* ʒj. *carbonas ammoniæ*, gr. x. *tinctura carbonomi*, ʒj. *tinctura opii*, gr. xx. Sir Astley speaks highly of this as an internal medicine, as well as of brandy and opium, which he says is the sheet anchor in gangrene. When the patient appears to be sinking, wine and brandy are to be administered, &c. The next state is that of the irritable ulcer, which is characterized by the great inequality of the granulations; the discharge, consisting of bloody pus, like strawberries and cream,—the margin of the surrounding skin is jagged—the edges everted—these, combined with pain and tenderness to the touch, the patient shrinking like a sensitive leaf from the slightest application, constitute what is called the irritable ulcer. The best application to this condition of ulcer is the *unguentum hydrargyri mitioris*, *ceratum cæci*, āā. ʒss. *pulvis opii*, ʒj. minutely mixed and spread on the ulcer. As internal remedies, calomel and opium are unquestionably the best. (Submuriæ hydrargyri, gr. 1½, opii, gr. j. twice a day morning and evening.) Sir A. observed that there was nothing so much diminished irritability as this; and that in irritable inflammation, it was the remedy most resorted to, without, however, carrying it so far as to affect the mouth. In Iritis, he (Sir A.) further observed that three grains of calomel, and one of opium, continued for the space of a fortnight or three weeks, would remove the inflammation where it had not existed for any previous length of time. There are also other acids, such, for instance, as the *extractum sarsaparillæ*, on which, however, very little could be said, other than merely that it did something towards lessening the irritability, when continued for a length of time. It does not possess a specific quality.—See GANGRENE.

I.—**ULCERS, SINUOUS.**—When a sore extends to a considerable depth, it forms a channel, and then becomes difficult to heal, for two reasons; first, as matter is secreted from the sinuous parts, it has to issue to the mouth of the sore, and necessarily breaks through any adhesion that may be formed, preventing, by this means, its sides from healing: and thus it will continue for months and years. It is the same with respect to *fistulæ in ano*. Secondly when the sinus is in the muscular parts, the action of the muscles being opposed to the closing of the sore, it is prevented from healing. This is the reason *fistulæ in ano* are so difficult to be healed; because the sides of the sinus are continually being drawn from each other by the action of the sphincter ani.

TREATMENT OF SINUOUS ULCERS.—First by injections. The best is the *tinctura lyttæ*, which produces the adhesive inflammation, and which, with pressure, causes the edges of the sinus to unite. But sinuses by the anus are not to be treated in this manner; yet Sir A. Cooper has seen two cured by an injection, first of port wine and water, and then port wine only. Secondly, when injections do not succeed, introduce a caustic bougie, and thus irritate the lower end of the sore: pressure here again must be used.

In some of these cases it is impossible to excite sufficient action; the best method then is to divide or lay open the sinus, and heal each extremity separately: pressure, however, must still be employed.

II. **ULCERS FROM EXTRANEOUS BODIES.**—When extraneous bodies are exciting inflammation, they become encysted and keep up a high degree of irritability until they are removed. In deep-seated exfoliations there is not only inflammation at the bottom of the sore, but on the surrounding parts. In cases of exfoliation we are to act chemically on the bone by means of the dilute nitric acid, &c. which stimulates and promotes a quicker separation, &c.

III. **ULCERS FROM NAILS GROWING INTO THE SKIN.**—These may exist for weeks and months, or even longer, baffling the surgeon, if he be ignorant of the principles on which to act. These sores often produce fungus by the great irritation kept up by the nail. If the fungus be removed by means of caustic, it is soon reproduced.

TREATMENT OF, &c.—The mode of cure depends upon removing the cause. The fungus requires no attention—it declines with the cause. The treatment is as follows: place the foot or hand in warm water, to soften the nail, and cut through it by degrees; it is then to be raised and a piece of lint applied under it. There is another method, viz. to pass a pair of scissors under the nail, and slit it up—this is certainly the best and quickest mode, although attended with considerable pain to the patient. A nail may so get out of harmony with the surrounding parts to which it is attached, and produce such a disordered state of them, as to cause the necessity of dissecting away the skin with which it is connected, and also the gland which secretes the nail—previous, however, to this operation the liquor calcis should be tried. A whitlow is an abscess or ulceration at the root of a nail—here it is long to make incisions, the best method is to cut away the nail confining the matter, &c.—*See PARONYCHIA.*

IV. ULCER, THE MENSTRUAL.—A menstrual sore produces a secretion of bloody matter once in three weeks or a month—this occurs in consequence of the stoppage of the menses. The plan of treatment consists in applying whatever agrees best with the sore, &c. The liquor calcis and ung. hydrarg. externally—calomel and opium internally. Five grains of Plummer's pill every night. *Castura camphorata cum ferro* $\mathfrak{z}$ jss. three times a day. Dr. Griffith's mixture, composed of myrrh, steel, zinc, &c.

V. ULCERS FROM VARICOSE VEINS.—This state of the veins is a common cause of ulceration, which is attended with much trouble and pain. Sir A. Cooper reprehends in very strong terms the division of a varicose vein, or putting a ligature upon it, in consequence of the very serious effects he has known to be produced by such means as a dangerous practice. He recommends, when the veins are much distended, to puncture them, and use the recumbent posture. The liquor calcis with the oxymuriate of mercury (one part of the former to $\mathfrak{z}$ j. of the latter) is the best application to the surface of the skin, with a bandage to make pressure on the veins. Sometimes a vein gives way—this more frequently occurs in pregnant women—a compress and bandage, with the recumbent posture, is all that is required in the generality of cases. Ulcers originate sometimes in the cellular membrane.—*See VEINS.*

VI. CHRONIC CARBUNCLE.—This arises in various parts of the body. Treatment consists in giving Plummer's pill with the decoction of sarsaparilla—the carbonate of ammonia, &c.—and for restoring the nervous power, there is no better prescription than the following, viz. $\mathcal{R}$. carbonas ammoniæ 3j.—aq. menth. virid. 3vss.—tinct. cardamon. comp. If any medicine gives power to the nervous system this does—nor does its effects soon cease if continued in for a time. In sores of females where there is considerable debility and irritability, apply the liquor calcis with calomel—and if they do not heal, touch them gently with the nitrate of quicksilver.

The skin frequently gets into a state of ulceration—the best application here is the oxymurias hydrargyri with the liquor calcis. There are other lotions, such as those made with the sulphates of zinc and copper, that may be also applied—as well as the ung. hydrarg. nit. dilut.—ung. zinci oxydi—with the oxymuriate of mercury and bark. These I have found the best means of removing cutaneous diseases. Oxymurias hydrarg. gr. j.—tinct. cinchona 3ij. is an excellent internal remedy, &c.

There are ulcers which arise on the face which frequently resist all means of treatment. Of this kind is the noli me tangere—a name importing that it must not be touched. This, however, has never been properly described. It is an inflammation of the follicles of the nose pouring out a crustaceous matter—it continues till it reaches the cartilages of the nose, when it becomes extremely difficult to heal. The method of treating ulcers of the glands of the face is by arsenical applications—these have never been found to do harm when applied over so small a surface. The following is a good formula for this purpose— $\mathcal{R}$. arsenic 3j.—sulphur 3j.—ceratum cetacei 3j. This spread on lint, and left on 24 hours, and repeated again for the same length of time, produces sloughing of the cartilages, which continues until they are separated. A saturated solution of the nitrate of quicksilver applied at the commencement is attended with much benefit. There are ulcers of the face which frequently assume the appearance of cancer, which, however, do not partake of this disease; to the application of arsenic once or twice, poultices and mild applications, they generally give way. In sores accompanying

the presence of chalk stones (urate of soda) which do not come away, their edges may be touched with the nitrate of silver, &c.

(Callous edges of sores must be adapted to their surface—the egg. hydrarg. may be used, and in the event of this not succeeding they may be scarified, or a blister applied. The edges of sores sometimes turn in, leaving a deep surface difficult to heal.

In this case stimulate the system by rousing the actions of the heart and arteries, and promoting the secretions generally—prescribing the common alteratives—and applying the nitrate of silver to the edge of the sore, and the liquor of calcis with calomel to the surface. When the edges of sores are everted it generally happens that they are of a malignant nature. The general treatment of ulcers may be expressed in a very few words—the plan adopted in the hospitals consists, on the admission of the patient, of poulticing and fomenting—using stimulating ointments, and when filled up with granulations, the adhesive plaster and roller upon Mr. Baynton's plan.

ULCERATION.

DEFIN.—The absorption of any constituent part of the body termed ulceration.

PROCESS.—Under the increased action of the vessels which accompanies inflammation, an increased deposit takes place from the arteries, and this deposit is according to the stage of the inflammation, and the part which the inflammation attacks; and the inflammation is either of the adhesive or suppurative kind, terminating in the one state by the intermediate introduction of the process of adhesion; and, in the other, in the effusion of a quantity of purulent matter from the extremities of the vessels.

INFLAMMATION.) But inflammation has not only an influence on the arteries, but also an effect on the absorbent vessels, which are thrown into a state of inordinate action whenever any considerable quantity of blood is thrown upon them. There is a natural balance between the action of the arteries and the absorbent vessels. In a state of health, and at the adult period of life, the proportion of matter deposited by the arteries, and the portion taken into the system by the absorbent vessels, are, as nearly as

possible balanced. In youth a greater quantity is poured out by the arteries than the absorbents remove; but in age a smaller quantity is deposited than absorption is taking away. It will, therefore, be found that the balance is destroyed in a different manner at different periods of life; but when a considerable and inordinate absorption takes place of some part of the body, that absorption is denominated ulceration. *See INFLAMMATION.*

CAUSES.—It was formerly thought that it was necessary to the ulcerative process, that matter should be formed; but this is not the case, as ulceration often occurs without being accompanied by any purulent secretion. The formation of matter, therefore, is not necessary to the process of ulceration. The great cause of ulceration is inflammation united with pressure. If the inflammation be considerable, and the pressure but slight, ulceration will be produced; and if the pressure be very considerable, and the inflammation but slight, still there will be ulceration. As a proof that pressure is the cause of ulceration, and that ulceration is not necessarily accompanied with the formation of matter, the example of aneurism of the aorta may be adduced, where the inflammation is very slight and the pressure very great, and where the ribs and sternum, as well as the anterior part of the spine have been absorbed by the pressure of the aneurismal sac. From these facts the conclusion is, that the formation of matter is not necessary to the ulcerative process; and that it only happens on exposed surfaces of the body, where it is necessary for the protection of sores, by covering granulations.—*See SUPPURATION.*

SYMPTOMS.—The constitutional symptoms of ulceration are slight. In general, a degree of fever attends it, but it is very slight. The pulse is under 100, and small. No considerable excitement of the constitution is present; and the fever is rather of the hectic or chronic kind, than sudden or violent in its attack. It continues sometimes for several days. The pain attending ulceration is not very considerable; if the patient be asked, he will tell you that it is of a gnawing kind, as if there were insects about the part. It may be concluded, therefore, that the irritation attending ulceration is but slight, and the pain not considerable. As regards the appearance of the ulcerated part, it looks as if it were worm-eaten: the surface is rough and very irregular. Not unfrequently a very

considerable portion of the body is removed by ulceration, such indeed is the power of the absorbent vessels of feeding, as it were, upon themselves. The ulcerative process is sometimes very rapid in its progress; and as much will be destroyed in the course of a few hours as will require weeks and months to repair. In proportion to the extent of surface destroyed will be the difficulty with which that surface is closed. Something will depend also on the form of the ulceration, and the kind of surface exposed: but the general rule is, that the difficulty of the reparative process is proportional to the extent of surface destroyed.

It is a common law, that the ulcerative process has a tendency to the nearest external surface of the body—a law attended with the most salutary effects, for, were it otherwise, the body would very frequently be destroyed by the ulcerative process. In consequence of this tendency, matter formed at a depth in the body finds its way through the integuments, instead of proceeding through the more important parts.

EXAMPLES.—Many examples have been given of this law of tendency of ulceration to exert itself outwards; and one of the most remarkable is when matter forms, which it not unfrequently does, behind the sternum close to the pleura and pericardium,—membranes that are extremely thin, and not so thick as the skin. From the proximity of these membranes, it might be expected that the matter would generally open into the pleura, and, in discharging itself into the cavity of the chest, destroy life. But, however, is not the case, for the pleura undergoes no other alteration than that of becoming thick; and while it is acquiring this additional substance, the process of absorption is going forward on the inner part of the sternum, an aperture is formed through it, and the matter makes its way through the bone and integuments, rather than through the pleura and pericardium. The same circumstance takes place with respect to the peritoneum. If matter be formed in the abdominal muscles, the peritoneum is very rarely absorbed to admit the matter into the cavity of the abdomen:—the matter makes its way through the integuments, and finds an outlet on the surface of the body. The same thing takes place in an abscess of the liver; the matter is discharged, not through the skin, which is a more remote surface, but into the

cavity of the intestines, whence it is carried off by stool, or discharged into the stomach, from which it is thrown up by vomiting. These effects are produced in the following manner:—the surface of the abscess becoming united with a portion of intestine or stomach by the adhesive process, the ulcerative action commences, by which a communication is formed between these surfaces, and the matter discharged in the manner above-mentioned, without danger, or at least with little danger to life. The same occurs in absorption of the bones. Thus in ulceration of the tibia, the matter breaks through the skin, or that surface which is only covered by skin and periosteum. This is a law partly depending on the less vitality and greater irritability of those parts which are nearest the surface of the body. The external parts of the body are the most weakly with respect to circulation, and most readily absorbed—not weakly with respect to quantity of blood, for they possess a considerable share of vascularity, but they are weakly with respect to the living powers. The external parts of the body are more irritable, and more subject to vicissitudes of action from corresponding changes of temperature than other parts of the body. They have less strength of circulation, and consequently give way to ulceration more readily than those parts which are more deeply seated, and possess a greater share of circulation. Another reason is, that the adhesive process goes on glueing the internal parts, while the external, which are thin and weak, become united to those parts, and in this way form a considerable solid. An instance of this may be adduced in the adhesion of the plura to a lung, so as to form one structure. It may be considered then as a law of the animal economy, that the ulcerative process has a disposition or natural tendency to exert itself towards the nearest external surface of the body.

Parts of the body newly formed are more liable to be absorbed than such as have existed longer. A part covered by a cicatrix proceeds rapidly to ulceration in consequence of its being more weakly constituted than those parts that preceded it. The irritability of a part is proportional to its weakness; and parts that are weak and irritable are most subject to the ulcerative process.

ILLUSTRATIONS.—When a child labours under symptoms of constitutional derangement during dentition, the gums are lanced,

for the purpose of giving a free passage to the teeth, and providing immediate relief to the child, but because, where the gum, by the adhesive process, heals upon the divided part, a cicatrix is produced by this little operation which is very readily absorbed; and the consequence is, that when the tooth rises, the child cuts with much less pain and irritation than it would otherwise have done. If a man have irritation in his leg, and this happens near a place where ulceration previously existed, the scar produced by an old ulcer gives way much more readily than the original skin. It has been observed that if a patient under gonorrhœa has had an abscess in the urethra, which now and then happens in consequence of the suppuration of the lacunæ, or if from the same cause he has had an abscess in the scrotum, or on the side of the penis, when he should get a second gonorrhœa, he will be sure to be attacked with a similar abscess; so that whatever care or caution may be employed, if there has been abscess in the first gonorrhœa, it will inevitably return in the same, on the recurrence of a second. One of the most remarkable instances of the promptitude with which the process of absorption attacks newly formed substances may be found in Lord Anson's voyage round the world. As he was obliged to sail sooner than he had anticipated, many of his crew consisted of invalids, some having scars, and others having previously had fractured bones. In doubling Cape Horn, the crew suffered severely from scurvy; and it was remarked by the clergyman, though he knew little of surgery, that those of the crew who had previously had sores, were invariably attacked with ulceration in the same parts; and that if their bones had been formerly fractured they became ununited. This is not surprising, because it is known that scurvy promotes the ulcerative process, attacking the gums, and causing profuse bleeding. When, however, fresh vegetables were procured, the men thus affected recovered their health, their bones united, and their sores healed.

The parts more remote from the heart ulcerate more readily than those in its vicinity. Thus for one ulcer in the arm twenty are observed in the lower extremities. Those parts having little power are very readily attacked by the ulcerative process; and in those to which the blood is sent more freely, this process

takes place with difficulty. This is the case with tendons which will slough to a great extent rather than become absorbed; in consequence of the very little blood they possess; and the few arteries or absorbent vessels distributed to them. This circumstance ought to influence our practice; as in abscess under the fascia, an incision should be made as early as possible to liberate the confined matter; also in abscess of the finger, when the constitution suffers, because the *theca* will not give way to the process of ulceration; and the nervous system becomes irritated by the pressure of the matter confined by it. The same practice of making an early incision, should be adopted in abscess below the palmar fascia.

USES OF THE ULCERATIVE PROCESS.—The process of ulceration is useful to the animal economy, in the removal of foreign bodies from the system. A ball for instance, lodged in the body, and a ligature round an artery, are disengaged by the process of ulceration. Exfoliation of bone is promoted by it, by separating parts that would otherwise remain in the body, for, perhaps, the remainder of life. In three or four months a considerable portion of bone will be removed by this process. In a case of popliteal aneurism in Guy's hospital, the leg sloughed a little below the calf; and almost the whole of the leg separated, except the tibia and fibula. Nothing was done, and nature herself, we believe, performed the operation of amputation without loss of blood or any danger to life.

URETHRA.

A membranous canal running from the neck of the bladder, through the inferior part of the penis, to the extremity of the glands penis, in which it opens by a longitudinal orifice, called *meatus urinarius*. In this course, it first passes through the prostate gland, which portion is distinguished by the name of the *prostatical urethra*; it then becomes much dilated, and is known by the name of the *bulbous part*, in which is situated a cutaneous eminence, called the *caput gallinaginis*, or verumontanum, around which are ten or twelve orifices of the excretory ducts of the prostate gland, and two of the spermatic vessels.

the remaining part of the urethra contains a number of triangular mouths, which are the lacunæ, or openings of the excretory ducts of the mucus glands of the urethra. For diseases of the urethra (GONORRHOEA, STRICTURES, &c.

URINARY ORGANS. *See* BLADDER, &c.

URINE, INCONTINENCE OF.

CAUSES.—Inflammation of the bladder, during which the quantity secreted is extremely small, with a constant desire to expel it. This is called incontinence of urine. It takes place, however, under circumstances where the immediate cause is not so obvious. It is also means uncommon in young subjects, particularly children during the night. It would appear that in these instances there is a condition of the bladder similar to that of chronic or slight inflammation, which may be excited by the presence of urine longer retained, from negligence, than it ordinarily is—inasmuch that the contraction of the bladder, which in the natural state is a kind of involuntary motion, takes place more readily than under ordinary circumstances—the bladder contracts, and the urine is evacuated during sleep without disturbing the patient.

TREATMENT.—Regulate the diet, mode of living, stomach, and bowels; and in the plurality of instances a stop is put to the action. If further measures be necessary, the warm, tepid, and cold baths, may be employed in succession: and should these fail, the application of a blister to the lower and anterior part of the abdomen in the vicinity of the bladder.

CAUSES.—Incontinence of urine may occasionally arise from mechanical causes, *e. g.* calculus may be so lodged in relation to the orifice of the urethra, as to close up a portion of it, and leave the rest open for the constant escape of the water.

URINE, RETENTION OF.

CAUSES.—Diminution of nervous influence, as in cases of serious injury to the spine, from fracture of the spinal column, or compression of the chord. Loss of contractile power of the mus-

cular coat; the bladder then becomes distended, and requires to be contracted in the usual way. In elderly persons the sensibility of the bladder seems to be diminished, so that they do not feel the necessity of voiding the urine as young persons do. Neglecting the first call, for want of convenience, the bladder becomes distended, the desire perhaps goes off, a large quantity of water accumulates, and the bladder rises up to the umbilicus, and even higher; and when the patient is in a convenient place and attempts to void it, he finds himself totally incompetent to do so.

TREATMENT.—Introduce the catheter and relieve the patient at intervals until such time as the bladder recovers its contractile tone. Some weeks may elapse in this way; and where the bladder has been over distended, it is of the greatest importance to use the catheter, and to continue that introduction, so as to enable the muscular coat of the bladder to recover its natural contractile power, in order to prevent patients from being reduced to the very serious and unpleasant state of not being able to relieve themselves by their own natural efforts. For the operation, when necessary, see PARACENTESIS VESSICÆ.

UTERUS.

The Womb. A spongy receptacle, resembling a compressed pear, situated in the cavity of the pelvis, above the vagina, and between the urinary bladder and rectum.

The uterus is liable to many diseases, the principal of which are retroversion, and its falling down, hydatids, dropsy of the uterus, moles, polypi, ulceration, cancer, &c.

UTERUS, INVERSION OF. This case may either be complete or incomplete. When it is incomplete, the fundus only passes through the *os tincæ*. When complete, the uterus becomes entirely turned inside out, passing through the opening in its cervix, dragging along with it a part of the vagina, and descending more or less far down, sometimes even between the patient's thighs.—*Cooper's Surg. Dict.*

CAUSES.—Mostly produced by (though not always) unskilful

and violently pulling away the placenta after delivery. A tendency to this accident is very common in women who have been once afflicted with it.

TREATMENT.—Restoration of the uterus to its proper place before it contracts, without which perpetual barrenness can only ensue, and the person be subject for life to a difficulty of walking, and other maladies. This accident, as Windsor observes, happily admits of remedy, if any intelligent person be present to replace the uterus; for if this be done immediately, and the hand of the accoucheur be retained in the cavity of the organ, until it has contracted, and the patient afterwards confined to the recumbent posture, she will generally do well. Mr. Windsor's opinion is, that the placenta ought to be extracted after the reduction of the womb.—*See Med. Chirurg. Trans. Vol. X. p. 360.*

OBS.—When the inverted uterus cannot be reduced, many die, while others survive subject to an oppressive sense of weight, and frequent hemorrhages, which bring on great emaciation. One of the most afflicting consequences of this accident is so considerable an inflammation of the part, as to induce a danger of its mortifying.

UTERUS, PROLAPSUS OF.—The womb being situated in the upper and middle part of the pelvis and but imperfectly secured in its natural place by means of its broad and round ligaments, it not unfrequently descends into the smaller cavity of the pelvis, so as to pass more or less down the vagina, or even protrude itself beyond the labia pudendi. The first case is the incomplete, the second the complete Prolapsus Uteri.

UTERUS, RETROVERSION OF.—By this term such a change of the position of the uterus is understood, that the fundus is turned backwards and downwards upon its cervix, between the vagina and rectum, and the os uteri is turned forwards to the pubis, and upwards, in proportion to the descent of the fundus, so that, by an examination *per vaginam*, it cannot be felt, or not without difficulty, when the uterus is retroverted. By the same examination there may also be felt a large round tumour occu-

pying the inferior part of the cavity of the pelvis, and pressing the vagina towards the pubis. The following works may be advantageously consulted on these accidents of the womb:—*Sabatiere Med. Operatoire. Newnham, on the Symptoms, Causes, and Treatment, &c. J. Windsor, Obs. on, &c. with a Case of Extirpation. Med. Chir. Trans. Vol. X. p. 358, &c. Denman's Plates of a Polypus, &c. Dr. Baillie's Series of Engravings, Cooper's First Lines, &c. &c.*

UVULA.

The small conical fleshy substance hanging in the middle of the *velum pendulum palati*, over the root of the tongue.* It is subject to several kinds of enlargement, in which it becomes both longer and more bulky than natural, or is simply elongated. Under these diseased conditions, it consequently becomes troublesome in deglutition, and when the individual is speaking, and causes a disagreeable tickling at the root of the tongue, frequent retching, and an irritating and annoying cough. When things have attained this height medicines are frequently of no avail, and the only remedy consists in removing a portion of the uvula by means of a pair of scissors.

VARICOCELE.

A swelling of the veins of the scrotum, or spermatic chord: hence it is divided into the *scrotal-varicocele*, which is known by the appearance of livid and tumid veins in the scrotum, and varicocele of the spermatic chord. It mostly arises in consequence of excessive walking, running, jumping, wearing of trusses, and the like; producing at first only a slight uneasiness in the part, which, if not remedied, continues advancing towards the loins.—See *HERNIA, TRUSS, &c.*

VARIX, *see* VEIN, VARICOSE.

* The uvula is composed of the common membrane of the mouth, and a small muscle much resembling a worm, which arises from the union of the palatine bone, and descends to the tip of the uvula. It was called *Palato-Staphylinus*, by Douglas, and *Staphylinus Epistaphylinus*, by Windsor. When the uvula contracts it raises itself up.

VEINS.

A long membranous canal, which continually becomes wider, does not pulsate, and returns the blood from the arteries to the heart. They have a muscularity and an elasticity suited to their functions, and are subject to disease.

WEINS, VARICOSE.—A dilatation of a vein. A disease known as a soft tumour in a vein which does not pulsate. (*See ULCERS.*) Varicose veins mostly become serpentine, and often form a plexus of knots, especially in the groins and scrotum. This disease is relieved by cold applications, pressure from bandages, and by ligature. This disordered action of the veins (*varices*) is most commonly observed in the lower extremities, and reaches sometimes far up as the abdomen. They have, however, been noticed in the upper extremities, and it is probable that the whole venous system is susceptible of the affection. Mechanical obstructions, worms, &c. are the principal causes. See *Hodgson on the Diseases of Arteries and Veins*; *Travers on Wounds and Ligatures of Veins*; *Medie, in Med. Chirurg. Trans. Vol. VII. p. 195*; *Delpech Traite des Maladies, &c.*

VENEREAL DISEASE. *See* SYPHILIS.

VERTEBRÆ, DISEASES OF.

The spinal column is subject to disease sometimes originating from an ulceration of the intervertebral cartilages, sometimes in a diseased action of the cancellated structure of the bodies of the vertebræ, followed by a more or less complete loss of the power of supporting the legs, ultimate deformity, &c. The true cause of the disease is a morbid state of the spine, and some of the parts connected with it, *which distempered state of the parts will, upon careful enquiry, be always found to have preceded the deformity some length of time*; in infants, this is the sole cause, and external violence has nothing to do with it.—(Cooper, in *Surg. Dict.*) Mr. Pott, however, does not assert that external mischief is always and totally out of the question; though he ventures to affirm what is equal as far as regards the true nature of the case, which is, that although accident and violence may, in some few instances, be allowed to have

contributed to its more immediate appearance, yet the part in which it shows itself must have been previously in a morbid state, and thereby predisposed for the production of it. "I do not mean by this," observes Mr. Pott, "to say that a violent exertion cannot injure the spine, nor produce a paralytic complaint—that would be to say more than I know, but I will venture to assert, that no degree of violence whatever is capable of producing such an appearance as I am now speaking of, unless the bodies of the vertebræ were, by previous distemper, disposed to give way; and that no supposable dislocation, caused by mere violence done to the bones of the back, before the receipt of the injury, in a sound state, can possibly be attended with the peculiar symptoms of a curved spine."

Mr. Brodie agrees with Mr. Pott and other surgeons on the fact, that the actual curvature must be preceded by a disease of the parts, unaccompanied with any visible deformity, and that it cannot take place until the caries has made considerable progress. "The distortion," says Mr. Brodie, "of the spine is usually of a peculiar kind, and such as nothing can produce except disease of one or more of the bodies of the vertebræ."

Curvature of the spine, in the direction forwards, may arise from other causes, as a weak condition of the muscles, or a ricketty affection of the bones. In general, in such cases, the curvature occupies the whole spine, which assumes the form of the segment of a circle. At other times, however, it occupies only a portion of the spine, usually that which is formed by the superior lumbar and inferior dorsal vertebræ. But here the curvature is always gradual, and never angular, a circumstance by which it is to be distinguished from caries. Lateral curvatures of the spine are alleged generally to incline to the right side; and the fact is referred to the undue power which is acquired by the more general use of the right arm, and of other muscles, in the performance of the voluntary actions.—See *Brodie on Diseases of the Joints, &c.* *Baynton on the Diseases of the Spine.* *Copeland on Diseased Spine.* *Wilson's Lectures on the Skeleton.* *Pott, Dessault, and others, touching Diseases of the Vertebral Column.*

TREATMENT.—To endeavour to arrest the disease of the spine

means applied in the vicinity of the morbid parts. Instead of caustic issues, the French surgeons use the moxa, and sometimes repeated cupping near the affected bones, both of which means are strongly recommended by Dessault. Another practice, which yet has partisans, though it was strongly disapproved by Mr. Pott, is that of supporting the spine with machinery. This practice is, we believe, never advised, on the supposition of there being *any dislocation*, an error which formerly prevailed. And Mr. Brodie observes, that "certainly no machines ought ever to be employed for the purpose of elongating the spine and correcting the deformity; but, if they be used to take off the weight of the head, chest, and upper extremities, from the diseased part of the spine, they may sometimes be of service. The late Sir James Blandin had a very favourable opinion of their utility. In the first instance, however, they ought never to be employed for the purpose of superseding the constant maintenance of the horizontal position; though they may be rendered advantageous when circumstances make it desirable that the patient should begin to sit up a part of the day.—The recumbent position, quiet and rest, blisters, &c.

WHITLOW *see* PARONYCHIA.

WOUNDS.

DEFIN.—A wound is defined to be a recent solution of continuity in the soft parts suddenly occasioned by external causes, and generally in the first instances accompanied with the loss of a greater or lesser degree of blood.

In general, wounds are subject to a great variety in their nature, degree of danger, facility of cure, and the consequences which are apprehended from them. Some are perfectly trivial, and do not extend deeper than the skin and cellular membrane; others are more serious, and penetrate the muscles, tendons, large blood-vessels, and important nerves. There are likewise certain wounds confined to soft parts, but which injure even the bones, such, for instance, are many sabre-wounds which frequently separate at the base both a portion of the scalp and the subjacent part of the

skull; many of the head, chest and abdomen, injure the organs contained within those cavities. The varieties, in fine, and the degree of danger attending wounds in general, depend very much on some of the following circumstances :

1. The extent of the injury.
2. The kind of instrument with which the wound has been inflicted.
3. The violence which the fibres of the part have suffered, in addition to their division.
4. The magnitude and importance of the blood-vessels and nerves which happen to be injured.
5. The nature of the part wounded as regards its general power of healing favourably, or otherwise.
6. Whether the operations of the system at large, and life itself, can be well supported or not, while the functions of the wounded parts are disturbed, interrupted, or suspended, by the accident.
7. The youth or advanced age of the patient; the goodness or badness of his constitution, and the opportunities there may be of administering proper surgical assistance, and the like.

DIVISION OF WOUNDS.—By surgical authors wounds are distinguished into several kinds, as follows :

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|---------------|-------------------|
| 1. Incised. | 4 Lacerated. |
| 2. Punctured. | 5 Poisoned, and |
| 3. Contused. | 6 Gunshot wounds. |

a. Incised wounds.—Wounds made with a sharp cutting instrument are invariably attended with less hazard of dangerous consequences than any other description of wound ; though generally they bleed more freely than either the lacerated or contused ones, which sometimes at first scarcely pour out any blood, although important blood-vessels may have been injured ; but this circumstance, instead of diminishing the danger, seems deceitful, and serves rather to render the case in reality more perilous, by taking the inexperienced practitioner off his guard against after-hemorrhage. Thus, in gun-shot wounds, it frequently occurs, that, when they first happen, the bleeding is comparatively trivial ; but, the side of some large artery having suffered considerable violence at the time of the accident, it may, a week or ten

ess afterwards ulcerate, or slough; and an alarming, and even fatal effusion of blood, be the consequence.—*See AMPUTATION.*

TREATMENT.—In simple recent incised wounds, the surgeon has three objects to keep in view, which he should endeavour to accomplish without loss of time. The first and most important, and which demands immediate interference, is to check the hemorrhage; 2ndly, to remove all extraneous matter; and 3rdly, to unite, if possible, by the first intention, the opposite sides of the wound, (*see ADHESION*). When the vessels that are divided are above a certain dimension, the hemorrhage soon spontaneously ceases, consequently no surgical measures are requisite on this particular account; when they are somewhat larger, and their situation is favourable for compression with a bandage, it is often possible to close the wound by the application of compresses and roller, rather than have recourse to ligatures, which always produce a certain degree of irritation and suppuration.—*See AMPUTATION.*

The best common means of keeping the surfaces of divided parts in due apposition, is with strips of adhesive plaister; and in adopting this method, the wounded limb or parts are to be placed in the position the most favourable for that purpose. With respect to sutures, as they create pain and some degree of irritation, they ought, indeed, never to be adopted, if the parts can possibly be kept in contact without them.

Contused and lacerated wounds.—Instead of the fibres in these wounds having been divided by a cutting instrument, they have been torn asunder by some violence capable of overpowering their cohesive force. The edges of this description of wounds, instead of being straight and regular, are jagged or unequal. These two species of wounds so much resemble each other, and require so nearly the same kind of treatment, that by surgical writers they are usually treated of together.

TREATMENT.—The treatment of contused wounds, whether they be simple and slight, or complicated and severe, require the same employment of debilitating means, in order to guard against inflammation. Cold water and ice; and general and topical bleeding, are the means usually resorted to with success. Vulne-

rary lotions, camphorated spirits, and other spirituous applications are improper, and if their pernicious effects be not always visible, it is only because the contused injuries have been trifling, and in their nature perfectly easy of cure. In these cases, as well as in those of extravasations and glandular swellings, Professor Assalini gives a preference to cold applications. The internal remedies and regimen, he also observes, should, in like manner, be adapted to the condition of the patient.

OBS.—Professor Assalini, reasoning on this plan of treatment, says, that the operation of cold retards the course of the blood, which, meeting only with damaged vessels, augments the extravasation as it continues to flow. By lessening the temperature of the part, cold applications likewise diminish the danger of inflammation and sphacelus, at the same time that they have the good effect of rendering the suppuration, which must ensue, less profuse than it would be, were not the extravasation of blood, and violence of the inflammation, lessened by such applications, and a lowering plan of treatment.—(*Manuale di Chirurgia, Parte prima, p. 17.*) But, as Mr. Cooper justly observes, (see *Surg. Dict. Art. Wounds,*) cold applications, in cases of contused wounds, are chiefly to be preferred for the first day or two, in order to check the increase of extravasation and inflammation. After this period, a decided preference is given to an emollient linseed poultice, which will be found the most easy dressing during those processes, by which the sloughs are detached, the surface of the wound cleansed, and the origin of granulations established. When these changes have happened, the remaining sore is to be treated on the same principles as ulcers in general.—See ULCERS.

c. *Punctured wounds.*—A wound thus denominated, signifies one made with a narrow-pointed instrument, the external orifice of the injury being small and contracted, instead of being of a magnitude proportioned to its depth. An example of this kind of wound may be adduced by that which is inflicted with a sword, bayonet, or other pointed instrument.

TREATMENT.—The first indication on the treatment of a punctured wound is to guard against inflammation. When the hemorrhage has not been considerable, general and topical bleeding

should be put in practice, followed by the antiphlogistic plan of treatment. And as it is impossible to say whether such wounds will unite or not, and as no harm can result from the attempt, the wound ought to be closed, and covered with simple dressings. In such cases cold applications are highly commendable. Perfect rest is enjoined; and when the pain is severe, opium is to be administered.

1. Poisoned Wounds. Under this denomination are arranged the bite of poisonous serpents; punctures in dissection; the stings of bees, wasps, and hornets, &c.

TREATMENT.—As regards the bites of serpents, if the bites of mad dogs, and other rabid animals be excluded, wounds of this description are not very common in the British Isles. Those, however, inflicted by the rattle-snake in America, and the cobra-de-capello of the East Indies are the most speedily mortal. With us the bite of the viper of the serpent tribe, inflicts the worst poisoned wound ever met with. Excision of the bitten part is the safest remedy in all these cases. *See New London Medical and Pharmaceutical Pocket Book, for the treatment of these, and stings of insects, under art. POISON.*

As regards the treatment of the punctures made with dissecting scalpels, the Continental surgeons recommend immediate cauterization of the part, with a grain of caustic potass, or the solid muriate of ammonia. Tonic remedies, particularly wine, are prescribed, and great attention paid to the evacuation of the bowels.

PROGNOSIS OF WOUNDS; and first of wounds of the thorax.*

The thorax or chest, is exposed to every description of wound, the importance of which particularly depends on their situation. Those which do not extend beyond the integuments do not

The thorax or chest is a cavity of an irregularly oval figure, bounded in front by the sternum, laterally by the ribs, posteriorly by the vertebræ of the neck, above by the clavicles, and below by the diaphragm, a very powerful muscle, which forms a kind of partition between the cavity of the thorax and the abdomen.

differ from common wounds, and, when properly treated, are seldom followed by any bad consequences. On the other hand, those which penetrate the cavity of the pleura, even by the slightest opening, may produce the most alarming symptoms. And wounds injuring any of the thoracic viscera, are always to be considered as placing the patient in a state of considerable danger. Hence it follows that wounds of the thorax may very properly be divided into three kinds.

1. Those affecting only the skin and muscles.
2. Those entering the cavity of the chest, but injuring none of its contents.
3. Those injuring the lungs or other viscus.

On a surgeon being called to a recent wound of the chest, his first and principal care should be to ascertain whether or not the weapon has penetrated the pleura; and, in order to arrive at this conclusion it is recommended—

1. To place the individual wounded in the same posture he was in at the time the wound was inflicted; the depth of the part to be ascertained by means of the finger or probe.
2. To examine the weapon, if such can be procured in time for that purpose, to see how much of it is stained with blood.
3. To inject fluid into the wound, and to see whether it be thrown back, or retained within the cavity.
4. To notice the colour and quantity of the blood discharged from the wound, and whether any be coughed up.
5. To examine whether air escapes from the wound in respiration, and whether there is any emphysema. Lastly,
6. The condition of the pulse and breathing are to be taken into consideration.

OBS.—Wounds, from their nature, may be either slight, dangerous, or mortal. By a slight wound is meant one in which there are no parts injured that are important to the carrying on of life, or any of its functions, and whose uniform course is to heal quickly, and to leave no lesion or deformity. A dangerous wound implies one which, without being mortal, is still not exempt from danger, and presents more or less difficulty in its cure. Lastly, mortal

wounds comprehend those whose consequence and effect is death.

1. — Fracture of the ribs, if not complicated with sharp points pricking inwardly, is not absolutely dangerous, although there is even some impediment to respiration, and some apprehension of inflammation. But should the rib be much splintered, and the points not be reducible, it may end fatally.

2. *Penetrating wounds* are not in general dangerous, unless combined with fracture of the ribs, or the rupture of some blood-vessels. Internal hemorrhage and emphysema is often a dangerous and even fatal symptom.

3. Wounds of the lungs are dangerous, and the prognostic is always doubtful when the injury has been inflicted at the upper part of the thorax, or at the posterior side near the junction of the ribs with the vertebræ. The symptoms here require the strictest attention, as no case should be despaired of. These organs are also subject to concussion, which is termed *wind concussion*, and is usually fatal.

4. Fractures, luxations, and contusions of the vertebral column, are highly dangerous, and may sooner or later prove fatal.

5. Wounds of the heart, of its ventricles, and auricles, are mortal; though numerous cases are upon record where life has been prolonged for a considerable time after the infliction of the injury.

6. It is difficult to conceive of the pericardium being wounded without a correspondent injury to the heart; but if it be wounded separately, it is to be deemed a highly dangerous wound.

7. Wounds of the aorta and vena cava are fatal.

8. It is hardly possible that the thoracic duct can be wounded without affecting the vital parts, but if it should occur, it must be deemed fatal, as the chyle instead of passing in its ordinary course, is diffused into the cavity of the thorax.

9. For reasons similar to the above, the lower part of the œsophagus is scarcely, if ever, wounded separately; but if so, it is certainly mortal, as it prevents the proper passage of the food, and totally impedes the function of nutrition.

10. Wounds of the vena azygos* are mortal, as they are attended with a hemorrhage which it is impossible to suppress.

11. Wounds of the diaphragm, if made with a sharp pointed instrument, such as a sword, are dangerous, if only the muscular part be injured; but if the tendinous ones are also injured, they are considered fatal.

OBS.—As a general deduction from these remarks, it may be observed, that the prognostic in wounds of the thorax is, in most cases, an unfavourable one, although they are not often mortal, unless some primary organs be injured. John Bell, indeed, directs his pupils never to call any wound mortal, unless it be plainly a wound of the heart.

II. WOUNDS OF THE ABDOMEN.—Like those of the thorax, wounds of the abdomen are divided into external and penetrating wounds. The former are to be deemed simple, unless they have been accompanied with a violent shock of the system, or are of large extent. Penetrating wounds are to be dreaded, either from touching the periosteum, and thereby causing inflammation, or for producing ventral hernia; and in the latter case, the apprehension will be graduated on the nature of the viscus that has passed out, and the inflammation and strangulation that accompany it.

1. Wounds of the stomach are to be deemed highly dangerous, although there has been great diversity of opinion concerning their mortality.

2. It will not appear surprising that sudden death should be the consequence of a blow on the epigastric region, when it is recollected that it is the seat of the solar plexus, and of the semilunar ganglion, parts especially subservient to life: and also that on dissection no inflammation of the stomach and the other organs should in this case be found.

3. Wounds of the intestines are less to be dreaded than those

* The Greek word azygos signifies—having no fellow; several single muscles, veins, bones, &c. are so called. The vena azygos, or *vena sine pari*, is situated in the right cavity of the thorax, upon the dorsal vertebræ. It receives the blood from the vertebral, intercostal, bronchial, pericardiac, and diaphragmatic veins, and evacuates it into the vena cava superior.

off the stomach, and the instances of recovery are infinitely more numerous. Those of the smaller intestines are infinitely more dangerous than those of the larger, not only because they perform more important functions, but are supplied with a greater number of nerves.

4. Wounds of the mesentery cannot be deemed mortal, unless some of the large blood-vessels of the organ, or its principal glands be injured; and in these cases the danger arises from not being able to suppress the hemorrhage, or to supply the loss of the chyle.

5. Wounds of the omentum are to be estimated like those of the mesentery; but it deserves remark, that a contusion is apt to induce inflammation and gangrene.

6. Wounds of the pancreas seldom occur unless some other viscus be injured at the same time. If it should happen separately, the cause must have been an instrument entering at the back, and its wound cannot be considered as mortal unless some arterial or venous branches have been injured.

7. Wounds of the liver are generally mortal, and their fatality originates in some blood being injured, or in the consequences that ensue.

8. Wounds of the gall-bladder are deemed absolutely mortal, as its fluid is stimulating to a high degree, and occasions inflammation, and violent pain.

9. Wounds of the various ducts are mortal.

10. Wounds of the spleen are to be estimated like those of the liver: if deep and penetrating, death will follow from hemorrhage. There are, however, many cases of recovery from injury to this organ. It is a common circumstance in cases of sudden death from accidents, falls, &c. to find the spleen or liver lacerated, and therefore, to be deemed a fatal injury.

11. Wounds of the kidneys have often been successfully treated; they are, however, dangerous according to their depth, and the admission of urine (if any) into the abdomen. So also with wounds of the ureters.

12. Wounds of the bladder would not seem to be very dangerous, if we look at the success which ordinarily attends the operation of

lithotomy. They may, however, prove hazardous, from the effusion of its contents, or the injury done to the blood-vessel. Wounds of the neck and sphincter of the bladder are apt to leave incontinence of urine.

13. Wounds of the uterus are dangerous in proportion to the hemorrhage that follows, and the symptoms that supervene. If that organ be impregnated, the danger of course is increased.

OBS.—In all these instances of wounds of the abdomen, the danger is aggravated from extravasation, and this again is increased according to the nature of the fluid, which may be either blood, chyle, bile, fœcal matter, or urine. Extravasation of blood, is often within the power of the surgeon, but its consequences nevertheless are always to be dreaded. The other evacuations can scarcely, if ever, except in the case of the urine, be remedied by means of operations, and are hence generally mortal.

Wounds of the testicles are dangerous, particularly if accompanied with contusion, or injured by a sharp pointed instrument.

III. WOUNDS OF THE EXTREMITIES.—These are to be decided upon according to their nature, but the majority of them are not dangerous.

1. Wounds of tendons are generally tedious, and when cured are often followed by a loss of substance, and a want of mobility in the parts.

2. Compound fractures are sometimes hazardous—as also fractures near articulations, or parts surrounded by large masses of muscles. Comminuted fractures are extremely tedious in their cure. Finally, fractures in young persons, and in those who are in good health, are more readily healed than in old persons, valetudinarians, and pregnant women.

3. Wounds complicated with dislocations sometimes induce alarming symptoms, as also those in which an important nerve is divided. The prognosis, however, is favourable, unless serious symptoms supervene in the disease, and which are referrible to it.

4. Wounds of arteries and veins are not at the present day considered dangerous by modern surgeons, if timely aid be afforded; but under other circumstances, a wound of a large artery may prove fatal. The system may be injured, or so much blood

may have been lost, as to render assistance of little value. It is extremely rare that wounds of the veins prove dangerous, except the brachial or femoral ones be wounded near the trunk. Wounds of the articulations are generally to be dreaded, and the apprehension is increased when they are complicated, as for example, contusion, hemorrhage, or fracture. Finally, the prognostic from wounds occasioned by fire-arms, is, in all cases, more serious than those from wounds inflicted by cutting weapons.

IV. WOUNDS OF THE HEAD.—The prognostic in these instances, more so than in any other part of the body, is more uncertain. The general prognostic of wounds of the head depends on the nature of the injured part—the age and condition of the patient—the nature of the instrument with which the wound has been inflicted—the force and violence used—the manner in which it was applied, and the effects that followed. A wound of the integuments of the cranium, if inflicted with a cutting instrument, such as a knife or razor, may be deemed a simple wound, which will heal in the space of a few days; but if the instrument, although a cutting one, is of great weight, and has been propelled by a strong arm, our prognostic should be reserved, on account of the subsequent affection of the brain, which may truly be dreaded. If a sharp pointed instrument has been used, and it has penetrated as far as the bone, the inflammation and pain that follow are more severe than from incised wounds. When a contused wound has been inflicted, as by a stick or stone, the prognostic will depend much on the immediate symptoms, and it will be dangerous in proportion to the dizziness, nausea, insensibility, &c. that are experienced for a short time afterwards. A superficial contusion, accompanied with laceration and none of the above symptoms, may generally be deemed a slight wound. But a contusion, however slight, on the region of the temporal vessels, is scarcely ever exempt from danger, on account of the intimate connexion of this part with the brain, by means of its nerves, blood-vessels, and membranes.

Wounds of the pericranium in good constitutions, and well-treated, are not dangerous; but in bad ones, they are often serious, and are succeeded by an erysipelatous inflammation, which

is readily extended to the brain. A complete division of the pericranium is much less to be dreaded than a wound from a sharp-pointed instrument. In venereal patients caries of the bone is a frequent consequence of such injuries.

2. Fracture of the bones of the cranium may take place without any correspondent injury of the integuments, and the symptoms in such cases are extremely equivocal and deceitful. One deduction, however, must be drawn from the circumstances that immediately followed the infliction of the wound—from those that afterwards supervened, and from a consideration of the causes producing them. Among the first are vertigo, loss of sense and motion, vomiting, and bleeding from the nose and ears. Among the latter may be coma, convulsions, and paralysis. Fracture may, however, occur without any of these being present; and again they may all be present, without any fracture, and result from concussion of the brain.

OBS.—It should be remembered that fracture, accompanied with depression of the bone, is usually more dangerous than when none is present. Concussion of the brain is always dangerous, as are also all wounds of the brain and its membranes. It is, however, proper to remark, that the prognostic of wounds of the head, is, for the most part, that they are dangerous, and require the strictest attention. And this is rendered more necessary, since it has often happened that injurious and even fatal consequences have been produced long after the infliction of the injury, and that too where the immediate symptoms have given little or no reason for such a termination.—*See HEAD, INJURIES OF, &c.*

V. WOUNDS OF THE FACE are more or less dangerous according to the part injured, but in considering these, it is also necessary to take into account the deformity and irregular cicatrices that follow. Superficial wounds of the face are easily healed, but when deep, and attended with much loss of substance or denuding of the bones, they are tedious, and leave considerable deformity.

1. Wounds of the forehead, in which the frontal muscles are divided transversely, or of the eye-brows, cause the upper eye-lid to fall down, and may produce a lasting debility of the parts.

2. Wounds of the eye, when of considerable extent, must always be deemed dangerous, from the nature of that organ, and from the immediate connection between it and the brain. A wound with a sharp-pointed instrument has been known to pass through the orbit and prove fatal. Wounds of the transparent cornea always leave a scar, and intercept vision. Wounds of the iris cause a loss of sight, and if the instrument penetrates to the vitreous humour, the eye is left empty, thus combining blindness with deformity.

3. Wounds of the nose, from a cutting instrument, leave great deformity, and particularly if the cartilaginous part be injured—if struck with a round instrument, or by a blow, it may not only be crushed, but the sense of smell may be destroyed. The ethmoid bone has been driven in this way upon the brain. Lastly, a sharp-pointed instrument has sometimes penetrated the nose, reached the brain, and hence proved fatal.

4. Wounds of the external ear are not accompanied with danger, but the deformity is serious. Wounds of the internal ear either destroy hearing, or, from their vicinity to the brain, prove in themselves dangerous.

5. Wounds of the lips, if there be great loss of substance, not only deform but are injurious to the speech, and are sometimes accompanied with a constant flow of saliva, particularly when any of the glands have been opened.

6. Wounds of the ranular artery sometimes occur in children, when dividing the frænum, and where the hæmorrhage cannot be suppressed, they have been known to prove fatal.

7. Wounds of the parotid gland are always tedious in curing, and they sometimes become fistulous.

REMARKS.—In all cases of the wounds of the face, the surgeon should state in his report, the degree of deformity that has been produced.

II. WOUNDS OF THE NECK.—Wounds in this part of the body vary considerably with respect to danger. Wounds of the integuments and muscles of the neck, may be considered as simple wounds; but it must be added that they generally heal with difficulty, in consequence of the mobility and looseness of the parts. Transverse cuts may indeed prove dangerous; and

affect the motions of the head, or of the pharynx* or larynx†, and thus prove an impediment to the due exercise either of speech or of deglutition. Wounds of the pharynx and œsophagus are peculiarly dangerous, as other important parts are generally divided along with them; but even if injured alone, or from stabs or gunshot wounds, they are much to be dreaded, since the nourishment of the system must be carried on through them, and the action of deglutition is directly opposed to a speedy adhesion of parts. Even wounds of a portion of the fibres surrounding the œsophagus are dangerous, inasmuch as they induce a weakness of the action of deglutition, and also by the inflammation that supervenes, tend to induce compression on the trachea. Wounds of the larynx are serious injuries, as they derange or weaken the voice. A wound of the recurrent nerve alone, on one side, seriously affects this organ, but if both be divided, a complete muteness will follow. Injuries, however, of this description, if not of a complicated nature, cannot be considered mortal.

Penetrating wounds of the trachea are always dangerous, since, from its nerve being in a quiet state, it is difficult to promote a speedy reunion. Numerous cases, however, prove that a partial division is not mortal, but it is allowed that a complete division is generally so; and principally from the vessels that must be divided to accomplish this, than from the injury itself.

Wounds of the par vagum, either on one or both sides, are absolutely fatal.

* The muscular bag at the back part of the mouth. It is shaped like a funnel, adheres to the fauces behind the larynx, and terminates in the œsophagus. Its use is to receive the masticated food, and to convey it into the œsophagus.

† A cartilaginous cavity, situated behind the tongue, in the anterior part of the fauces, and lined with an exquisitely sensible membrane. It is composed of the annular or curved cartilage, the scrutiform or thyroid, the epiglottis, and two arytaenoid cartilages. The superior opening of the larynx is called the glottis. The *laryngeal arteries* are branches of the external carotids. The *laryngeal veins* evacuate their blood into the external jugulars. The nerves of the larynx are from the eighth pair. The use of the larynx is to constitute the organ of voice, and to serve also for respiration.

Fractures of the cervical vertebræ are highly dangerous, and if the spinal marrow be injured, they are fatal.

Luxation of the neck is generally fatal, from pressure on the same part.

Wounds piercing the vertebræ, or passing between them, are suddenly mortal.

Injuries of the neck from contusion, are always dangerous, and should they end in death, must be judged of by the appearances that are found on dissection, as extravasated blood, laceration, &c.

WRY-NECK. (*Obstipitis*.)

An involuntary and fixed inclination of the head towards one of the shoulders.

CAUSES.—Any cause destroying the equilibrium between the sterno-cleido mastoidei muscles, will produce a wry-neck; for instance, when one of them is affected with spasm, and acts more powerfully than the other, it draws the head towards the shoulder of the sound side; but when one sterno-cleido mastoideus is paralytic, while the other only retains its natural power, the balance of action is equally destroyed, and the sound muscle inclines the head towards the nearest shoulder. But although the wry-neck may occasionally depend on the state of the sterno-cleido mastoidei muscles, the case is far from being frequent. This deformity more often is the consequence of some affection of the integuments.

TREATMENT.—In paralytic cases electricity (see *Philos. Trans. Vol. LXVIII. p. 97*, and *Gilby, in Lond. Med. Journ. Vol. IV. 1790*.) leeches, stimulating liniments, the shower-bath, sea-bathing, setons, moxa, and attention to the general health, hold out the fairest prospect of relief. If the operation be requisite, then division of the tendons of the sterno-cleido mastoideus muscle; or, perhaps, the most prudent mode of operating is the division of the tubercular portion of the contracted muscle, and even to cut out a sufficient piece, to remove all chance of the ends uniting again. It could easily be accomplished by means of a director and curved scalpel, after making the requisite division of the skin with a common scalpel.—See *Cooper's Surg. Dict. p. 1269*. *Sharp's Treatise of the Operations of Surgery*. *Chirurgical Works of Dr. Gooch, Vol. II. p. 8*. *B. Bell's System of Surgery, &c. &c.*

OBS.—Mr. Abernethy remarks, that “cases of wry-neck are no uncommon occurrence, and they seem to indicate undue action of the sterno-cleido mastoideus.”—“As to wry-necks in general (Mr. A. further observes) they are the result of the irregular action of the muscles; and many muscles are concerned in the production of the wry-neck. Now in those cases of wry-neck which result from the irregular action of muscles, if the sterno-cleido mastoideus be chiefly affected, what is to be done? Why you must endeavour to tranquillize the muscles. There are many of those cases entirely the result of a disturbed state of nerves, and I believe, caused by disordered digestive organs. But there are cases of wry-neck where people have their necks twisted, and the muscles put into such an irritable state of action, that the case do not yield quickly, even to what I (Mr. Abernethy) should consider the most judicious and appropriate treatment.”—*Surgical Lectures, St. Bartholomew's Hospital.*

GLOSSARIUM.

Those marked with a star thus *, may also be consulted in the body of the work under their respective heads.

AA. 1. In composition this letter, the *a* or *alpha primitiva* in Greek, signifies without; thus, *aphonia*, without voice; *acaulis*, without stem; *aphyllus*, without a leaf, and the like.

2. **A. AA.** Abbreviations of *ana*, which signifies of each, a word used in prescriptions after the mention of two or more ingredients, equal quantities of which are to be taken.

ABAPTISTON. The crown of the trepan, thus named by the ancient surgeons from its having a conical shape, which prevented it from penetrating the skull too rapidly, and plunging its teeth into the dura mater and brain.—*Abaptista* means the same.

ABARTICULATION. A species of articulation of bones which admit evident motion. See **DIARTHROSIS**.

ABDOMEN. The belly. The largest cavity in the body.

ABERRATION. A deviation from the ordinary course of nature.

ABLUEENT. That which washes away any impurity adhering to the surface.

ABRASION. A term usually employed to import the destruction of the natural mucus of any part, as the stomach, intestines, and urinary bladder, &c. Also to any part slightly torn away by attrition in collusion with hard bodies, as the skin, &c.

ABSCCESS.* A departure of parts previously in a state of continuity. See **APOSTUME**.

ABSCISSION. 1. The cutting away of some morbid or superfluous part, with an edged instrument. 2. Formerly used by medical writers to denote the sudden termination of a disease in death, before it arrives at the decline.

ABSORBENTS. Small, delicate, transparent vessels, which take, and absorb substances from the surface of the body, or from any cavity,

and carry them to the thoracic duct, and thence to the blood. They are denominated, according to the fluids they convey, lacteal, or lymphatics, which *see*.

ABSORPTION. The taking up of substances applied to the mouths of absorbing vessels.

ABSTERGENT. ABSTERSIVE. An application to cleanse foul ulcers.

ACATAPOSIS. (Composed of a negative, and the Greek word to swallow.) Difficult deglutition.

ACCELERATION. The augmentation of the motion of bodies in general.

ACCIPITER. A bandage which was put over the nose: so called from its resemblance to the claw of a hawk, or from the tightness of its grasp.

ACHOR. A species of scald head, called also *lactumen*, *abas*, *cerion*, *favus*, and *crusta lactea*. It is called achor from the branny scales thrown off it.

ACINUS (*Surg.*) A granulation of flesh. *Anat.* Glands which grow together as grapes do.

ACME. The height or crisis of a disease. The ancients divided diseases into four stages. 1. *Arche*, the beginning; 2. *Anabasis*, the growth; 3. *Acme*, the height; 4. *Paracme*, the decline of the disease.

ACNE. A small pustule or pimple, (*see* PUSTULES) sprouting out usually at the time the body is in full vigour. The same as *ionthos* and *varus* of some writers. An eruption of *passulæ* on the face, especially the forehead and chin, as well as on the shoulders, neck, and breast, it seldom descends to the lower part of the trunk, or extremities.

ACOR. Acidity and acrimony. It is occasionally adopted to express that sourness in the stomach the consequence of indigestion whence flatulencies and acid eructations are generated.

ACROPIS. Imperfect articulation from a fault in the organ of speech.

ACROTICUS. Affecting the external surface.

ACROTISMUS. Defect of pulse. Pulselessness. Acrotism.

ACTION. The operation or exertion of an active power. Fa-

ality, power, or function of the body. e. g. 1. The vital functions. 2. The natural functions. 3. The animal actions.

ACTIVE. Possessing the power of acting with energy, for instance, we say, an active medicine, as opposed to one that is passive.

ACTUAL. Applied to any thing having the property or virtue of acting by an immediate power inherent in it: e. g. a red hot iron or fire is called an actual cautery, in contradistinction to caustics, which are called potential, (*see* ESCHAROTICS.*) Boiling water is actually hot; brandy producing heat in the body, is potentially hot, though of itself cold.

ACTUAL CAUTERY. *See* ACTUAL.

ACUPUNCTURE. Ramming a needle into a part affected with pain. Still practised in the Eastern nations; and lately tried with rather equivocal benefit in this country, in cases of chronic rheumatism.

ACUTENACULUM. The handle of a needle to make it penetrate easily when stitching a wound. Heister calls the *portaiguille* by this name.

ADENOGRAPHY. A treatise on the glands. *See* GLANDS.*

ADHESION. (*Surg.*) Inflammation. Generally speaking, the state of two bodies which are joined or fastened together either by mutual attraction, the interposition of their own parts, or the impulse or pressure of external bodies.

ADHESIVE. Having the property of sticking.

ADHESIVE INFLAMMATION. *See* INFLAMMATION.*

ADIPOSE. Fatty. Adipose membrane, &c.

ADSTRICTION. Occasionally used to express a constipated state of the body: and often synonymously with astringent.

ADULT. The distinction between adolescence and maturity.

ADUST. An old surgical term; formerly used the same as cauterization, and means the application of any substance to the body which acts like fire. With the ancients, particularly the Arabs, adustion was in great repute as a remedy in local diseases.

ADVENTITIOUS. Accidental. Any thing not in the common course of natural causes: e. g. adventitious diseases, that is, not

hereditary. Adventitious membranes, or membranes of unexpected spontaneous occurrence.

ÆGYLOPS. A disease so called from the supposition that goats were subject to it. A sore just under the inner angle of the eye. Considered by the best modern surgeons as only a stage of fistula lachrymalis.

ÆTIOLOGY. The doctrine of the causes of diseases.

AGARIC. A fungus growing on the oak, and formerly in great estimation as a styptic. *See* HEMORRHAGE.*

AGENT. That whereby a thing is done or effected; or that which has a power whereby it acts on another, or by its action induces some change in it.

AGGLUTINATION. The process of adhesion. The union or sticking together of substances.

ALBUGO. A white opacity of the cornea. The white of the eye. *See* LEUCOMA.*

ALCAHEST. An Arabic word to express an unusual dissolvent which was pretended to by Paracelsus and Van Helmont.

ALGEDO. A violent pain about the anus, perinæum, testes, urethra, and bladder, arising from the sudden stoppage of a violent Gonorrhœa.

ALPHONSIN. The ancient name of an instrument for abstracting balls.

ALVEOLAR. Appertaining to the alveoli, or sockets of the teeth.

AMBLYOPIA. Dimness of sight according to Hippocrates, to which old people are subject. Others, and among them the best modern writers, seem to think it the same as the incomplete amaurosis.

AMPHIARTHROSIS. An articulation, so called from its partaking of both diarthrosis and synarthrosis. A mixed species of connection of bones, which admits of an obscure motion, as is observed in the metacarpal and metatarsal bones,—the vertebræ.

ANABROSIS. A corrosion of the solid parts, by sharp and biting humours.—*Galen.*

ANACATHARSIS. An expectoration of mucus, or a purgation by spitting.—*Hippocrates and Galen* both use the word in this sense.

ANACLASIS. A repletion or renovation of the members.—*Hippocrates.*

ANANCE. (From the Greek verb to compel) Necessity. Applied to any desperate operation.

ANAPHRODISIA. Impotence. Want of the generative power.

ANAPLEUSIS. The rotting of a bone, so that it drops off and lies upon the flesh.—*Hippocrates, Ægineta, &c.*

ANAPNEUSIS. Respiration.

ANASARCA. Dropsy from serous fluid collected between the skin and flesh in the cellular membrane of the limbs, or any other part of the body.

ANASTAMOSIS. The communication of vessels with one another.

ANATOMY. The dissection or division, of organised substances, to expose the structure and function of parts, that is, of the human body; in contradistinction to comparative anatomy.

ANATOMY, COMPARATIVE, or dissection of brutes, fishes, polypi, mollants, &c.

ANATRESIS. (From the Greek *to perforate*.) A perforation like that which is made upon the skull by trepanning.

ANCHYLOSIS. A stiff or anchylosed joint. It is divided into the true and spurious, according as the motion is entirely or partially lost.

ANGEIOLOGY. A dissertation, or discourse on the vessels of the body.

ANIMALCULE. Creatures, the true figure of which cannot be discerned without the help of glasses, or more especially to such as are invisible to the naked eye.

ANIMATION. The particular effect produced by the *vis vitæ*, by which life is begun and supported.

ANTIPERISTALTIC. Whatever obstructs the peristaltic motion of the intestines.

ANTIPHLOGISTIC. A term applied to such medicaments, plans of diet, &c. as tend to oppose inflammation.

APHRODISIAC. That which excites a desire for venery.

APONEUROSIS.* A tendinous expansion.

APPARATUS. A term applied to the instruments, preparation, and preliminary arrangement of every thing necessary in the performance of any operation, surgical, medical, or chemical.

APPENDICULA. A little appendage.

APPENDIX. An appendage. That which belongs to any thing.

APPROXIMATE. To bring into contact or close together.

ARTHRITIC. Pertaining to the gout.

ARTHRITIS. Inflammation of a joint.

ARTHRODIA. A species of moveable connection of bones, where the head of one bone is received into the superficial cavity of another, so as to admit of motion in every direction; for instance, the head of the shoulder-bone with the glenoid cavity of the scapula.

ARTHRODYNIA. Pain in a joint.

ARTHROPUOSIS. A collection of pus. Applied also to other affections.

ARTICULAR. Belonging to a joint.

ARTICULATION. The connection of the bones of the skeleton. Anatomists distinguish three kinds of articulations; namely, 1. *Diarthrosis*. 2. *Synarthrosis*. 3. *Amphiarthrosis*, which see.

ASCITES. Dropsy of the belly.

ASPHYXIA. Total suspension of the power of the mind and body from various causes.

ASSIMILATION. The conversion of the food into nutriment.

ASTHENOLOGY. The doctrine of diseases arising from debility.

ASTRINGENT. That which, when applied to the body, renders the solids denser and firmer by contracting their fibres, independently of their living or muscular power. The acids, alum, lime-water, chalks, certain preparations of copper, zinc, iron, lead, &c. are the principal of this class.

ATHEROMA. An encysted tumour thus named, containing a soft pulpy substance of the consistence of a poultice.

ATONY. Weakness, or defect of muscular power.

ATROPHY. Wasting away of the flesh from various causes.

ATTENUANT. That which has the power of imparting to the blood a more thin and fluid consistence than it previously had possessed, such, for instance, as water, whey, and all aqueous fluids.

AUSCULTATION. The act of listening. In a medical point of view it imports attending to the sound or noise which the several parts of the body give when struck, or without any percussion, in

order to form a judgment of the condition of those parts. See *Corbe's Translation of Laennec, on Diseases of the Chest.*

AUXILIARY. Assisting or helping, and applied to means which co-operate in curing diseases, and to parts which assist others in performing certain functions.

B.

BILIARY. Of or belonging to the bile.

BINOCULUS. The name of a bandage for keeping bandages on both eyes.

BISTOURY. A small knife for surgical purposes.

BLENORRHAGIA. A discharge of mucus.

BLENORRHŒA. A discharge of mucus from the urethra and vagina, though equally applied to discharges of the same kind from the nose, throat, bronchiæ, or bowels. There are three distinct species of this affection; the *simple*, *chronic* and *venereal*.

BLEPHAROPHTHALMIA. An inflammation of the eye-lid.

BLEPHAROPTOSIS. A falling down of the upper eye-lid, so as to cover the cornea. See *Ptosis*.

BLOOD-LETTING. Every artificial discharge of blood, in whatever manner abstracted, comes under this appellation. See *preceding.**

BRONCHIAL. Belonging to the windpipe or bronchia, as artery, and, &c.

BURSOLOGY. The doctrine of the bursæ mucosæ. See p. 110.

C.

CACHEXY. A bad condition or habit of the body, known by a depraved or vitiated state of the solids and fluids.

CALEFACIENT. That which excites a degree of warmth in the parts to which it is applied; as pepper, spirits of wine, &c, belong to the class of stimulants.

CALORIC. Heat. Latent heat. The igneous fluid.

CAPILLARIES. The capillary tubes. The very small ramifications of the arteries which terminate upon the external surface of the body, or on the surface of internal cavities, are called capillaries, because they appear as small as hairs.

CARRIES. Foul. Corroding. A term formerly applied to such condition of ulcers and soft parts, but now universally used to

express a denuded state of a bone; tending probably to a dead state, though, in all probability, the vitality may not have left it.— See *Necrosis*.*

CARTILAGE.—A white, elastic, glistening substance, growing to bone, and commonly called gristle.

CARUNCLE. A little fleshy excrescence variously situated.

CATAXIS. Division of parts by an instrument.

CATLING. A long, narrow, double-edged, sharp-pointed knife, chiefly used in amputations of the leg and fore-arm, for dividing the interosseous ligaments and the muscles.

CATOPSIS. An acute and quick perception; and formerly applied to the acuteness of the faculties which accompanies the latter stages of consumption.

CATOPLER. An instrument resembling that called *speculum ani*.

CATARRH. Fluxion to the lung, or bronchia. The terms *catarrhus*, *bronchus*, and *coryza*, are now considered as synonymous, though formerly otherwise; and hence the following distinctions:

“*Si fluit ad pectus dicatur rheuma catarrhus;*

Ad fauces bronchus, ad nares esto coryza.”

CELOTOMIA. The operation for strangulated hernia, by cutting.

CERATATOME. A name given to a knife, by *Baron Wenzel*, which he used in operations of the eye.

CHARACTER. A term in use in every department of science, meaning an assemblage of marks, or symptoms, by which one thing is known and distinguished from others.

CHEVASTER. A double-headed roller, applied by its middle below the chin; then running on each side, it is crossed on the top of the head; then passing to the nape of the neck, is there crossed; it then passes under the chin, where crossing, it is carried to the top of the head, &c. until it is all taken up.

CHONDROLOGY. A discourse on cartilages.

CHRONIC. Of long continuance of a disease. The antithesis of acute.

CINERITIOUS. Of the colour of ashes. Applied to the cortical substance of the brain, from its resemblance to the colour of ashes.

(CIRSOCELE. An enlarged or varicosed vein. A morbid or varicose distention and enlargement of the spermatic veins.

(COLLIQUATIVE. Any excess of evacuation which melts down, as it were, the strength of the body; hence, colliquative perspiration, diarrhœa, &c.

(COLLUVIES. Filth. Excrement. The discharge from an old ulcer.

(COLPOCELE. A hernia or tumour situated in the vagina.

(COMMUNUTE. Broken into pieces: applied to fractures.

(COMPAGES. A suture or joint. A commissure.

(COMMISSURE. A suture, juncture or joint. A term anatomically applied to the corners of the lips where they meet together; and also to certain parts of the brain.

(COMA. A propensity to sleep. Lethargic drowsiness.

(COMATOSE. Having a strong propensity to sleep.

(COMPRESS. Soft linen, lint, or other substances folded, for the purpose of being placed over parts which require a regular pressure.

(CONCRETION. The growing together of parts which, in a natural state, are separate; as the fingers and toes.

(CONDYLE. A round eminence of a bone in any of the joints.

(CONDYLOMA. Soft warty excrescences about the verge of the penis and pudendum of both sexes, *plur.* condylomata.

(CONGESTION. An unnatural collection of blood, mucus, bile, &c. in their proper vessels or other places.

(CONTRACTION. Applied, pathologically, to stiffened joints.

(COUNTER-APERTURE. A counter opening. An opening made opposite to one that already exists.

(COUVRE-CHEF. The name of a bandage.

(CLOUCHING. A surgical operation that consists in removing the cataract lens out of the axis of vision, by means of a needle constructed for the purpose.

(COUNTER-FISSURE. A fracture in a part opposite to that on which the blow is received; as when the frontal bone is broken by a blow on the occiput, where the bone remains sound. The *contre-coup* of French writers.

CONVALESCENCE. The recovery of health after the cure of a disease.

CORROBORANT. Whatever gives strength to the body. Tonics. Bark, wine, beef, cold bath, &c.

CUBITAL. Belonging to the fore-arm.

CYPHOMA. CYPHOSIS. A gibbosity, or curvature of the spine.

CYSTEOLITHUS. A stone, either in the urinary or gall-bladder.

CYSTIC. Belonging to the urinary or gall-bladder, *e. g.* cystic duct, cystic bile, &c.

CYSTIRRHAGEA. A discharge from the bladder.

CYSTITOME. An instrument for cutting or opening the capsule of the crystalline lens.

CYSTOCELE. Hernia formed by the protrusion of the urinary bladder.

D.

DARTOS. By this word is understood the muscular or condensed cellular substance lining the scrotum ; by means of which, the skin of the latter is corrugated and relaxed.

DECUSSATION. When nerves or muscular fibres cross one another, they are said to decussate.

DECUSSORIUM. An instrument to depress the dura mater, after trepanning.

DEFENSIVE. Applied, surgically, to plasters and dressings for wounds.

DELAPSION. The falling down of any part, as the rectum, womb, &c.

DENUATION. The act of making bare, generally applied to a bone.

DEPASCENT. Eating away ; corroding ; applied formerly to phagedenic ulcers.

DEPENDENT. Hanging down.

DEPRESSION. The condition of a part that has fallen or broken down : *e. g.* depression of the skull, lower jaw, palate ; also applied to an operation for cataracts.

DERMA. A Greek word signifying the skin.

DERMATOLOGY. A discourse or treatise on the skin.

IDIARTHROSIS. A moveable connection of bones. This genus of articulation has five species; namely, enarthrosis, arthrodia, aglymus, trochoides, and amphiarthrosis.

IDIASTASIS. A separation: applied to the ends of bones; as that which occasionally happens to the bones of the cranium in some cases of hydrocephalus.

IDIASTOLE. The dilatation of the heart and arteries.

IDIASTOMOSIS. A dilatation—or the instrument that dilates.

IDIASTREMA. A distortion of any limb or part.

IDIATASIS. The extension of a fractured limb, in order to reduce it.

IDIATERESUS. A perforation or aperture.

IDIATHESIS. A particular state of the body: *e. g.* in inflammatory fever, there is an inflammatory diathesis, and during putrid fever a putrid diathesis.

IDIETETIC. Relating to diet.

IDIGESTIVES. Substances applied to wounds to promote suppuration; namely, certain resins, warm poultices, fomentations.

IDIPLOE. The spongy substance between the two tables of the skull.

IDIRECTOR. *Surg.* A hollow instrument for guiding an incisor &c.

IDISCRIMEN. A small roller.

IDISCUTIENT. Substances which have the power of repelling or resolving tumours.

IDISLOCATION. Luxation. The secession of a bone or a moveable articulation from its natural cavity.—See *Dislocations*.*

IDORSAL. Belonging to the back.

IDUCTUS. A canal or duct.

IDYSPEPSIA. Indigestion.

E.

EEBRASMA. A painful fiery pimple.

EECOPROTIC. An opening medicine; generally applied to one, the operation of which is very gentle; such as manna, senna, and like.

EECRINOLOGY. The doctrine of secretions.

EEFUSION. The escape of any fluid out of the vessel, or viscus,

naturally containing it, and its lodgment in another cavity, as in the cellular substance, or in the substance of parts.

ELONGATION. An imperfect laxation, where the ligament is only lengthened, and the bone not put out of its socket.

EMBRYO. The fœtus in utero, is so called before the fifth month of pregnancy, because its growth resembles that of a budding plant.

EMBRYOTOMY. The separating of any part of the fœtus whilst in utero, to extract it.

EMUNCTORY. The excretory ducts of the body are termed emunctories; thus the exhaling arteries of the skin constitute the great emunctory of the body.

ENARTHROSIS. A species of diarthrosis or moveable connection of bones, in which the round head of one is received into the deep and round cavity of another, so as to admit of motion in every direction; as the head of the *os femoris* with the acetabulum of the *os innominatum*.

ENCEPHALOCLE. A rupture of the brain.

ENCEPHALON. The cerebrum; by others the whole contents of the brain.

ENCYSTED. A tumour consisting of a fluid or other matter, enclosed in a sac or cyst. See *Tumours*.*

ENTERIC. Belonging to the intestines.

ENTERO. Names compounded of this word belong to things which resemble an intestine; or to parts connected with, or diseases of some part of, the intestine.

ENTERON. The bowels.

ENTEROCELE. An intestinal rupture or hernia. Every hernia may be so called that is produced by the protrusion of a portion of intestine, whether it be in the groin, navel, or elsewhere. See ENTERO. *Hernia*.*

EPIPLO. (The *Omentum*.) Names compounded of this word belong to parts connected with, or disease of the omentum or epiploa.

EPIPLOCELE. An omental hernia.

EPISTASIS. A suppression of the natural secretions.

EPISTAXIS. Bleeding at the nose.

EPULOTIC. That which promotes the formation of skin.

EROSION. A word often used in the same sense as ulceration;

namely, the formation of a breach, of continuity or chasm in the substance of parts by the action of the absorbents.

ERROR LOCI. A term introduced by Boerhaave from an opinion which he entertained of the vessels being of different sizes, for the circulation of blood, lymph, and serum; and that when the larger sized globules were forced into the lesser vessels they became obstructed by an error of place.

ERYSIPELATOID. Resembling the erysipelas.

ERYTHEMA. Simple redness, according to Hippocrates. Rash or inflammatory blush without fever. *Cullen.* A lesser degree of erysipelas. *Callisen.* A nearly continuous redness of some portion of the skin, attended with disorder of the constitution, but not contagious.—*Willan.*

EXPELLENT. That which drives morbid humours out of the body.

EXTRACTION. The removal of extraneous substances from the body, such, for instance, as bullets and splinters, from wounds; stones from the urethra or bladder. Sometimes the term is also surgically applied to the removal of tumours from the seat of their formation, &c.

EXTRAVASATION. A term applied to fluids that are out of their proper vessel; *e. g.* when blood is effused on the surface or into the ventricles of the brain, it is expressed by the word extravasation, &c.

EXTREMITY. A term applied to the arms and legs. The upper and lower extremities, in the human subject; and the anterior and posterior in animals.

EXULCERATION. Commonly applied to the first stage of ulceration.

EXUVIÆ. Applied to the casting of the skin of serpents.

F.

FASCIA. 1. A bandage, fillet, or roller. 2. The tendinous expansion of muscles, which bind parts together.—See *Apoapophyses*.*

FAVOSUS. (From *favus*, a honeycomb). Applied to some eruptive diseases, as *Porrigio favosa*, which is covered with a honeycomb-like secretion.

FEBRIFUGE. Any thing having the property of abating fever.

FIBRE. The muscular fibre. A very simple filament or component part of muscular substance.

FOLLICLE. A little bag. Applied to glands.

FOMES. Fuel; and when applied to diseases it is either to their remote or efficient causes, or to the infection contained in woollen or cotton materials, or other substances. FOMITES. The same.

FONTICULUS. An issue. An artificial ulcer formed in any part by cutting a portion of skin, and a discharge kept up by the daily introduction of a pea covered with any digestive ointment.

FORCEPS. A pair of surgical pincers used to extract extraneous substances and the like, from the body. Also the name of an instrument used in midwifery to bring the head of the fœtus through the pelvis.

FOSSA. A small depression, or sinus.

FUNICULUS. A little cord.

FURFURACEOUS. Applied to the bran-like sediment occasionally deposited in the urine.

G.

GASTER. The stomach properly so called.

GASTRIC. Appertaining to the stomach.

GASTRO. Names compounded of this word are connected with the stomach.

GASTROCELE. Hernia of the stomach, occasioned by a protrusion of that viscus through the abdominal parietes.

GASTROCOLIC. A term applied to a vein proceeding from the stomach to the colon.

GASTRODYNIA. Pain in the stomach.

GASTRORAPHY. The sewing of wounds of the abdomen.

GASTROTOMIA. The operation of cutting open the abdomen.

GIBBOSITY. Crookedness.

GLAND. *See* p. 365.

GLENOID. The name of articulate cavities of bones.

GLOMER. A clue of thread: mostly applied to glands.

GLOSSO. Names compounded of this word belong to muscles.

erves, or vessels, in consequence of their being attached, or going to the tongue.

(GLOSSOCELE. A retraction of the tongue.

(GLOSSOCOMA. Retraction of the tongue.

(GLUTEAL. Belonging to the buttocks.

(GOMPHOSIS. A kind of immoveable connexion of bones, in which one bone is fixed in another, like a nail in a piece of wood; as the teeth, for instance, in the sockets or alveoli of the jaws.

H.

(HÆMATAMESIS. A vomiting of blood: the consequence of bruises, blows, falls; some internal stimulant.

(HÆMATOCELE. A swelling of the scrotum or the spermatic cord, proceeding from or caused by blood.

(HÆMATOLOGY. The doctrine of the blood.

(HÆMATURIA. The voiding of blood with urine.

(HÆMOPTÆ. Spitting of blood.

(HÆMORRHAGE. A bleeding or flow of blood from a part.

(HÆMORRHOIDS.* Piles.—*See* p. 406.

(HEPATIZATION. Resembling the substance of liver: applied to any thing, but originally to the lungs. The cause of this singular change of structure in the lungs is either natural, or it is introduced during life by an ecchymosed state of the part. The natural change is produced after death, from the transudation and extravitation of the blood.—*See* ECCYMOSES.*

(HEREDITARY. Transferrable from parents to their offspring, as a disease, or a predisposition to a disease.

(HIDROCRISIS. A judgment formed from the sweat of the patient.

(HOMOGENEOUS. Uniform; of a similar kind or quality. The opposite of heterogeneous.

(HORRIPILATION. A sense of creeping or shuddering in various parts of the body.

(HYBRID. A production of two different species of animals or plants. In the former instance a mule is one product. Neither hybrid animals nor the seeds of hybrid plants propagate their species.

HYDATID. A tumour or vesicle consisting of a membrane distended with a water-like fluid.

HYDRAGOGUE. A medicine so termed which possesses the properties of increasing the secretions or excretions of the body, so as to promote the removal of water from any of its cavities—such as cathartics and the like.

HYDRIODATE. A salt consisting of the hydriodic acid, combined in a definite proportion with an oxide.

HYDROCYSTIS. An encysted dropsy.

HYDROPHYSOCELE. A swelling formed of water and air. It was applied to a hernia, in the sac of which was a fluid and air.

HYDROCIRSOCELE. Circocoele, with dropsy of the scrotum.

HYO. Names compounded of this word belong to muscles which originate from or are inserted into, or are connected with the os hyoides.

HYPERCATHARSIS. An excessive purging from medicine.

HYPEREPHIDROSIS. Immoderate sweating.

HYPOCHONDRIAC. Belonging to the hypochondria. A person affected with lowness of spirits.

HYPOCHONDRIUM. That part of the body which lies under the false ribs.

HYPOGASTRIC. Belonging to the hypogastrium.

HYPOGASTRIUM. The part of the abdomen that reaches from above the pubes.

HYPOPYUM. An accumulation of a glutinous yellow fluid, like pus, which takes place in the anterior chamber of the aqueous humour, and frequently also in the posterior one, in consequence of severe acute ophthalmia, particularly the internal species.

HYPOTHENAR. The part of the hand which is opposite to the palm.

HYPOTHESIS. An opinion, or a system of general rules, founded partly on fact, but principally on conjecture.

HYPOTHETON. A suppository, or medicine introduced into the rectum to procure stools.

HYSTEROCELE. Hernia of the womb.

HYSTEROPHYSA. A swelling or distension of the womb, from a collection of air in its cavity.

HYSTEROTOMY. See *Cæsarean Operation*.*

I.

IDIOPATHIC. A disease, which does not depend on any other disease, in which respect it is opposed to a symptomatic disease, which is dependent on another.

IDIOSYNCRASY. A peculiarity of constitution, in which a person is affected by certain agents, which, if applied to a hundred other persons would produce no effect: thus some persons cannot witness the bleeding of a finger without fainting; and thus violent inflammation is induced to the skin of some persons by means of substances perfectly innoxious to others.

ILIAC. Belonging, situated near to, or connected with parts about the flanks.

ILLUSION. Error of the imagination.

INANITION. Applied to the body or vessels, it means emptiness; and as regards the mind, it implies a defect of its powers.

INCRASSANT. Having the property of thickening the fluids.

INDICATION. That which demonstrates in a disease what ought to be done. It is three-fold: *preservative*, which preserves health; *curative*, which expels a present disease; and *vital*, which respects the powers and reasons of diet.

INDIGENOUS. Applied to diseases, plants, and other objects which are peculiar to any country.

INDURANT. A medicine which hardens.

INFIBULATION. An impediment to the retraction of the penis.

INFLAMMATION. A disease characterised by redness, attended with more or less heat and pain, tumefaction and fever.

INFUNDIBULUM. 1. A canal proceeding from the valve of the ureter to the pituitary gland in the sella turcica. 2. The beginnings of the excretory duct of the kidney into which the urine is first received, from the secretory cryptæ.

INOSCULATION. The running of the veins and arteries into one another, or the interunion of the extremities of the arteries and veins.

INTERCOSTAL. Lying between the ribs.

INTEROSSEOUS. Lying between bones.

INTUSSUSCEPTION. A disease of the intestinal canal, and, most frequently of the small intestines. It consists in a portion of gut passing for some length within another portion.

INVERSION. Turned inside outward.

IRRITABILITY. The contractility of muscular fibres, or a property peculiar to muscles, by which they contract upon the application of certain stimuli; without a consciousness of action.

IRRITATION. The action produced by any stimulus.

J.

JUGAL. Appertaining to the cheek. e. g. os jugale.

JUGULAR. Belonging to the throat.

L.

LACHRYMAL. Of or belonging to the tears, or parts near where they are secreted; as lachrymal bone, duct, gland, &c.

LAPAROCELE. A rupture through the side of the belly.

LARYNGISMUS. LARYNGEAL. Belonging to the windpipe.

LARYNGOTOMY. *See* BRONCHOTOMY.*

LASSITUDE. A feeling or sense of weakness and debility, independent of fatigue.

LATERTIOUS. A term applied to the brick-dust like sediment occasionally deposited in the urine.

LAVIPIDEUM. A bath for the feet.

LENTICULAR. Spherical or convex on both sides.

LETHARGY. A heavy and constant sleep with scarcely any intervals of waking: when awakened, the person answers, but, ignorant or forgetful of what he said, immediately falls off into the same state of sleep.

LEUCOMA. Often used synonymously to denote a white opacity of the cornea of the eye.

LINCTUS. A loch, a lambative. A soft and somewhat oily substance, of the consistence of honey, which is licked off the spoon, it being too solid and adhesive to be taken otherwise.

LINGUAL. Of or belonging to the tongue.

LIPAROCELE. That species of sarcocele in which the substance constituting the disease very much resembles fat.

LIPOMA. A solitary, soft, unequal, indolent tumour, arising from a luxuriance of adeps in the cellular membrane.

LIPPITUDO. A chronic disease, frequently the result of an acute form of ophthalmitis. It consists of an exudation of a puriform humour from the margin of the eyelids.

LITHIAS. A lithiate or salt, formed by the union of the lithic acid, or acid of the stone, sometimes found in the bladder of animals with salifiable bases: thus *lithiate of ammonia*.

LITHONTURPTIC. Having the power of dissolving stone in the bladder—still, however, a desideratum in medicine.

LITHROSIS. 1. The formation of stone or gravel. 2. A tumour of the eyelid, under which is a hard concretion resembling a stone.

LUMBAR. Belonging to the loins, as lumbar region.

LYMPH. The liquid contained in the lymphatic vessels.

M.

MADAROSIS. A defect or loss of eyebrows or eyelashes, causing a disagreeable deformity, and painful sensation of the eyes, in strong light.

MALACOSTEON. A disease of bones (*mollities ossium*) wherein they can be bent without fracturing them, in consequence either of the inordinate absorption of the phosphate of lime, from which their natural solidity is derived, or else of the matter not being fully secreted and deposited in their fabric.

MALARIA. The Italian name of an endemic intermittent which attacks people in the neighbourhood of Rome, and especially about the Pontine Marshes, which have frequently been found to carry off the decomposing animal and vegetable substances that diffuse their *aria cattiva* (unwholesome air) over the adjacent country.

MALIGNANT. Applied to any disease, the symptoms of which are so aggravated as to threaten destruction to the patient. It is frequently used to signify a dangerous epidemic.

- MAMMARY. *Mammillary*. Appertaining to the mamma or breast.
- MARASMUS. Wasting away of the flesh.
- MASTICATORY. A medicine intended for chewing.
- MASTOID. Nipple-like. Applied to certain processes of bones, as the mastoid process of the temporal bone.
- MAXILLA. The jaw, both upper and lower.
- MAXILLARY. Appertaining to the jaw.
- MEATUS. An opening which leads to a canal or duct, *e. g.* Meatus auditorius, the passage of the ear, &c.
- MEDIAN. A term applied to vessels, &c. from their situation between others.
- MEDIASTINUM. The membranous septum, formed by the duplicature of the pleura, that divides the cavity of the chest into two parts. It is divided into an anterior and posterior portion.
- MEDITULLUM. *See* DIPLOE.
- MEDULLARY. Resembling marrow.
- MELICERIS.—A tumour of the encysted kind. *See* TUMOUR.*
- MELOSIS. A term frequently occurring in Hippocrates (*de capitis vulneribus*) for that search into wounds which is made by surgeons with the probe.
- MELOTIS. A little probe for cleansing the ear, commonly called *Auriscalpium*.
- MEMBRANEUS. Of the nature of membrane.
- MEMBRANOLOGY. That which relates to the common integuments and membranes.
- MENINGOPHYLAX. An old instrument used by the ancients for guarding the dura mater and brain from injury in their mode of trepanning.
- MENINX. Before the time of Galen, meninx was the common term of all the membranes of the body; afterwards it was appropriated to those of the brain. *See* Dura Mater.
- MESENTERY. A membrane in the cavity of the abdomen attached to the vertebræ of the loins, and to which the intestines adhere.
- MESOCOLON. That part of the mesentery to which the colon is attached.
- MESOCRANIUM. The crown of the head or vertex.

MESOGASTRIUM. The concave part of the stomach, which attaches itself to the adjacent parts.

MESOMERA. The parts between the thighs.

MESOMPHALIUM. The middle of the navel.

MESOPHYRUM. The part between the eye-brows.

MESOPLEURUM. The space or muscles between the ribs.

MESORECTUM. The portion of the peritoneum which connects the rectum to the pelvis.

METAPTOSIS. A change from one disease to another.

METASTASIS. The translation of a disease from one part to another.

METROPTOSIS. Descent of the womb through the vagina.

MIASMA. A Greek word, signifying pollution, corruption, or defilement generally; and contagion, a Latin word, importing the application of such miasm or corruption of the body through the medium of touch or smell. "Hence," observes Dr. Goode, "there is neither parallelism nor antagonism, in their respective significations—there is nothing that necessarily connects them, either disjunctively or conjunctively. Both equally apply to the animal and vegetable worlds, or to any source whatever of defilement or touch, and either may be predicated of the other: for we may speak correctly of the miasm of contagion, or of contagion produced by miasm."

MITRAL. Mitre-like: applied by anatomists to parts which were supposed to resemble a bishop's mitre; as the mitral valves of the heart.

MOLLITIES. A softness: applied to bones, nails, and other parts.

MUCIC. Appertaining to mucus.

MUCUS. A name given to both an animal and a vegetable substance. Animal mucus, for instance, is one of the primary fluids of an animal body, perfectly distinct from gelatine and vegetable mucus. Animal mucus differs from that obtained from the vegetable kingdom, in not being soluble in water, swimming on its surface, nor capable of mixing oil with water, and being soluble in mineral acids, which vegetable mucus is not.

MYETER. The nose and nostril.

MYLO. Words compounded of this word belong to muscles attached near the grinders.

MYSTAX. The hair which forms the beard in man, on each side of the upper lip.

MYOLOGY. The doctrine of the muscles.

MYOTOMY. The dissection of the muscles.

MYXOSARCOMA. A tumour partly fleshy and partly mucous.

N.

NÆVUS. A spot or blemish.

NÆVUS MATERNUS. A mother's mark. A mark on the skin of children which is born with them.

NARIS. The nostril.

NARCOSIS. Stupor; stupor; numbness.

NATES. The buttock or fleshy part upon which we sit.

NATURAL. Appertaining to nature.

NAUSEA. An inclination to vomit.

NEPHROTOMY. The operation of extracting a stone from the kidneys.

NERVINE. That which relieves disorders of the nerves.

NEURILEMMA. The neurileme, sheath, or covering of a nerve.

NEUROLOGY. The doctrine of the nerves.

NEUROTOMY. The anatomical dissection of the nerves.

NICTITATION. The twinkling or winking of the eyes.

NODE. A hard circumscribed tumour, proceeding from a bone, and caused by a swelling of the periosteum.

NOLI ME TANGERE. A species of malignant herpes or lupus, affecting the skin, and not unfrequently the cartilages of the nose, very difficult to cure, because it is exasperated by the generality of applications.

NOMA. An ulcer attacking the skin.

NON-NATURALS. Air, drink, meat, sleeping, watching, motion, rest, the retentions and excretions, and affections of the kind, or, in other words, those principal matters which do not enter into the composition of the body, but at the same time are necessary to its existence, come under the denomination of non-naturals.

NOSOLOGY. Synonymous with pathology, though mostly applied to the division of it; a science, which considers the most appropriate names of diseases, and their methodical arrangement or classification, of which there are many—as those of Cullen, Sauvages, Mason, Goode, &c.

NUTRITION. The completion of the assimilating functions.

NYMPHOTOMY.—The operation of removing the nymphæ, when too large or diseased.

O.

OBESITY. Corpulence. Troublesome fatness.

OBSTETRIC. Belonging to midwifery.

OBSTIPATION. Costiveness.

OBTUSE. Blunt, not pointed.

ODONTIRRHŒA. Bleeding from the socket of the jaw, after drawing a tooth.

ECONOMY. The conduct of nature, or any department of nature, in preserving bodies, and following her usual order—hence animal economy, and vegetable economy.

ESOPHAGISMUS. Difficult swallowing.

OLFACTORY. Belonging to the organ or sense of smelling.

OMA. A Greek final, usually importing external protuberance as in sarcoma, staphyloma, &c.

OMO. Names compounded with this word appertain to muscles attached to the scapula.

OMPHALOTOMIA. The division or separation of the navel-string.

OPACITY. The faculty of obstructing the passage of light.

OPISTHENAR. The back part of the hand.

OPTIC. Relating to the eye.

OPISTHOTONOS. A fixed spasm of several muscles, so as to bend the body in a fixed position, and bent backwards.

OPPRESSION. A sensation of weight, as oppression of breathing when it seems to be difficult to breathe from a sense of weight obstructing respiration, &c.

OPHTHALMOPTOSIS. A falling down of the globe of the eye on

the cheek, canthus, or upwards, the ball itself being scarce altered in magnitude; are caused by laxation of the muscles and ligamentous expansions of the globe of the eye, &c.

ORBIT. The two cavities under the forehead, in which the eyes are situated, are termed orbits.

ORCHOTOMY. The operation of extracting a testicle.

ORGAN. Part of an animal or vegetable, which has a determined office in its economy, hence the organ of feeling, motion, sight, hearing; organs of generation; organs of deglutition, digestion, &c.

ORGANIC. Having a structure in which there are traces of organization.

ORGASM. Salacity. *See Œstrum Venerum.*

ORTHROPNŒA. A very quick and laborious breathing, during the paroxysm of which the individual is obliged to be in the erect posture.

OSSIFICATION. The formation of bone.

OSTEOGONY. The growth of bones.

OSTEOGRAPHY. The description of bones.

OSTEOLOGY. The doctrine of the bones.

OSTIOLUM. A little door. The valves of the heart have been called *ostiola*. Also applied to small openings or mouths of vessels.

OSTIUM. A door. Applied to foramina or openings.

OUROLOGY. The doctrine of the judgment of diseases from inspection of the urine.

OVIDUCT. The duct or canal through which the ovum or egg passes.

OZÆNA. An ulcer in the nose discharging a fœtid purulent matter, and sometimes accompanied with caries of the bones—or, according to some authors, an ill-conditioned ulcer in the antrum. The first meaning, however, is the original one. This disease is often connected with scrofulous and venereal complaints. In the latter instances, portions of the ossa spongiosa often come away; and after the perfect cure of all venereal disorders, an exfoliating dead piece of bone will often keep up symptoms similar to those of the ozæna, until it be detached. It is remarked by Mr. Pearson

that ozæna frequently occurs as a symptom of the cachexia syphiloidea. It may perforate the septum of the nose, destroy the spongy bones, and even the bones of the nose themselves: such mischief, indeed, is now more frequently the effect of the cachexia syphiloidea than of lues venerea. The ozæna must not be confounded with abscesses of the jaw-bones.

P.

PAIN. An unpleasant sensation supported by some offending cause.

PABULUM. Food or aliment.

PABULUM VITÆ. The food of life. Such are the different kinds of aliment. The animal heat and spirits are also so called.

PALATO. Names compounded of this word relate to muscles &c. attached to the palate.

PALATUM. The palate, or roof of the mouth.

PALATUM MOLLE. The soft palate; lying behind the bony palate; and from the middle of it the uvula hangs down.

PALATUM DURUM. The hard palate; which lies in the fore-part of the roof of the mouth, and formed by the bones of the palate.

PALLIATIVE. Any thing given with a view to palliate or relieve, to diminish the violence of a disease, but not to cure disorders.

PALMARIS. Belonging to the hand.

PALPITATION. A convulsive action of the heart.

PANACEA. An epithet given by the ancients to those remedies which they conceived would cure every disease.

PANARIS. A whitlow. *See* PARONYCHIA.

PANCREAS.—A glandular viscus of the belly, of a long figure, compared by anatomists to the tongue of a dog, situated in the epigastric region under the stomach.

PANDEMIC. A disease of a very general nature, attacking all or a great many persons in the same place and at the same time.

PANDICULATION. The act of yawning or gaping.

PANOPHOBIA. That kind of melancholy which is principally characterised by groundless fears.

PAPILLA. The nipple of the breast.

PARACUSIS. Depraved hearing.

PARAGLOSSA. A prolapsus of the tongue; a swelled tongue.

PARALOGIA. A delirium in which the patient talks incoherently.

PARALYSIS. The palsy. A disease known by the loss or diminution of the power of the voluntary muscles.

PARAMORPHIA. Morbid structure. A term applied to organic diseases.

PARTURITION. The expulsion of the fœtus from the uterus.

PATHOGNOMONIC. A term given to those symptoms which characterise a disease. They are also termed proper or characteristic symptoms.

PATHOLOGY. The doctrine of diseases: a branch of natural philosophy: it embraces the consideration of every thing relating to diseases.

PECTORILOQUISM. The sound of the voice within the chest.

PELVIS. The cavity below the belly; composed of the two ossa innominata, and os coccygis. It contains the rectum and urinary bladder; the internal organs of generation; and is lined and covered by muscles and common integuments.

PENCILLIFORM. Pencil-shaped: applied to the extremities of the arteries which secrete the bile.

PERICARDIUM. The membranous bag that surrounds the heart; the use of which is to secrete and contain the vapour of the pericardium, which lubricates the heart, and by this means prevents it from concreting with the pericardium.

PERICHONDRIUM. The membrane that covers cartilage.

PERICRANIUM. The membrane that lies in immediate contact with the bones of the head and cranium.

PERINÆOCELE. A rupture in the perineum.

PERINÆUM. The space between the anus and organs of generation.

PERIOSTEUM. The membrane which invests the external surface of all the bones except the crowns of the teeth. It is of a fibrous texture, and well supplied with arteries, veins, nerves, and absorbents. On the cranium, it is called *pericranium*; on the

orbits, *periorbita*; when it invests cartilage, *perichondium*; and *peridesmium*, when it covers ligament. Its use seems to be to distribute the vessels on the external surface of bones, and to allow of easy motion to the muscles.

PERISTALTIC MOTION. The vermicular action of the intestines, to expel their contents, as well as that in the Fallopian tubes after conception, by which means the ovum is conveyed from the ovarium into the uterus.

PERSPIRATION. The vapour secreted by the extremities of the cutaneous arteries from the external surface of the body. It is distinguished into sensible and insensible.

PHAGEDÆNA. A species of ulcer that spreads with great rapidity.

PHLEBOTOMY. The opening of a vein. *See Bleeding.**

PHLEGM. A thick tenacious mucus secreted in the lungs.

PHOTOPSIA. An affection of the eye in which the patient sees luminous rays, ignited lines, or corruscations.

PHYSIOLOGY. The science of the phenomena proper to living beings; it is divided into vegetable physiology, which is employed in the consideration of vegetables; into animal or comparative physiology, which treats of animals; and into human physiology, in which the special object is man.

PHYSOMETRA. A windy swelling of the womb.

PINGUIDENOUS. Fatty; greasy.

PLACENTA. The afterbirth.

PLEURA. A membrane lining the internal surface of the thorax, and covering its viscera.

PNEUMONIC. Belonging to the lungs.

PODOLLEX. The thumb or great toe.

PROGNOSTIC. Applied to those symptoms which enable the physician to form his judgment of the probable cause or event of disease.

PRONATION. The act of turning the hand downwards.

PROSTATE. Standing before; jutting out.

PROXIMATE. The next in order.

PSOAS. Belonging to the loins.

PSORIC. Belonging to the itch, or Psora.

PTERYGO. Names compounded of this word belong to muscles connected with the pterygoid process of the sphenoid bone, as pterygo—pharyngeus, &c.

PTERYGOID. Resembling the wing of a bird.

PTYALOGOGUE. Any thing which promotes a discharge of saliva.

PTYALISM. Increased secretion of saliva from the mouth. Salivation.

PUDENDUM. The parts of generation.

PUDICAL. Belonging to the pudenda.

PUERPERAL. Belonging to child-bearing—as puerperal convulsions, fever, insanity, &c.

PULSE. The beating of the heart and arteries.

PURIFORM. Like the secretion called pus.

PURULENT. Having the appearance of pus.

PUS. A whitish, bland, cream-like fluid, heavier than water, found in abscesses or on the surfaces of sores. It is distinguished according to its nature, into laudable or good pus, scrofulous, serous, and ichorous pus, &c.

PYLORUS. The inferior aperture of the stomach, which opens into the intestines.

PYPOETIC. Suppurative.

PYREXIA. Fever.

PYRIFORM. Pear-shaped.

R.

RABIES. Madness: generally applied to those animals whose saliva has the property of producing hydrophobia.

RECTUS. Straight. Several parts of the body, particularly muscles, are so called from their direction.

REGION. A part of the body; generally applied to external parts under which is some particular viscus, that the particular place may be known. *See ABDOMEN, &c. p. 1.*

RENAL. Belonging to the kidney.

RENIFORM. Kidney-shaped.

REPELLENT. A name occasionally given to certain applications which make diseases recede, as it were, from the surface.

RESOLUTION. One of the terminations of inflammation, in which the disease disappears without any abscess, mortification, &c.

RESOLVENT. A term given to such substances as discuss inflammations and other tumours.

RESUSCITATION. Restoring of persons apparently dead to life.

RETENTION. Keeping back any thing which should be expelled.

RETICULAR. Interwoven like a net.

RETIFORM. Net-like.

RETROCEDENT. RETROGRADE. When a disease retires from one place and remains fixed in another, not its original site, it is said to be retrocedent.

RETROVERSION. Turned back. A term applied to the uterus, and other parts.

RHINOPHONIA. A nasal voice.

RIGOR. A sudden coldness, attended by a shivering more or less perfect, a symptom which ushers in many diseases, especially fevers, and acute inflammation of internal parts, &c.

S.

SACCATED. Encysted, or contained in a bag-like membrane.

SACRO. Names compounded of this word relate to the sacrum.

SANGUIFICATION. A natural function of the body, by which the chyle is changed into blood.

SANGUINEOUS. Bloody; appertaining to the blood.

SARCOCELE. A disease of the body of the testicle.

SARDONIC GRIN. A term applied to a singular convulsive grin or laugh, which was first observed in those who had eaten the herb called sardonia.

SATYRIASIS. Inordinate desire for venery in men.

SCAPULAR. Belonging to the shoulder.

SCARIFICATION. A superficial incision made with a lancet, or an instrument called a scarificator, for the purpose of abstracting blood, or letting out fluids.

SCLEROTIC. Applied to membranous parts.

SEARCHING. The introduction of a sound through the urethra into the bladder, to ascertain if there be calculi in the bladder.

SEBACEOUS. Applied to glands which secrete a suety humour.

SECRETION. A function in an animal body, arranged by physiologists under the head of natural actions.

SECURIFORM. Shaped like an axe.

SEDATIVE. That which has the power of diminishing the natural energy.

SENSORIUM. The organ of any of the senses.

SIGMOID. A term applied to several parts, as the valves of the heart, the cartilages of the trachea, the semilunar apophysis of the bones, and flexure or turn of the colon.

SINCIPUT. The fore-part of the head.

SINE PARI. Several veins, muscles, arteries, &c. are so called.
*See Veins.**

SPASMOLOGY. A treatise on convulsions.

SPECIFIC. An infallible remedy in the cure of diseases.

SPERMATIC. Appertaining to the testicle and ovary; as the spermatic artery, chord, and veins.

SPHENOID. Wedge-like.

SPLANCHNIC. Belonging to the entrails.

SPLANCHNOLOGY. The doctrine of the viscera.

SPONGOID. Hollow and porous like a sponge or sieve.

SPORADIC. An appellation for such infectious and other diseases, as seize a few persons at any time or season.

SQUAMOSE. Scaly: applied to the bones which lie over each like scales.

STEATOMA. An encysted tumour, the contents of which are of a suety consistence.

STEATOCELE. A collection of suety matter in the scrotum.

STERNO. Names compounded of this word belong to muscles which are attached to the sternum.

STERTOR. A snorting or snoring. A loud and deep sound produced in the larynx and fauces.

STOMACHIC. That which excites and strengthens the action of the stomach.

STRUMOUS. Of the nature of scrofula.

STYLIFORM. Shaped like a bodkin or style. Applied to processes of bones.

STYLO. Names compounded of this word belong to muscles which are attached to the styloid process of the temporal bones.

STYLUS. A surgical instrument called a probe.

STYPTIC. A term given to such substances as have the power of arresting hæmorrhage from the smaller vessels; as alum, agaric of the oak, &c.

SUBCUTANEOUS. Lying under the skin.

SUBLINGUAL. A name given to parts immediately under the tongue.

SUBSCAPULAR. Lying under the scapula.

SUBSULTUS. Weak convulsive motions or twitchings of the tendons.

SUFFUSION. A cataract. An extravasation of some humour, as blood—e. g. a suffusion of blood in the eye, vulgarly called bloodshot.

SUPINATION. The act of turning the hand upwards.

SUPPOSITORY. A substance placed in the rectum and suffered gradually to dissolve.

SUPPRESSION. The total defect or non-secretion of any humour.

SUSPENSORY. A bag or bandage to suspend any part.

SYCOMA. A wart or excrescence resembling a fig, on the eyelid, about the anus, or any other part.

SYMBOLOGY. The doctrine of the signs and symptoms of disease.

SYMMETRY. The exact and beautiful proportion of parts one to another.

SYMPHYSIS. A genus of the connection of bones, to which they are united by means of an intervening substance. It comprehends four species; namely, synchondrosis, syssarcosis, syneurosis, and syndesmosis.

SYMPTOMS. Coincidences or circumstances happening at the same time a disease takes place.

SYNDESMOLOGY. The doctrine of the ligaments.

SYNOVIA. An unctuous fluid secreted from certain glands of the joints in which it is contained. *See* BURSÆ MUCOSÆ.*

SYPHILOID. Resembling syphilis.

SYSTOLE. The contraction of the heart.

T.

T Bandage. A bandage thus named from its figure. *See* **BANDAGE.***

TAXIS. The retention of parts that have quitted their natural situation by an operation with the hand without the assistance of instruments, as in the reduction of hernia, &c.

TEMPORAL. Belonging to the temple.

TENESMUS. A continual inclination to go to stool, without a discharge, accompanied by a straining.

TENTORIUM. A process of the dura mater.

TETANIC. Appertaining to cramp. *See* **TETANUS.***

THECA. A case, sheath, or box. The canal of the vertebral column.

THENAR. The palm of the hand or sole of the foot.

THORAX. The chest, or that part of the body situated between the neck and abdomen.

THYROID. Resembling a shield.

TONIC. A rigid contraction of the muscles, without relaxation. *See* **TETANUS: TRISMUS.**

TORMEN. A severe pain of the bowels.

TRACHEA. The windpipe.

TOXICOLOGY. A dissertation on poisons.

TOURNIQUET. An instrument used to stop the flow of blood from a limb.

TRACHELO. Names compounded of this word belong to muscles, &c. which are attached to the neck.

TRACHELOCELE. A tumour upon the trachea.

TRANSUDATION. Oozing through the pores or cells of any thing.

U.

URTICATION. Whipping a paralytic or benumbed limb with nettles, in order to restore sensation.

V.

VAS. A vessel applied to arteries, veins, ducts, &c.

VENTER. A term formerly applied to the larger circumscribed cavities of the body, as the abdomen and thorax.

VENTRICLE. A term given to the cavities of the heart and brain.

VERMIFORM. Worm-shaped.

VISCUS. Any organ or part which has an appropriate use, as the viscera of the abdomen, &c.

VITREOUS. Glassy. Applied to parts of the body, *e. g.* vitreous humour, &c.

VOMICA. An abscess of the lungs. *See Abscess.*

X.

XIPHOID. Sword-like: applied to parts which had some resemblance to an ancient sword.

Z.

ZOSTER. A kind of erysipelas which goes round the body like a girdle.

ZYGOMA. The cavity under the zygomatic process of the temporal bone and os malæ.

ZYGOMATIC PROCESS. An apophysis of the cheek bone, and another of the temporal bone, are so called.

ZYGOMATIC. The union of the zygomatic process of the temporal bone to the cheek bone.

Z Z. By these two letters the ancients signified myrrh. They have also been used for ginger.

INDEX.

	Page		Page
ABDOMEN, divisions of	1	Anthrax.....	ibid.
Abscess	2	Antrum	60
Abscess, lumbar	7	Anus, diseases of.....	62
Abscess, psoas	7	— imperforate	ibid.
Acid, acetic	11	— artificial.....	64
Adhesion	ibid.	Aponeuroses.....	68
Amaurosis.....	16	Arteriotomy	69
Ammonia, muriate of.....	19	Arteries	ibid.
Amputation	21	— operations for tying ...	73
—, methods of	22	The A. innominata ...	74
I. of the thigh	ibid.	— external iliac...	ibid.
II. of the leg below the knee	24	— internal iliac ...	76
III. flap of the leg	26	— carotid.....	ibid.
IV. of the fore-arm	27	— subclavian	77
V. of the upper arm	ibid.	— brachial	78
VI. of the hand at the wrist...	28	— ulnar.....	ibid.
VII. partial, of the hand.....	ibid.	— radial	ibid.
VIII. foot, at the tarsus.....	29	— anterior tibial .	79
IX. partial, of the foot	30	— posterior tibial	ibid.
X. of joints	31	— axillary	80
XI. of the fingers.....	ibid.	Bandages	80
XII. metacarpal bone of		Bladder, diseases of.....	82
thumb.....	32	Bleeding.....	85
XIII. at the shoulder-joint...	33	Bones, diseases of.....	89
French methods of	37	Bougie.....	90
La Faye.....	ibid.	Boil	ibid.
Baron Larrey	38	Brain, compression of.....	59
Duputren }		—, concussion of	162
Lisfranc }	39	I. acute-inflam. of	91
XIV. at the hip-joint.....	40	II. Chronic	92
XV. of articular extremi-		III. indolent affections	ibid.
ties	42	IV. irritable	93
Mr. Abernethy's		V. malignant disease of..	94
rule for	ibid.	VI. unnatural growth of.....	ibid.
Anastomosis	43	encysted swelling of	ibid.
Anchylosis.....	44	VII. fleshy tumours of	95
Aneurism	45	VIII. scirrhus tumours of...	96
I. of the ascending aorta...	51	— operation	101
II. curvature of	52	for.....	91
III. arteria innominata	ibid.	Breast, diseases of	102
IV. descending aorta	ibid.	Bronchocele	104
V. abdominal	53	Bronchotomy	104
VI. formation of	54	Bruises, <i>see</i> contusions	169
VII. varicose	59		

	Page		Page
Bubo.....	105	Ecchymosis	222
Bubonocoele	106	Ectropium	223
Burns	ibid.	Eczema	224
Bursæ mucosæ	110	Embrocation.....	225
Caesarian operation.....	111	Emphysema	227
Calculi, urinary, <i>see also</i> litho- tomy.....	115	Empyema	230
Callus	116	Encanthis	231
Cancer	117	Entropium.....	232
Cancer scroti.....	127	Erethismus	234
Carbuncle	129	Erysipelas	ibid.
Castration	130	Erithema	236
Cataplasms.....	132	Escharotics.....	238
Catheter.....	134	Exfoliation.....	240
Catheterism	ibid.	Eye, diseases of	242
Caries	135	—, extirpation of	243
Cataract.....	137	—, fungus hæmatodes of	244
Caustics	147	Extravasation	246
Cauteries.....	ibid.	Fever, sympathetic, &c.	246
Cerates	ibid.	—, irritative	247
Chancre	150	—, inflammatory	249
Chemosis	152	Fistula	251
Chilblains.....	ibid.	Fistula in ano	ibid.
Chordee	154	Fistula lachrymalis.....	255
Cicatrization.....	155	Fistulous ulcers, <i>see</i> Ulcers.	
Collyrium	157	Forceps	259
Compression of the brain.....	59	Fracture.....	260
Concretions, morbid	161	—, distinctions of	266
Concussion.....	162	—, varieties of, and gene- ral treatment.....	294. 354
Conjunctiva, inflammation of ..	166	Fungus	354
Contusions.....	169	Fungus cerebri	ibid.
Cornea.....	170	Fungus hæmatodes.....	357
Corns	172	Ganglion	360
Couching (<i>see also</i> cataract).....	173	Gangrene	361
Crepitus.....	ibid.	Gland	365
Cupping.....	174	Gland, prostate.....	366
Decoctions.....	175	—, diseases of	367
Digestive organs	177	Glaucoma	373
— — sympathy of.....	ibid.	Gleet	374
Diplopia	180	Goitre, <i>see</i> Bronchocele.	
Dislocations	ibid.	Gonorrhœa	377
I. of the spine.....	188	Gonorrhœa in females	388
II. — ribs.....	191	Granulation	390
III. — pelvic bones.....	192	Hare-lip	392
IV. — occygis	193	Hæmatocele	394
V. — clavicle.....	ibid.	Hæmorrhage.....	ibid.
VI. — shoulder	ibid.	Head, injuries of.....	398
VII. — elbow.....	198	Hectic.....	402
VIII. — wrist joint	201	Hemeralopia.....	405
IX. — bones of the carpus.....	202	Hemorrhoids.....	406
X. — Fingers and toes	203	Hernia	411
XI. — thumb	204	—, species of	ibid.
XII. — lower jaw.....	205	—, operations	413
XIII. — hip joint	207	—, treatment	442
XIV. — patella	213	Hernia humoralis	ibid.
XV. — knee joint	214	Hydarthrus	443
XVI. — partial of the femur	214	Hydrocele	444
XVII. — Ankle-joint.....	215	Hydrocele of the cord	451
XVIII. — Comp. of ankle- joint	220	Hydrocele in infants	452
		Hydrophobia.....	453
		Hydrophthalmia	ibid.

	Page		Page
Inflammation	454	Sugillation	ibi
Injections	467	Suppuration	56
Iritis	ibid.	Suppuration in bone	56
Irritation	469	Suture	56
Irritation, counter	465	Syphilis	ibi
Joints, diseases of	473	Testicle	58
Ligature	480	Testicle, fungoid, &c.	58
Lithotomy	482	Testicles, enlargement of	58
——, operation for	483	Testicle, inflamed, <i>see</i> Hernia	
Lithotomy in the female	495	humoralis	
Lithotriety	496	Tetanus	58
Lotions	498	Thrombus	58
Mesentery	502	Tonsil	58
Mesenteric glands, affections of	ibid.	Tonsils, enlarged	ibi
Mortification	504	Tracheotomy, <i>see</i> Bronchotomy	
Mortification of old people	512	Trephine	58
Nævi	513	Trephining	ibi
Nebula	514	Trichiasis	6
Necrosis	515	Trismus	6
Œsophagus	516	Truss	ibi
Œsophagotomy	517	Tumour	6
Ophthalmia	519	——, varieties of, &c.	
I. Purulent		Ulcers	6
II. Strumous, &c.	523	——, varieties of, &c.	6
Paracentesis abdominis	524	Ulceration	6
Paracentesis vesicæ	527	Urethra	6
Paraphimosis	529	Urinary organs, <i>see</i> Bladder.	
Paronychia	530	Urine, incontinence of	6
Phimosis	531	Urine, retention of	ibi
Polypi	533	Uterus	6
Presbyopia	536	Uterus, inversion of	ibi
Pterygium	537	——, prolapsus of	6
Pustules	538	——, retroversion of	ibi
Ranula	538	Uvula	6
Scrofula	539	Varicocele	6
Scrofulous glands, &c.	547	Varix, <i>see</i> Vein, Varicose.	
Splints	552	Veins	6
Staphyloma	554	Veins, varicose	ibi
Strictures	ibid.	Venereal disease, <i>see</i> Syphilis	
I. Permanent		Vertebræ, diseases of	
II. Spasmodic	561	Whitlow, <i>see</i> Paronychia.	
III. Inflammatory	562	Wounds	
		——, division of	
		——, prognosis of, &c.	
		Wry-neck	

THE END.



